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## The Left Behind Generation: Instructional Practices to Increase the Technological Literacy of Older Adults

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The Left Behind Generation: Instructional Practices to Increase the Technological Literacy of  
Older Adults

by

Daphne Pace Phillips

A dissertation submitted in partial fulfillment  
of the requirements for the degree of  
Doctor of Education  
Department of Teaching and Learning  
with a concentration in Educational Innovation  
College of Education  
University of South Florida

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## **DEDICATION**

This dissertation is dedicated to Jesus Christ, the Author and Finisher of my faith

Who directs my every step

and

Whom without I would not have attained one of life's greatest accomplishments.

*I have loved you with an everlasting love and with lovingkindness I have drawn you.*

Jeremiah 31:3-4.

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## **ABSTRACT**

This study sought to explore the utilization and perception of best practices by community-based technology training programs when instructing older adults to become technologically literate. The target population included adults age 55 years and older of the Baby Boomer generational cohort who ranged academically from possessing a high school diploma or General Education Diploma (GED) through a college degree and had enrolled in a local technology training program to improve their technological skill level with the goal of obtaining employment and/or to remain functionally independent. This study was conducted at three community technology training centers located in the southeast that offered computer training classes for both civilian and ex-military older adults and employed a mixed methods research design. Data was collected through a series of participant interviews, surveys, and class observations to establish an understanding of current participant computer literacy status, demographic details and experiences, class structure, the computer curriculum, and training execution. It was the intent of this study to help maintain increased focus on the necessity of reducing the present digital divide that exists between younger and older adults by highlighting the importance of designing technology training programs that incorporate both expert recommended best practices for instructing older adults, as well as the expressed benefit and personal needs of the Baby Boomer population being served by local technology training centers.

## **CHAPTER 1**

### **INTRODUCTION AND BACKGROUND**

Technology continues to advance at lightning speed, infiltrating every area of our society and requiring individuals to learn and comprehend it at an equally fast pace. Consequently, this study will explore the instructional practices of community-based technology training programs when teaching adults 55 years and older, and the perceptions of program participants.

Community-based technology training centers offer convenience and are a great resource for adults desiring to learn or improve their computer skills for self-improvement or as a requisite to employment. The opportunity for adults to attend a program that is conveniently located near where they reside and that does not require them to have to travel a significant distance to attend classes of interest is an important factor in both regular attendance and completion rates.

Community technology training centers usually cater to the instructional and job placement needs of civilians as well as veterans who have completed their military career and transitioned to civilian employment. Veterans, particularly those in this study who were previously enlisted military personnel, may find these centers beneficial in that unlike the traditional college setting, they offer short term, direct, hands-on training without requiring general studies prerequisite coursework. This job-specific training is similar to the direct job training formerly enlisted veterans received upon joining the military. Short-term training offered by community technology training programs that also offer certificates of completion may be an attractive choice for these individuals (Dadgar & Trimble, 2015). Through referral or independent search,

these veterans may choose technology training from local training centers or programs that have an established reputation, commitment, and a focused mission on training veterans since their military background can present obstacles that must be addressed to help them successfully navigate the job search and hiring process. Another added advantage of these programs is that many of them are state, federally, and/or privately funded and can offer classes free of charge with the opportunity for students at program completion to interview for jobs with companies who have a contractual hiring agreement with the center.

Older adults who enroll in community technology training programs with the goal of obtaining employment must be effectively taught using established best practices for teaching this population if they are to learn the technological skills necessary to apply for and receive a job offer in today's digital job market (Fisk, 2009). The effects of technology can clearly be seen on both sides of the job search process. For the applicant, long gone are the days when potential job candidates sought job openings via media print advertisements in newspapers and posted want ads or announcements where they completed paper applications by hand. The desks of human resource personnel in businesses and employment agencies are no longer cluttered with stacks of paper resumes and applications. Today, the entire job search process is electronic, incorporating modern technology and social media. Perhaps global digitalization is for the sake of convenience, cost savings, or to comply with environmental ordinances promoting a greener planet, but whatever the motive, the use of paper in every area of our lives has been drastically diminished. Adults of the Baby Boomer generation, born between 1946 and 1964, who are age 55 years and older, face a special set of readjustment concerns especially if they have not sought employment for many years, such as knowing how to appropriately use a computer to apply for a job if their present knowledge is very limited or their prior career did not involve computer use.

Nearly half (46%) of adult participants in a recent survey report planning to retire later than age 65, and nearly a quarter state they never plan to retire (Employee Benefit Research Institute (EBRI) Retirement Confidence Survey, 2018). Thus, the current labor force is getting older. A large study conducted by the Pew Research Center (Smith, 2014) reveals that many older adults are unfamiliar with various computer programs, applications, shortcuts, and other digital devices. While lacking technological competency, adults 65 years and older represent the largest percentage of Internet use, comprising nearly 60% of all U.S. users and growing at a faster rate than any other age group (Wager, Hassanein, & Head, 2010).

As the daughter of aging parents, I have witnessed first-hand the frustrations they have experienced in learning new technology. Often, older parents are left at the mercy of a younger family member to show them how to accomplish what would have been a simple task had they been taught how to perform it.

The following narrative excerpt from the *New York Times* Technology section vividly explains my motivation for doing this study:

The job I'm trying to get now requires me to know how to operate a computer, said Elmer Griffin, 70, a retired truck driver from Bessemer, Alabama who was recently rejected for a job at an auto-parts store because he was unable to use the computer to check the inventory. I wish I knew how; I really do. People don't even want to talk to you if you don't know how to use the Internet. (Wyatt, 2013, p B1).

In 2009, President, Barack Obama created a \$7 billion initiative to expand Internet service across the United States through the building of necessary infrastructure, particularly in underserved areas of the country. But even with this access, the lack of technology use by adults has remained consistently unchanged over the past four years at around twenty percent of the

U.S. population creating inequity with digitalization for roughly 60 million people (Wyatt, 2013). This technical inequality has adversely affected the aging U.S. economy, with many older adults being unable to obtain necessary employment due to a lack of computer literacy, which may be attributed in part to their lack of interest in programs designed for the older adult (Huber & Watson, 2014).

### **Statement of the Problem**

A sizable separation exists between older adults who have readily adopted today's technology and those who retain a hesitancy for learning it, thereby creating a digital divide (Carvalho et al., 2012). Community-based technology training programs provide the opportunity for adults to narrow this digital divide by offering computer training courses, with some programs rewarding successful participants with a certificate of completion. One major disadvantage that exists with these programs is they are often open to any interested students regardless of age or prior computer knowledge or experience. However, research by Fisk (2009) on best practices shows that this structure and learning environment is often not conducive to teaching older adults. Instructional design experts suggest that older students require a teaching method that is quite different from that of younger adults such as slower paced and more hands-on instruction (Fisk, 2009). Adults fifty and older who are not already skilled in computer technology often express feeling overwhelmed and intimidated by the many technical features they need to learn (Huber & Watson, 2014). This scenario may place older, more experienced adult workers attempting to make a career change at a disadvantage. With the best practices for teaching older adults in mind, local technology training programs should consider offering separate classes for adult students based on age groups that will allow and promote an optimal learning environment and experience. Older adults who lack computer job skills and attempt to

use outdated tools when applying for jobs risk their application not being considered and thus, also risk the chance of remaining unemployed. An unfortunate parallel exists between both scenarios; a lack of basic computer job skills could mean no employment, and no employment can lead to unwanted financial and personal stress.

An indisputable reality that cannot be ignored is that people of every age must be at least minimally computer literate to function in today's society and maintain a good quality of life because technology affects many areas of our lives including our ability to communicate, access healthcare, order household items, drive a car, and even pursue employment (Barnard et al., 2013; O'Brian & Scharber, 2010).

This study will contribute to the current body of knowledge by highlighting the perceptions of older adults regarding recommended instructional best practices used when learning technology and the importance of incorporating and tailoring their perceptions of what is most beneficial into these best practices. The addition of this information may be used to further expand and improve instructional best practices for this population and help decrease the generational inequality that currently exists between older and younger adults with technology. The results of this mixed methods research study may also promote increased awareness of, and attention to the importance of the combination of these two factors when teaching this population, possibly encouraging dialog among state and local policymakers regarding legislation addressing the educational needs of an increasing number of older adults choosing to reenter or remain within the workforce.

### **Purpose and Research Questions for the Study**

The purpose of this research study was to explore the use and perceptions of best practices by community-based technology training programs when instructing adult learners 55

years and older to increase their technological literacy. Adults are living longer and for various reasons choosing to remain in or reenter the labor force (EBRI, 2018). Their exposure to and knowledge of basic computer skills can affect either positively or negatively their ability to both seek and obtain employment. The following two research questions were used to guide this study:

*RQ1: How are the best practices for teaching older adults reflected in the training program?*

*RQ2: What are students' perceptions of the computer training program?*

### **Significance of the Study**

According to the Census Bureau (2016) the U.S. population is aging, and the workplace is becoming increasingly digitized making computer literacy an important and necessary skill set for job applicants. Adults fifty-five years of age and older of the Baby Boomer generation have not yet reached retirement age and those that have are choosing for various reasons to continue working even after reaching retirement, representing a sizable number of job applicants (EBRI, 2018). Their reasons for seeking career training vary from being unemployed, underemployed, to boost retirement savings, for career advancement, to needing greater intellectual and social stimulation. While a significant amount of data exists regarding enrollment in two-year or four-year colleges offering workforce training to adult students of any age, either within a traditional face-to-face classroom setting, or online with the goal to increase their knowledge and skill set for either general or employment purposes, there is limited data regarding community-based, non-credit, short-term workforce training programs that specifically train older adults in acquiring the technological skills necessary to obtain and maintain employment in the 21<sup>st</sup> century job market.

According to 2016-2017 data from the American Association of Community Colleges



(AACC), nearly half (5 million) of the total enrollment of 12.1 million students and well over a half million (533,579) of these students completed non-credential certificates (Figure 3), instead of associates degrees. The total veteran enrollment at U.S. community colleges totaled 4 percent and the enrollment of students above 40 years of age was 10 percent (AACC, 2018). A breakdown in the percentage of students 50 years of age and older in attendance was not specified but can be estimated to be less than 10 percent providing a basis for this research on additional career training options for this segment of the population.

The importance of this research is to spotlight the continued existence of technological literacy issues among our nations' fastest growing population of older adults, and the lack of dedicated technology training classes designed specifically to instruct this population using established best practices by community-based training centers located where these adults reside. We live in a society that has become technologically dependent therefore requiring at least some knowledge and skills in this area to function and maintain a good quality of life.

### **Definition of Terms**

This section introduces and defines terminology in this study that are derived from the use of terms for older generation individuals, veterans, technological literacy, and community-based technology training programs.

***Baby Boomers*** are the generation of persons born after World War II between the years 1946 to 1964 and are the largest living generation reaching nearly 80 million in 2017 according to the U.S. Census Bureau.

***Best Practices in Technology Education*** are industry acceptable standards and instructional methods that have been proven to be highly effective when training older adult students (Fisk, 2009).

*Community-Based Education* refers to programs that are conveniently located within the confines of a community setting that provide adult learning in subject areas of interest to improve the quality of life of individual citizens and the community (Merriam, 1999).

*Technological Literacy* is the ability of an individual to understand, comfortably manage, solve, and evaluate various technological devices, to include computers, tablets, smart phones and other related devices (Dugger & Moye, Standards for Technological Literacy, 2018).

*Workforce Training* provides workers with targeted education and training to meet the needs of area employers and businesses (U.S. Department of Labor, 2018).

### **Assumptions**

The assumptions of this study are that program participants will provide thoughtful and unfiltered answers to both interview questions and surveys regarding their computer knowledge and experience and their objectives and perceptions about the training program. It is anticipated that student participants will be committed to responding to and submitting the study instruments including questionnaires and post-class survey. It is also the assumption that program instructors will remain unaffected by the presence of the researcher during observations and will not alter current instructional practices to assuage the researcher so that accurate information can be gathered to inform the research. These assumptions are necessary to establish accurate data with respect to the use or lack of instructional best practices when teaching older adult students computer technology.

### **Limitations**

The limitations of this study are the accuracy of participants current computer ability cannot be directly ascertained from a survey questionnaire and is solely dependent upon the subjective statements provided by participants. Some participants might be reluctant to reveal

their current employment status due to various uncontrollable variables that may relate to pride and privacy regarding the nature of and reasons for leaving a previous job or not having a current one. With respect to quantitative data, the participants will not be randomized, but will be chosen using purposeful sampling to control case selection and increase study confidence.

### **Delimitations**

The limitations imposed on this study will be that the research will focus only on the instructional design and curricular delivery method of three, specific technology training programs. This will not be an empirical study that looks at other similarly related programs.

### **Summary**

Individuals who are 55 years of age or older comprise the largest segment of the U.S. population and many have not yet reached retirement age (U.S. Census, 2016). These individuals offer an expanse of knowledge, skills, and ability that can prove to be invaluable to the workplace, and a desire to continue making significant contributions to business and society by attempting to reenter the job market or improve their present career status. Older adults whose highest educational attainment is a high school diploma, may encounter obstacles to acquiring jobs and thus seek the help of programs that can increase their knowledge and skillset to make them more attractive to potential employers. Community-based technology training programs are an attractive option for this specific group of adults because they are more conveniently located making them easily accessible, and have a class roster of similar student types creating an atmosphere that is often more comfortable and conducive to meeting the learning and training needs of these students than a traditional college campus. One other attractive feature of local workforce training programs is that they may offer short term certificates of completion that can be completed within a year versus longer certification programs that may last up to two years in

length (AACC, 2018). In addition to family and job responsibilities, adults of this age group who have been away from an educational setting for a long time after completing a high school diploma, an associates, or bachelor's degree may not want to attend a traditional class at this point in their life and career, making the short-term certificate offered by some career training centers a more feasible choice. The large increase in the number of adults enrolling in certificate programs supports this trend (AACC, 2018).

The literature review that follows in Chapter 2 provides a background and in-depth analysis of current research on technological literacy among older adults, and its' impact on their future skillset acquisition for self-improvement, employment prospects, or career mobility.

## **CHAPTER 2**

### **A REVIEW OF THE LITERATURE**

The U.S. population is aging as people are living longer. It is predicted that by the year 2050, the number of adults sixty years of age will increase dramatically at a rate that is double what it is today. This aligns with data that shows an increase in the age of adult workers by twelve percent since 2000 with employees age fifty-five and older comprising nearly a quarter of the U.S. job market by 2020 (Toossi, 2012). Data reported to the United Nations by the World Population Prospects (2017) is consistent with that of the U.S., reporting that the population is in fact aging globally at a substantial rate with an expected increase of twice the number of adults age sixty and older exceeding 2 billion by the year 2050. This represents an increase of more than a billion (3.1) older adults only half a century later by the year 2100. Europe already possesses the largest number of senior adults, with 25% of its' adult population being sixty or older.

To further expound upon the growth of the older adult population, the World Population Prospects report reveals that adults eighty years and older will show an increase from a current 137 million to 425 million by 2050. A recent survey conducted by the Society for Actuaries (SOA), found that 1 out of 3 males and 1 out of 2 females who are in their mid-fifties today will live to be ninety years old at the current rate of population aging (2017). While living a longer, healthier life reflects positively on the human condition in society, it often requires resources to meet the additional financial needs that may not have been factored into original retirement

plans. The reasons identified for why many older adults are choosing to continue working relates to living longer and needing to boost retirement savings, as well as unexpected household and healthcare expenses (SOA, 2017). These possibilities must be considered by adults over the next twenty to thirty years or more after reaching age sixty-five. These astonishing statistics on longevity reveal the urgent need to address the societal and economic impact this population boom can have on both the U.S. and ultimately, the world economy. Countries around the world are looking at ways to politically and socially maximize the knowledge, skills, and talents of these adults (United Nations, 2017). The information provided here guides the basis for the following literature review on equipping older adults with 21<sup>st</sup> century technology job skills to assure long-term career success that equates with the possibility of a long life.

### **Literature Search Strategy**

This literature review includes empirical and theoretically based scholarly articles that focus on the adult population, age 55 years and older to include members of the Baby Boomer cohort who may be seeking to obtain employment upon the completion of career training programs providing technological education. Technological education in this review refers to basic computer skills training necessary to function successfully in today's economy and to apply for and maintain employment. Veterans, one group of older adult career training program participants, are included in this review because of the unique challenges they face when attempting to comparably document military job skills transferrable to civilian skills.

To identify and explore specific areas related to this research on older adults and technology training, peer-reviewed journals, books, national research data banks including the U.S. Department of Education, the U.S. Census Bureau, the Society of Actuaries, Current Population Survey of the Bureau of Labor and Statistics, the American Association of

Community Colleges, Analysis of Integrated Postsecondary Education Data System, National Center for Education Statistics, the National Center for Veteran Analysis and Statistics, the United Nations Statistics Division, the National Bureau of Economic Research, and established academic research organizations such as the Georgetown Center on Education and the Workforce have been used to support this study. Online resources include Google Scholar, ProQuest Central, SAGE, Wiley Online Library, EBSCO Host, and the University of Michigan online library.

This literature review is organized into six major topics relating to the technological skill development, career training, and employment of older adults: 1) Older Adults and 21<sup>st</sup> Century Technology, 2) Workforce Training Programs, 3) Teaching Older Adults Technology, 4) Factors Motivating Older Adults to Learn New Technology, 5) Lifelong Learning, and 6) Educational Innovation and Technology Training for Older Adults. In the next section is a discussion of the theoretical framework upon which this study is based. Keyword and Boolean phrases were as follows: Workforce training programs, technological skills training, Baby Boomer, best practices, generation, older adult, veteran, Gulf War I, Gulf War II, Korean War, Vietnam War, conflicts, certificate, certification, community-based education, One Force Training Centers, andragogy, and self-directed learning.

### **Theoretical Framework**

Adult students of computer technology training programs can be identified as possessing a unique set of learning and social characteristics that directly influence their ability to be successful and that have evolved from theories based on andragogy (adult learning), career construction theory (occupational choice and relevant skills), and social constructivism (cultural influence on learning). A primary characteristic of adult learners according to the theory of adult

learning known as andragogy, is the aspect of self-directed learning. Knowles (1996) discusses six components of adult learning in relation to the use of technology-based instruction: 1) adult learners desire to know why they are learning something and how it will directly benefit them, 2) adults dislike and reject the deliberate enforcement of someone else's will upon them, 3) they like the ability to share knowledge and life experiences during the learning process, 4) they become ready to learn when they can envision a need to learn something that may impact their personal or professional life, 5) adult students are oriented towards flexible learning that allows their input, and 6) adults respond best to internal motivating factors to learn such as career satisfaction and feelings about self-worth or quality of life.

The adult learning theory by Knowles (1996) relates to those of adult cognitive development theorist, William Perry and to Piaget's Formal Operational Stage of Cognitive Development (Perry, et al., 1986). One can extract from these theories that adults can think hypothetically and abstractly for themselves. Adult students can be characterized as having reached the stage of Relativism theorized by William Perry (1986) in that due to life experiences, they have formulated and are committed to their own knowledge and values. In addition, these adults can articulately verbalize and support their opinion while at the same time acknowledging the beliefs, values, and opinions of others.

### **Career Construction Theory**

Career research focuses on how individuals learn, establish, and continue their professional endeavors from early to later stages in life and is important for this research that looks at career training undertaken by older adults seeking to advance or acquire employment opportunities later in life and the associated complexities. Lyons, et al., (2014) defines a career as a choice of occupation linked to specific skillsets. In addition to the theory of andragogy, this



study will utilize the tenets of career construction theory which is based on the methods and decisions individuals make in relation to choosing, building, and establishing their careers as discussed by Savrickas (2005) and social constructivism which relates to how individuals personalize career training (Jaramillo, 1996). The career construction theory seeks to understand occupational behavior throughout life. This theory is important for research on technological workforce training programs used by older adults because it focuses on identity and adjustment concerns of a person to various careers while recognizing corresponding life themes using individual narratives. The ability to obtain job training within the community where adults live and interact with their social acquaintances and family members plays a key role in influencing a person's career choice (Del Corso & Rehfuß, 2011).

The fundamental aspects of career construction theory include perspectives of developmental psychology, which explores how individuals are mentally impacted by career job requirements, career changes, and stressors affecting the work environment. Career construction theory is also important because it illuminates areas concerning individual career interest, attitudes and identity about work, and job market skill adaptability applicable to today's workforce (Kim, 2013). The career construction theory is grounded in social constructivism, which is the process by which some individuals attempt to formulate meaning about their world socially and psychologically. Social constructivism aligns with career construction theory by considering the link between personality and career development as a predictor of future career choices. Unlike during the industrial age when employees held a single job for decades until retirement, the 21<sup>st</sup> century job market is characterized by volatility creating the necessity for workers to remain flexible as they navigate career moves, and at the same time construct a sense of stability within

their personal lives. Career construction theory looks at career transitions and the ability of a worker to adapt to the frequent job changes that may occur over their lifetime (Savrickas, 2005).

### **Social Constructivism Theory**

The theory of social constructivism, which evolved from Lev Vygotsky's (1930) theory of social development, views learning as dependent upon cultural socialization within one's social setting and shifts learning from the teacher as the sole disseminator of knowledge to a learning environment of dynamic discussion and feedback between students and the instructor.

Instructors within this classroom setting welcome student expression of shared knowledge, skills, ideas, and experiences, which is particularly conducive to instructing older adult students. This theory is most applicable to this research because it examines how older adults who choose to seek employment, a career change, or career advancement through enrolling in a job skills training program must become actively involved and responsible for their own learning by personalizing the learning experience. Adult students in a constructivist learning environment explore avenues to solving problems using lesson concept inquiry to investigate solutions. One innovative area of pedagogical research that is based on the theory of social constructivism and directly corresponds to this study is Computer-Supported Collaborative Learning (CSCL). The methodology of CSCL is based on the premise that learning occurs through social interplay using a computer or the internet to exchange ideas and knowledge, allowing adult learners to use the skills and technology found in the 21<sup>st</sup> century workplace (Shin & Jung, 2018). Both the theory of Social Constructivism and CSCL apply to the older adult population.

The population of interest for this research is the Baby Boomer generational cohort. A Baby Boomer is a person born between 1946 and 1964 in Australia, the United Kingdom, Canada, or the United States (Colby & Ortman, 2012). They are sometimes divided into several subgroups

based on birth year to include; Early Baby Boomers born 1946 to 1953; Mid Baby Boomers born 1954 to 1959; and Late Baby Boomers born 1960 to 1964 (Health & Retirement Study, 2016). Adults of the Baby Boomer generation who are engaged with one another in seeking career training have a cultural connection based upon common threads of life experiences that existed during a similar timeframe in history. These students can share and relate about the pre-technological work economy and the evolutionary changes they have observed with technology as it has progressed over the years. Veteran students as older adults share a common bond and connection with one another due to the many aspects of being affiliated with military life and culture. This bond when socializing with other veterans can help facilitate the learning process in a social constructivist environment. Civilian and veteran adult learners as participants in community-based job training programs must be willing to become skilled in required digital forms of information access and transmission to enhance their knowledge of current methodologies for communicating within the workplace.

The study of the relationship and quality of life benefits between technology and growing older, including helping older adults remain healthy and socially connected is known as Gerontechnology (Wu, Damnee, Kerherve, Ware, & Riguard, 2015). While a review of the literature reveals a substantial amount of research that addresses training older adults to use technology for daily life activities such as the cell phone to communicate, or computers for healthcare, casual entertainment such as emailing, reading, or shopping, (Marston, Kroll, Fink, Rosario & Gschwind, 2016), research specifically dedicated to computer skills training for the increasing number of older adults who are remaining within and attempting to reenter the workforce is limited. It appears that the consistent increase in the older adult working population has caught researchers off guard and thus, has either gone unnoticed or has not been taken seriously

regarding ways to adequately manage their continual impact on the workforce. This study aims to address a gap in the literature by examining community-based, non-credit, technology training programs that offer computer job skills training and their effectiveness at meeting the technological learning needs of the older adult population.

Although they are advancing in age, adults 55 years and older represent a vibrant and increasingly healthy cohort of the Baby Boomer generation with many having not yet reached retirement age. A natural decline in physical agility and strength has been documented by Kenny, Yardley, Martineau, and Jay (2008), occurs with aging and could create some performance difficulties with physically demanding jobs like that of a fire fighter, plumber, or police officer. Nevertheless, recent research supports the vitality of adults belonging to this generation and their ability with adequate career training, to play an active role in the work environment. Studies document that biological age and chronological age do not necessarily influence one another because other variables including lifestyle, genetics, psychological health, and ethnicity play a major role as well. A healthy and active 55-year old adult could be medically determined by their physical wellbeing, to be ten years younger which can positively affect their productivity (Bucher, et al., 2018). In addition, research also shows there are mental health benefits to be gained by older adults who continue to work. Results from a Health and Retirement Study conducted by Rohwedder and Willis (2010) among older workers living in twelve European countries revealed that the cognitive function of workers fifty and older who remain employed is greater than that of workers who live in countries with public pension systems and retire early. As the population ages, the young adult workforce is declining. Because of this shift in population, employers will have to consider more experienced candidates when hiring for available positions once given priority to younger applicants due to their familiarity and ease of

use with the latest technology (Maului, 2009). Due to this shift in the dynamics of the labor market, it is necessary for older adults to be trained and skilled in the latest technologies commonly used for today's jobs however, research reveals that only about four percent of older adults express any interest in doing so (Barclay, Stoltz & Chung, 2011).

### **Older Adults and 21<sup>st</sup> Century Technology**

Technology has advanced so quickly and become so entrenched in every aspect of society that many assume though erroneously, that everyone has knowledge about how to perform basic computer functions. After all, how could anyone not because technology skills have become a requirement to effectively function in everyday life. However, it is exactly this blanket assumption that has created the great digital divide with a generation of adults having gone unnoticed and left on the sideline of the tech boom (Knowles & Hanson, 2018). Some commonly used basic computer skills in today's job market that are taught in computer job skills training programs include, though not comprehensive, the use of a computer mouse and its' functions, computer keyboard shortcuts, opening and closing multiple windows, creating a professional resume, unloading, downloading and attaching documents, Microsoft Office Word, PowerPoint, Excel, and the necessary soft skills. Unless technology has been a part of the older adults' career path, it is possible that they may never have learned the technical skills necessary to apply for or obtain and maintain employment, especially if the use and importance of technology during their years of employment was not necessary.

The Organisation for Economic Cooperation and Development (OECD) conducted a large-scale research study on computer literacy over four years from 2011 to 2015 of nearly a quarter a million (215,942) adults ages 16 to 65 years living in thirty-three industrialized countries. A minimum of 5,000 participants were enrolled from most countries. Participants were

studied using simulated software and asked to complete fourteen computer tasks constructed at the same difficulty level regardless of participant age, with instructions translated into each country’s primary language. Results were obtained in 2016 and are shown in Table 1 below for the four technology/computer proficiency levels used for this study.

**Table 1.** OECD Study on Computer Technology Proficiency Level

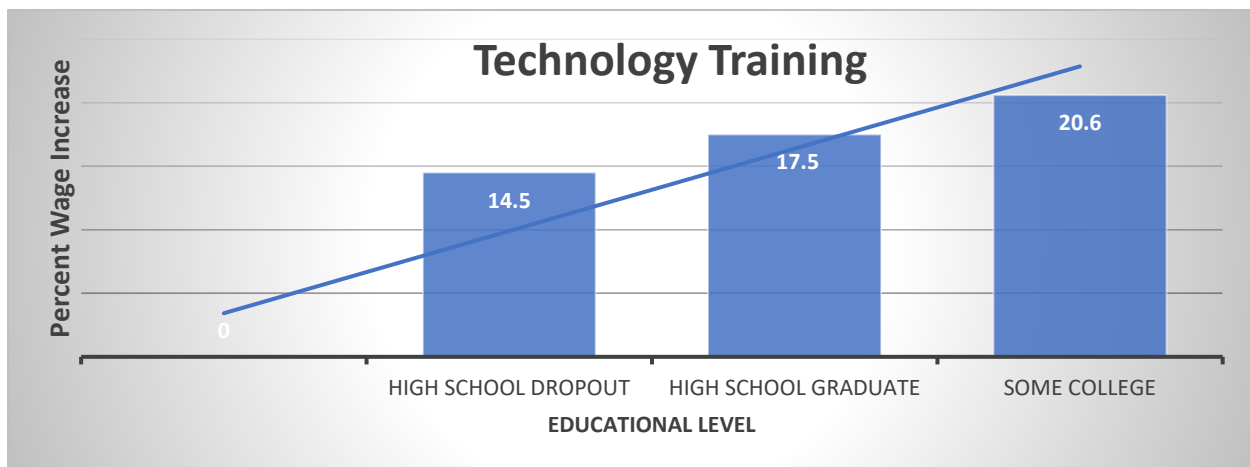
<b>Proficiency Level</b>	<b>% of Adult Population</b>	<b>Example of Tasks</b>
Below Level 1	14%	Single task without any navigation
Level 1	29%	Widely familiar with tasks with easy inference & little navigation
Level 2	26%	Familiar with specific applications Solves tasks using various tools
Level 3	5%	Familiar with specific applications Multiple navigation steps Solves difficult tasks
No Computer Use at All	26%	View as too difficult to learn

*Note.* Adapted from Organisation for Economic Cooperation and Development (OECD) Study

Study results reveal a striking, statistically significant difference across countries. When comparing literacy skills, a very small percentage, 5 to 8 percent, of adults of a country’s population possessed strong computer literacy skills (Top: Level 3), compared to a very high 92 to 95 percent of adults of a country’s population who functioned at Level 1 or below. Of interest were results showing the United States population at 95%, Northern Italy at 93%, and Asia with 92% of adults functioning at or below Level 1, possessing very rudimentary computer skills with minimal navigation required. The study also revealed that only slightly more than one-third of adults (31 – 38%) functioned at Levels 2 or 3 for three countries including the United States (31%), Japan and the United Kingdom (35%), Canada and Singapore (37%) and Northern

Europe and Australia (38%). This large study highlights the necessity of designing computer training classes at a simple level to accommodate a wide variety of computer skill levels that may lean more towards an amateur ability since two-thirds of the adult population in many industrialized countries are lacking basic computer skills.

An increase in technological literacy through career training can result in an increase in wages for individuals with post-secondary degrees by enhancing and increasing their job efficiency and can also serve to augment job responsibilities for persons without a degree. As depicted in Figure 1, blue collar workers who did not complete high school but are trained to use technology in their job can expect an increase in job benefits and a higher pay of 15% or more than similar employees who lack technological training and do not use it on the job (Mishel & Bernstein, 2003). This research shows that technology training, education, and salary are interdependent variables in today's workplace.



**Figure 1.** Technology Training, Education, and Wages.  
Source: Mishel and Bernstein, 2003

### Why Older Adults Seek Employment

The reasons for seeking employment by older adults vary widely but can involve employment termination which includes dislocated workers who have been laid off,

underemployment, job dissatisfaction, skill mismatch, a need to increase retirement savings, and socialization, among others. In addition, adults age 55 to 64 years old have not yet reached retirement age and may simply want to continue working until attaining that life milestone where they then become eligible to receive all accumulated retirement benefits.

A lack of employment and adequate income among older adults can lead to poverty. The Senior Community Service Employment Program (SCSEP) was established by the federal government to provide job training and employment to adults fifty-five years and older who meet or exceed the federal poverty level with a single person income of less than \$15,000 annually. This program which is managed and presented by AARP served more than 13,000 people during 2013-2014. In 2015, during the White House Conference on Aging, Encore Network Leaders prepared a report entitled “The Longevity Dividend and the Encore Vision.” Sadly, data analysis and results from this report revealed that most impoverished older adults serviced by the Senior Community Service Employment Program are women, racial and ethnic minorities, over age sixty-five, and thirteen percent are among our nation’s heroes; veterans or their spouses. (Encore.org, 2015).

To assist older workers in their employment efforts, the American Association of Retired Persons (AARP) has established the “Employer Pledge Program” with a listing of over 500 employers who have committed to hiring older workers. They have also begun a program entitled “Back to Work” 50+ in collaboration with fifteen community colleges and career centers located in the southern United States to train women age fifty and older with the necessary skills to transition back into the workforce as well as to help them overcome hiring obstacles they might encounter (AARP.org, 2018). There must be a commitment by more businesses and agencies like AARP to address and develop programs to assist the increasingly older working



segment of our society with remaining active and employed. This data presents compelling evidence to support how learning and remaining computer savvy can help older adults remain independent, socially connected, working, and out of poverty and hunger. Older adults represent the backbone of experiences and social motivation for change leading into our future.

### **The Veteran Population and Employment**

The current veteran population exceeds 20 million (20.4) and accounts for eight percent of the total U.S. population (Bureau of Labor Statistics, 2017). States with the highest number of veterans include California, Texas, and Florida reporting over a million and a half veteran residents each.

#### **The Veteran Population**

Among states located in the southeastern United States where this research is being conducted, some have a large veteran population that exceeds a third of a million people with a significantly greater percentage of those veterans being sixty-five years or older (U.S. Census, 2016). Veteran Administration 2016 fiscal year expenditures on veteran education, vocational rehabilitation, and employment totaled around \$200,000 in some southeastern states compared to a much larger amount spent by other states where average expenditures exceed \$13 million (13,838,235) nationally. Perhaps this information identifies potential capacity within some state budgets for additional financial allotment for technology career training and employment.

#### **National Veteran Population Statistics**

In comparison to the general population, the majority (91%) of veterans are men. Veterans tend to be older than non-veterans with an average age of 64 versus 44 years. Male veterans are likely to be European American (79%), and Non-Hispanic, whereas female veterans are likely to be Non-White and Non-Hispanic. Female veterans are more likely to have

completed a higher educational level than male veterans and less than 1% of all veterans during 2016 used VA education benefits. Nearly 5 million (4.9) veterans served during the period between the Korean War and the Gulf War I era with a reported age of 45 years or older. The largest percentage of these veterans (39%) were 55 years of age and older and 22% were between the age of 45 to 54 in this survey (V.A.gov, 2016). This generation of Baby Boomers, age 55 and older, who are seeking employment are the focus group for this research. Post 9/11 veterans who served in the Global War on Terror totaled 4.1 million, the largest percentage being female, and are the first to have volunteered to fight on two war fronts simultaneously. In addition to their return to the United States after deployment, the Army, which is the largest branch of the military totaling 30,000 members faced the possibility of future layoffs which could have contributed significantly to the number of soldiers transitioning to civilian life and work (Clemens, 2008). A representation of some of the major wars involving United States veterans, the dates of engagement, and the percentage of veterans serving in each war is shown in Figure 2 below.

Gulf War II Era	September 2001 to Present	8.7%
Gulf War I Era	August 1990 to August 2001	13.1%
Vietnam Era Korean War WWII	August 1964 to April 1975 July 1950 to January 1955	51.3%

**Figure 2.** U.S. Wars and Period of Conflict with Percentage of Veterans Served  
Source: Current Population Survey, 2017

There are several points of interest involving Post 9/11 military service men and women that are unique when compared to civilians. First, the military is often successfully used by economically disadvantaged groups as an avenue for professional and financial progress. The military offers job stability which is an important necessity (Elder, Wang, Spence, Adkins & Brown, 2010). Compared to their civilian counterpart's veterans, particularly those who served in WWII and the Korean War, earn a higher salary, and veterans in general enroll in college at a higher percentage rate than civilians of the same age bracket (U.S. Census, 2017).

According to the 2017 Current Population Survey (CPS), the unemployment rate for veterans who served at any time since 2001 during the Gulf War II era declined to 4.7 percent, and from 4.5 percent to 3.7 percent for all veterans. While the unemployment rate for male veterans declined to 4.3 percent, the unemployment rate for female veterans remained virtually unchanged from the previous year at 5.5 percent for 2017. Of the 370,000 currently unemployed veterans, the largest percentage by age group were veterans between ages 25 and 54 years at 59%, and ages 55 and over at 37%. These statistics support the need for identifying and training older adult veterans, particularly those age 50 and older who are among the larger percentage of the quarter of a million-unemployed veteran population (U.S. Census, 2017). Nearly 30 percent (27%) of Gulf War II Era veterans work in the public sector and about half this percentage (15%) work for the federal government. Some misunderstandings exist among veterans and potential employers regarding how to accurately translate military job duty descriptions into comparable civilian terms (Stone & Stone, 2015). Consequently, this may be a contributory factor to the unemployment experienced by some veterans, affecting the application and interview process and thereby documenting the availability and necessity of career training programs to address this problem.

## **Technology Use Among Veterans**

Recent research regarding technology access involving the use of computers and the Internet within the veteran household have revealed several interesting facts. According to a 2017 American Community Survey (ACS), nearly 80% of veterans age 55 and older have Internet access and an average of 75% (74.6) of males, and 74% (73.6) of females have a computer. Of veterans who have a computer, over half live in poverty; (55.5% male and 65% female) and over half have obtained a high school diploma or less; (61.2% male and 59.5% of females). Results obtained are significant at the 90% confidence level (ACS, 2016).

## **Workforce Training Programs**

In July 2014, the Workforce Innovation and Opportunity Act (WIOA), established by President Barack Obama was passed to provide employment assistance to low income, unemployed, and underemployed workers. The Title I section of this Department of Labor funded program deals with career education, training, and job location assistance provided through what is known as “One Stop Services”. Some southeastern states have approximately thirty-nine One Stop Career Centers located within community colleges and cities throughout the state. One Stop acts as an employment referral resource in partnership with local career training programs and employers to assist potential workers with obtaining employment assistance services. One shortcoming of this service is that most of these centers do not offer any dedicated computer job skills training classes, only initial assistance with the online job application process. In addition, any referrals for computer training must be made to off-sight community colleges and other locations where most classes last a year or longer for completion, and where cost can be quite prohibitive for most older adults on a limited or fixed income or unemployed. Research of the literature shows that many adults who are older and have already worked for

many years, express a preference for shorter training programs lasting a few weeks to a few months, that are less disruptive to their present lifestyle, and can get them working again as quickly as possible (AACC, 2017).

This study considered the many variables and preferences associated with older adult job seekers and career training programs. A study conducted by the National Bureau of Economic Research (NBER) found that adults who received career training but were not laid off saw an increase in wages upon obtaining a new job (Andersson, Holzer, Lane, Rosenblum & Smith, 2013). Similar results showing an increase in wages were observed from a study conducted by Park (2012) among adults possessing only a few job skills who participated in a career training program. During 2016, nearly 16,000 dislocated workers in one southeastern state received employment services through the Workforce Innovation and Opportunity Act. For dislocated workers age 50, there was more than a twenty-one percent difference in positive employment outcomes of those adults who received job training (85%), than for dislocated adults who did not receive job training (63.8%). It has been determined from these studies that a pre-enrollment career assessment should be conducted to prevent adults from being trained and placed into careers that are not suitable for them after training completion. This data presents a positive advantage in support of job training programs for older adults. Workers who participate in career training programs can see an increase in wages of up to eleven percent (Altonji & Spletzer, 1991; Bishop, 1996; Loewenstein & Spletzer, 1998; Mincer, 1988). Additionally, data from the National Center for Educational Research reveals that older adults ages 55 to 65 and those with a high school diploma or GED make up the largest number of adults completing a work experience program (NCES, 2016). This information aligns with national statistics showing older adults continue to remain active within the U.S. workforce.

## **Factors Motivating Older Adults to Learn New Technology**

It is often believed that older adults don't readily adopt new technologies because of cost or difficulties with learning to use them. However, research conducted by e.g., Sharit, Czaja, Perdomo & Lee (2004) on the adoption of technology by older adults found that contrary to these preconceptions, the main reason for older adults not adopting new technologies is usually not the inability to comprehend or financially related but is based on perceived benefits for learning. In addition, the results of a qualitative study conducted by Melenhorst (2002a) found that experience, value, and enjoyment of using new technology also play a key role in motivating adult users and are related to benefit. If the technology was perceived as beneficial, older adults were likely to be motivated towards use and to correspondingly have more usage experience. The conclusion here is that to motivate older adults to try new technology, they must first recognize a beneficial incentive to learn it, or they may choose not to. This research supports this study by showing that older adults will be motivated to enroll in computer training programs and continue to use them if they perceive the benefit of gaining employment by doing so.

Self-efficacy and attitude are two psychological attributes that have been found to be associated with motivation for learning technology (Igbaria & Livari, 1995). According to Hsu & Chiu (2004), when adults believe they are capable of learning and successfully using new technology, they are encouraged to continue using it. Research studies on self-efficacy across an adult's life repeatedly find that the greater the adult's sense of positive self-productiveness the greater the possibility that they will use technology. The education theorist, Albert Bandura (1977) posits that the motivation to learn not only occurs by observing others successfully accomplish a task, but also by believing that you can have a similar outcome. Thus, adults who possess a strong affirmative belief in themselves and their abilities are less reserved about trying,

learning, and using something new like the latest technology.

According to Waters and Moore (2002) the state of being unemployed can negatively affect an individual's self-esteem and sense of self-efficacy, taking a toll not just on personal finances, but also on the psychological wellbeing of an individual. Perhaps an innovative method for addressing this issue would be to perform a pre-psychological assessment and have exercises designed to increase self-efficacy incorporated into adult career training programs prior to, or during technology training classes to improve learning outcomes. This research presents evidence for future exploration into gaps in the literature on the link between the psychological well-being of adults seeking employment and learning technology.

Selective Optimization with Compensation (SOC) and Socioemotional Selectivity (SST) are two theories linked to aging and life span that have been applied to the motivation by older adults to adopt new technology. These theories postulate that as adults age, they prioritize activities and resources based on their perception of how important they are in relation to a limited lifetime (Baltes, & Baltes, 1990; Carstensen, 1991). According to SST, new technology is less likely to be learned by older adults if the associated benefits for doing so do not fit into a pre-determined and limited time frame (Carstensen, Isaacowitz, & Charles, 1999; Melenhorst, 2002b). Thus, for older adult's time is precious and selecting to pursue a new activity with any associated benefit must be believed to be worthwhile.

The Motivating Opportunities Model has been used to assess the success or failure of adult learners (Hardre, 2009). The variables impacting an adult's decision to enroll in a class are quite different from those of traditional learners (Cerone, 2008). Current career and family responsibilities can positively or negatively impact the course completion rates of adults, and a negative impact can result in the discontinuance of classes (O'Connor, et al., 2003). In his book

entitled “*Human Motivation*” Franken (2006) expounds on the elements that create internal motivation in people. He suggests that adults are internally motivated to return to school and to learn a specific skill based on preset goals they establish for themselves. Internal motivations related to career training might include the need to improve knowledge and/or job skills to obtain a new job or a promotion at a current one; or other life events such as the loss of a job and the necessity to learn new skills to obtain a new one. As previously discussed, with the theory of andragogy, adults seek and enroll in classes if they have a profoundly beneficial reason for doing so, not simply to obtain a certificate or degree as is often the case with traditional learners. The fact that older adults are motivated by different reasons than traditional college students to take a course requires instructors to plan for and implement lesson plan modifications to better meet the needs of this special student population. (Wuebker, 2013). Additionally, adult learning is often self-directed requiring educators to develop methods to identify the strengths and weaknesses of individual learners to provide them the best learning experience possible (McClellan & Conti, 2008). To determine if enrolling in a career training class is beneficial or not, adult learners might ask themselves the following: “Will taking these courses make me more marketable to obtain a new job?” Thus, major life decisions influence future learning objectives for adults, and knowledge of these internal motivators can be used by instructors to help older adult students achieve their goals when reentering the classroom.

### **Teaching Older Adults Technology**

One important consideration that the non-traditional older adult student must be aware of is that the method in which courses are taught has changed dramatically over the last few decades requiring some level of technological ability (Wuebker, 2013). Enrolling in classes offers the opportunity for previously exposed but less technologically savvy adults to brush up



on their tech skills and for those completely unskilled to begin learning. Without having enrolled in a course, many older adults might have never increased their technology skills thereby continuing to lag further behind in society.

Lynch (2001) and Ke & Xie (2009) offer several suggestions for instructors to prepare adults to be successful when returning to the classroom. First, it is recommended that instructors conduct an Index of Learning Styles Questionnaire utilized by researchers Felder and Soloman (2012) to ascertain the learning styles of enrolled adult students. The information obtained from each student provides the instructor the opportunity to make any necessary course modifications that will improve instructional design and student learning. Secondly, Lynch (2001) and Ke and Xie (2009) suggest teachers offer a technology overview prior to beginning instruction to ascertain each students' current level of technological knowledge, skill, and understanding so that appropriate assistance can be provided to help them achieve course objectives and success (Mason, 2006; Rekap, 2010; Ruey, 2010). Lorch (1993) found similar results in a study with university students who exhibited increased memory recall of text when they were provided a structured course overview compared to students who did not receive an overview. Thus, the presentation of a course overview by instructors when teaching adults of any age appears to have a positive effect on memory. Furthermore, if complex lessons requiring multiple steps are necessary, for example, when learning specific programs like PowerPoint or Excel, the use of scaffolding is suggested to prevent cognitive overload and reduce confusion among older adults (Merrill, 2012).

The famous educational psychologist, Abraham Maslow (1954) postulates in his theory of the Hierarchy of Need that individuals meet their cognitive needs through knowledge, understanding, curiosity, and exploration. This theory that elucidates the cognitive aspect of

motivation involving an individuals' desire to understand concepts, solve problems, independently make decisions, and to investigate the unknown, is certainly pertinent for older adults when learning something new like computer technology.

While humans may have a built-in curiosity to test the unknown (Maslow, 1954), identifying and eliminating the fear factor many older adults experience regarding computers is important when attempting to teach them technology. A study conducted by Hill, Betts, & Gardner (2015) explored the experiences of two focus groups of older adults using Interpretive Phenomenological Analysis (IPA). IPA is a qualitative methodology used to explore in detail complex human experiences and how people make sense of them. It can be used to observe and analyze various phenomena including an emotion like fear (Smith, Flowers & Larkin, 2009). Two themes; *Disempowerment* which related to adult participants perceived technical difficulty, barriers, and negative results associated with digital technology, and *Empowerment*, involving the positive benefits of digital technology were identified from the data. Fear acted as a barrier to older adults learning to use technology, but when discussing this fear and discovering that for some adults fear was linked to the monetary consequences resulting from accidentally breaking a computer, they were then taught that computers are quite resilient and allowed to practice and see for themselves that breakage does not easily occur with normal usage. Implementing this process resulted in alleviating fear and increasing usage and confidence.

This study lends support to using simulation that allows a slow, flexible pace when experimenting to reduce concerns older adults often have regarding the risk of damaging digital equipment. Instructors should also use demonstration sessions prior to student simulations to let them observe both correct and incorrect procedures and the stability of computer design (Fisk, 2009).

Older adults, in their 60's and 70's process information at a rate that is roughly two times slower than adults in their 20's. However, earlier research conducted by Strayer and Kramer (1994) agrees with later research by Fisk (2009) that speed in task performance by older adults may be affected by a greater desire for task accuracy than has been observed with younger adults. A study conducted by Brigman and Cherry (2002) on working memory in older and young adults found that older adults can and do learn new skills but do so at a slower pace than younger adults. Strayer and Kramer (1994) also noted that with practice, both older and younger adults show an increase in acquiring news skills. This research reveals that while older adults may begin a task more slowly, evidence supports the positive effect of repeated practice on skill acquisition. Fisk (2009) suggests skills should be practiced until they become second nature.

When older adults were given the opportunity to use computers for tasks related to everyday living, hobbies, and socialization, their enjoyment and appreciation for using them increased. In his principles of instruction, Merrill (2012) discussed how learners are motivated to learn when they believe what is being taught is meaningful and relative to their own lives. He suggests that teachers link instruction to what adult students already know by using analogies. For example, older adults can often relate to and visualize office file cabinet drawers holding cardboard files filled with papers. This current knowledge can be used when teaching them about electronic files and folders and how to open, close, and organize them. The ability to relate and link concepts serves to peak interest and promote learning. Merrill goes on to mention that when tasks are viewed by adult students as meaningful, they can gain an understanding of how they relate to their world outside of the classroom setting, thereby promoting the storage of new information into their long-term memory and assisting with future recall when needed.

To further acknowledge the value of technology discovered by adults when learning,

Bear (2012), discusses how some adults have in fact effectively used the internet to improve their technical literacy. Adults surveyed for this study reported improvement in keyboarding, research and navigational search skills, software apps, general technology, and computer equipment knowledge. While becoming generally knowledgeable, these adults may still lack computer skills directly related to the current job application process needed to obtain employment. This research illuminates the importance of learning technology by older adults and the fact that those who do learn technology show increased skills while those who continue to resist learning will continue to become more isolated and excluded from a society that shows no signs of reversing or slowing down in advances in digitalization.

There is a consensus among educational experts which shows that learning technology occurs best when older adult students are taught using hands-on interactive learning tools (Czaja & Lee, 2008). This allows for creativity and does not simply deliver content via the older drill and practice methodology that unfortunately is still often used today. Not only does the ability to interactively participate in the learning process through the creation of resume's, charts, excel tables, graphs, and other activities promote motivation and better job skill development, it also works to produce a sense of autonomy and self-efficacy among adult students (Wu, Damnee, Kerherve, Ware, Rigaud, 2015). When participating in hands-on learning it is important to reduce hand strain and injury when typing on computers. To accomplish this, McMillian (2006) recommends replacing the mousepad with a portable mouse or trackball to reduce the amount of tapping required by older adults performing lesson tasks.

The ability for adults to gain a sense of independence when learning aligns directly with the andragogy adult theory of learning (Knowles, 1996), and the opportunity for adults to participate and learn via hands-on interaction, with the social constructivist theory of learning, by

not just listening but doing. William Perry's Theory of Cognitive Development also lends support to Knowles' theory that adults are very capable and have a desire to discuss and share their knowledge and experiences by collaborating with others, including their classmates (Perry, 1996). When incorporating these theories into teaching, the learning environment should be socially supportive so that as older adults gain experience and confidence they will come to view technology positively and be motivated to continue learning it throughout life (Slegers, Van Boxtel, Jolles, 2009).

### **Instructional Best Practices for Training Programs**

In the book entitled "*Designing for Older Adults: Principles and Creative Human Factors Approaches*", instructional design expert Fisk (2009) provides the following suggestions for best practices for career training programs when teaching older adults. Early in the development stage, programs should incorporate user-centered design that includes user requirements, user goals, and user tasks. As adults age, they experience changes in spatial reasoning, quickness and agility, attention, and working memory. These changes should be considered by instructors when developing training programs for this population. The authors discuss how learning and acquiring new skillsets occurs in the following three stages and how teachers should strive to integrate certain instructional methodologies when teaching older adults.

#### **Stage One:**

Stage one requires adult students to devote special attention to new material or tasks being taught. Instructors should provide a course overview to assist older students with comprehending the how's and why's of tasks to be completed instead of presenting tasks in isolated phases which would then require older adults to attempt to decipher information to

determine how the material links together. Instructional material should be presented at a slower pace because older adults process information more slowly than younger adults. In their research Carter and Beier (2010) found that younger adults tend to thrive within learning environments involving less structure and correction management, whereas older adults thrive better within the opposite type of learning environment that is highly structured and offers frequent correction. As a result, it is inadvisable to mix older and younger adult students in the same learning environment due to possible frustrations that might occur.

Many technology training programs offer classes comprised of various adult age groups, including younger and older adults without consideration for the learning styles of the participants. Libraries offer computer training classes but do not segregate students by age or ability and thus, are not designed specifically to meet the needs of older adults. Research also shows a decline in computer class offerings by libraries over the past decade due to limited resources in terms of finances, computer availability, and space, as well as training staff resulting in adults having to seek training elsewhere (Jaeger et al., 2007). Research shows that all adults do not learn at their best potential under the same classroom situations, but that older adults learn better under a special set of instructional practices from those of younger adults (Merrill, 2012). Jamieson and Rogers (2000) tested this theory in a study that mixed technology training of older and younger adults and found that differences do exist with regards to learning a new digital task, and that learning of the task by older adults appeared to be affected by their physical well-being. Information from this study presents an interesting aspect to consider when training adults of the Baby Boomer generation who may not be experiencing a deficit in learning solely based on age, but also their overall health status. This provides an important consideration for future research.

Traditional classroom methods involving the presentation of large amounts of material or multitasking appears not to work well when teaching older adults who are experiencing a decline in their working memory. Introducing motivational exercises early in the learning process, e.g., creating a social media account so students can communicate verbally and visually with family and friends when at home can help improve retention. Overlearning information and tasks build habits in students that compensate for reduced information processing in older adults. Finally, instructional material needs to be legible and clear, lacking ambiguity, so it will not disrupt or impede the learning process.

### **Stage Two:**

During this stage, older adults have now attained a good understanding of the concepts being taught and place information learned into mental packets. Tasks can be integrated with learned concepts, e.g., open a file and upload it to a certain page.

### **Stage 3:**

Practice. Practice. Practice is the main theme of this stage of learning which requires long, repetitive execution sessions. Learning during this stage has now become more grounded in habit than consciousness where due to an increased comfort level, older adults can modify and eliminate some steps when performing procedures. An example here would be the simple use of the “enter” button when completing a task requiring submission, instead of using the mouse pad to scroll and then click the submission button. Connections between rules and facts can be made. Research conducted by Bean and Laven (2003) agrees with that of Fisk (2009) by suggesting that continuous review and training of newly acquired computer skills is an important aspect of helping older adults learn technology.

## **Managing Classroom Material**

An experimental study conducted by Chessaigne et. al., (2004) tested the ability of adults 40 to 50 years, older adults aged 65 to 74 years, and elderly adults aged 75 to 90 years old to select a direct or inverse relationship hypothesis using either one or two cues. They found that older adults were able to select a direct or inverse relationship hypothesis if provided only a single cue, but experienced difficulty in completing this task if provided two or more cues. This study concluded that a more complex learning situation can impede or complicate learning for older adults. Merrill (2012) confirms these study results by theorizing that older adults learn best when instructional material that is presented to them is well organized into related categories, in a simple and consistent manner that focuses on one concept at a time. This structure helps older adults better formulate differences and similarities between information being taught. He continues to support this theory by asserting that a slower instructional pace helps to reduce cognitive overloading for older adults. In addition to an organized and slower pace, Fisk (2009) discusses that simplicity should also prevail within the classroom environment which should provide adequate lighting and be devoid of unnecessary and distracting noises.

Instructors should remain cognizant of incorporating the following instructional techniques suggested by Fisk (2009) into their lesson plans when training older adults. Overtraining which involves training students to learn certain tasks beyond their mastery where it then becomes easily recalled works well when attempting to assure that material taught has been retained. Salthouse (1996) discusses how as working memory declines, there is a corresponding decline in cognitive speed. Therefore, classroom material should be carefully managed for older adult students by making sure it is organized and categorized into related subject matter tasks, from simple to more difficult to help reduce impact on working memory



and increase information retrieval. An example of this when learning to use computers would be automatic recall of the functions of a right or left mouse click.

Information should be organized and delivered in a consistent manner in order not to confuse older adults who may be experiencing changes in maintaining attention and in perceptual abilities. An example of this for computer training would be when teaching the meaning of certain keyboard shortcuts that can be accomplished in different ways, e.g., left click mouse and highlight text to copy and paste, or use control + C to copy and control + V to paste, should not be taught simultaneously, but at different times. Tasks requiring numerous steps to learn should be taught using distributed practice instead of attempting to cram every step into a single session. Break tasks into smaller parts versus teaching from a complete concept method.

In the literature, instructional design experts vary in opinion regarding the appropriate amount of time needed by older adults for classroom rest breaks. To prevent information overload Fisk (2009) suggests allowing older adults to take lesson breaks of at least 15 minutes between sessions which provides them time to mentally regroup and review taught material. According to Fisk (2009) this amount of time appears to work better than shorter rest periods of 5 to 10 minutes for older adult students. One thing for instructors of older adults to keep in mind when allowing session breaks, is that it is a good strategy to review previously taught material after the break to improve retention before moving to the next lesson topic (Fisk, 2009).

One important best practice feature for teaching older adults technology that was assessed for this study involved learner feedback. Fisk (2009) suggests that constructive feedback that is positive or negative should be provided to older adults immediately to correct errors in learning and prevent incorrect information processing. Feedback can occur in several ways including, face-to-face between instructor and student or digitally on a computer screen using text or voice.

Their research also found that older adults benefit best from face-to-face feedback, that is not excessive and occurs early in the learning process. Ferdinand and Kray (2013) observed the responses of 26 older adults, with an average age of 72, and 24 younger adults with an average of age 22 years, to positive and negative feedback. Due to a decline in working memory, older adults focus more on one type of feedback, giving preference to positive over negative feedback.

The type of instructional material used is of course, based on what is being taught and at the discretion of the instructor. However, research shows very minimal advantages with using newer innovative technologies over traditional methods of instruction. Multimedia has however, been shown to create confusion for older adults. Instructor's should be readily available to provide one-on-one assistance whenever possible, since there is a wide variation in the physical and mental capacity of aging adults (Fisk, 2009). Memory aids in the form of pamphlets or objects, for example a portable/wireless mouse with an instruction sheet are also useful for instructional material retention. Comparable to the learning concept of schema, which involves the organization of knowledge we have stored in our memory about a concept or topic, when considering devices or systems like computers, this memory storage ability is referred to as a Mental Model (Fisk, 2009). Older adults are better able to construct a Mental Model by linking a familiar object or tasks to the new object or task. This analogy with something they are familiar with builds confidence and reduces lesson anxiety and fear.

This research study focused on seven recommended best practices by instructional design expert Fisk (2009) and colleagues when instructing adults 55 years and older in technology. These included; integration of previous skills and knowledge, hands-on training, course overview, slow pace, course delivery, class break time, and providing feedback. Table 2 below provides a synopsis of the best practices with corresponding empirical and theoretical research.

**Table 2.** Best Practices for Teaching Older Adults

<b>Description</b>	<b>Best Practice</b>	<b>Theoretical Research</b>	<b>Empirical Research</b>
Task/Lifestyle	Integrate tasks to hobbies & knowledge	Potelle & Rouet (2003)	Wylie & McGuinness (2004)
Hands-On Practice	Direct task interaction	Merrill (2012)	Czaja & Lee (2008)
Overview	Whole, non-segmented course introduction	Fisk (200)	Lynch (2001) Ke & Xie (2009)
Slower Pace	Slow course delivery	Morrell & Echt (2001) Salthouse 1994	Knowles & Hanson (2018) Brigman & Cherry (2002)
Keep It Simple	One Concept at a time.	Merrill (2012)	Chessaigne et al., (2004)
Breaks	Segment lesson with a rest periods	Fisk (2009)	
Feedback	Positive and immediate	Fisk (2009)	Ferdinand & Kray (2013)

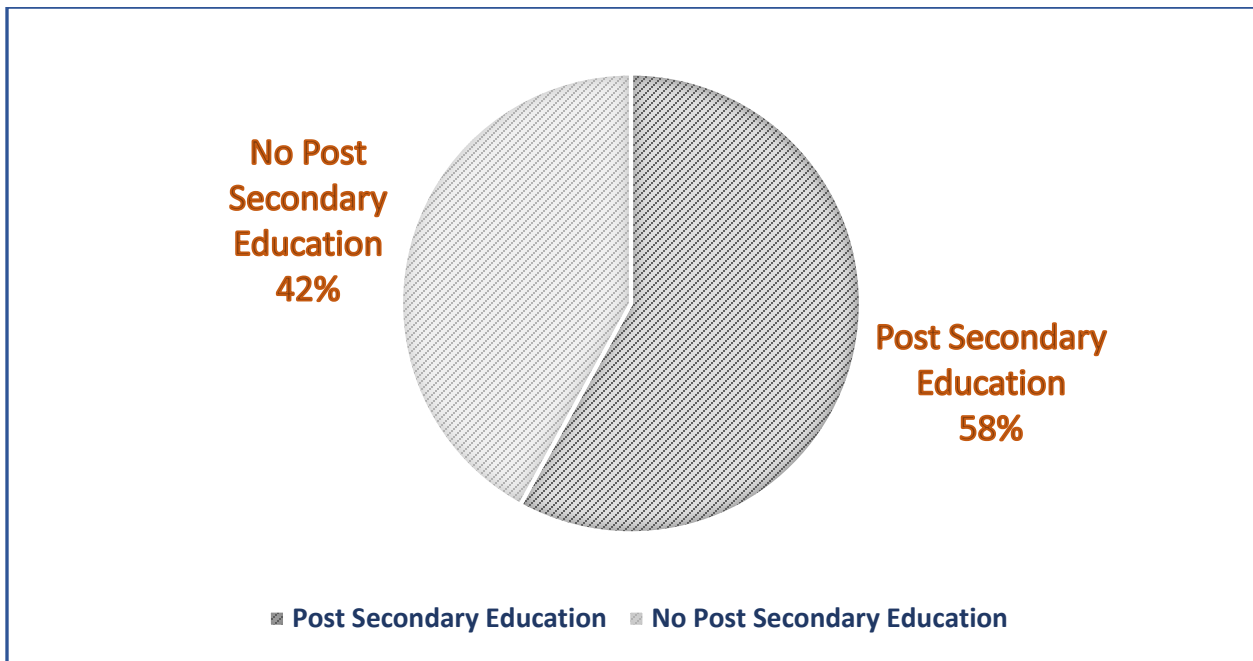
*Note.* N = 7

### **Training Program Credentials**

Some community-based career training programs award student’s certificates at program completion. A recent report by The Georgetown Center on Education and the Workforce reveals there are 30 million “good jobs” that do not require a degree beyond a high school diploma and pay between \$35,000 and \$55,000 annually. Most of these employees, totaling nearly 12 million people, have attained a high school diploma as the highest post-secondary degree. This is important for older adults returning to the classroom. Of course, several aspects involved with

becoming a student must first be considered before older adults enroll in classes. Cost plays a major role in the decision for adults to return to school. Some states like Texas and New York have introduced free tuition community college programs with promising enrollment results.

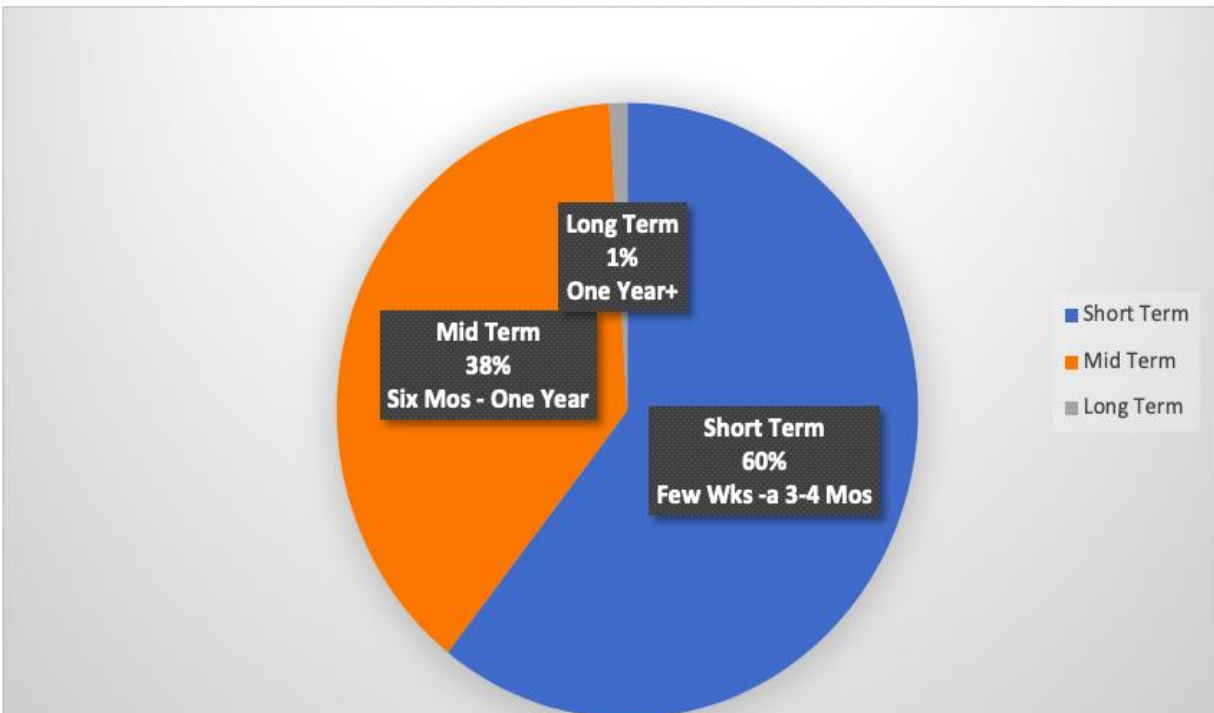
With increasing numbers in college enrollment, it might be assumed that most adults receive their career education and training from a traditional college campus. However, research shows that nearly three-fourths of post-secondary education is obtained from the military, apprenticeships, on-the-job training, and employer-provided education and training. Of those students who did attend community college to obtain a post-secondary education, approximately ninety percent of certificates awarded during the 2014/2015 school year were for career and technical education. Nearly sixty percent (58%) of adults have completed some type of post-secondary education. Figure 3 below provides a breakdown of employed adults who have received an educational credential after graduating high school (NCES, 2016).



**Figure 3.** Working Adults with a Post-Secondary Education

Source: National Center for Education Statistics (NCES), "Degree and Nondegree Credentials Held by Labor Force Participants," 2016.

This data appears to indicate a preference for certificates over degree completion among most students attending two-year colleges. Of the 1.6 million students in attendance at community colleges during the 2014/2015 school year, 39% were awarded certificates for career and technical education resulting in nearly a 240% increase in short-term certificates (AACC, 2017). Figure 4 below depicts the percentage of certificates awarded in relation to the certificate length of time to completion. Represented is a boom in certificates received between 2000 and 2014 where the number of certificates awarded at community colleges increased by 236 percent. Adults with the minimal postsecondary education of a high school diploma or GED as for some of those included in this research study, may be attempting to obtain better pay within the shortest time possible. Certificates offer the opportunity for these students to reach their goal, perhaps contributing to increased enrollment by adults in certificate programs (AACC, 2017).



**Figure 4.** Certificate Completion by Length  
Source: American Association of Community Colleges. AACC, 2017.

Community colleges award more certificates than all degree conferring institutions of high education. Of more than a million credentials conferred by community colleges in 2014, nearly forty percent (39%) were certificates, and the majority of those (60%) were short-term. In fact, during a four-year period between 2000 and 2014, short-term certificate enrollment grew by a whopping 236 percent. Many adult students have taken an exceptional interest in obtaining certificates to use as a gateway to continue their education or to obtain an occupation-specific credential in the future (Carnevale, Rose & Hanson, 2012).

According to the National Center for Education Statistics (NCES), there are some specific characteristics of adults who obtain non-degree postsecondary credentials. Nearly two hundred thousand (196,343) adults surveyed completed a non-degree credential, with the majority, 29% being female versus 24% male. Nearly a third of surveyed female and male adults possess a non-degree certificate, exceeding those adults who obtained a certification. While European Americans account for the majority, 120,744 of non-degree credentials, African Americans obtained the highest percentage, 11% of postsecondary certificates, followed closely by American Indian & Native Alaskans at 10%, and 8% for European Americans.

Almost half, 87,377 of the adults surveyed who obtained postsecondary certificates were members of the Baby Boomer generation, with the largest of this number, nearly 46,000 belonging to the 55 to 65-year age group. This supports the argument presented in this study for the desire and perceived benefits of obtaining a certificate of completion among these older adults and the possible advantages that doing so can provide. Adults with an associate degree and some college, or no degree or less (a high school diploma), were the largest recipients of postsecondary certificates at 33%. Most worked within the private sector and were not under-employed further supporting potential benefits for older adults obtaining these certificates that

signify to employers that training has been completed for a specific job skill.

Adults who previously worked in the military represented the smallest number, 94 of 200,000 total surveyed adults who have obtained any non-degree credential (NCES, 2016). Perhaps this can be attributed to the job-specific training usually received by enlisted veterans who may perceive their military training as equivalent to the requirements necessary for obtaining a certificate by civilian adults. However, research shows that effectively transferring military training into a related civilian job is often a difficult process for the veteran as well as the civilian hiring manager (Stone & Stone, 2015). The potential for confusion and the possibility of not obtaining needed employment as a result, provides support for veterans who enroll in career training programs that offer certificates that document skill sets that are easily understood within the civilian workplace.

Of the almost thirty-one percent (30.9%) of adults who report having a non-degree certificate, forty-nine percent reported that receiving a certificate was very useful in getting a job and over half (54%), reported that obtaining a certificate was very useful in improving their job skills. These statistics highlight the positive features that certificates can offer older adults seeking new or better employment. The NCES (2016) reported that most adults surveyed, 42.8% who have a non-degree postsecondary certificate do not have a postsecondary degree. This lends support to the fact that postsecondary certificates, due to their shorter time to completion, are an attractive credentialing tool for adults with only a high school diploma who comprise most participants within the community-based technology training programs targeted for this research study. While these statistics lend credibility to certificate completion among students with minimal postsecondary education, nearly half of those students with a higher postsecondary educational attainment did not obtain a certificate to augment their degree.

## **Lifelong Learning Principles**

Lifelong learning principles reflect upon every aspect of how adults learn and the effect of learning on society and our economy. It views knowledge as a repository of available information that constantly weaves through and across many life situations. Willis (2007) describes lifelong learning as a continuous process requiring individuals to adjust in accordance with the ebb and flow of the world around them. As a continual process, lifelong learning progresses formally from the elementary to secondary school years, eventually leading to adult educational events of choice like when they decide to enroll in short term computer training classes or other classes of interest later in life. Pursuing education and training as individuals get older can facilitate independence by increasing opportunities for employment and the ability to remain productive in society Diaz-Lopez, Liria, Auilar-Parra, & Padilla-Gongora (2016). Lifelong learning also occurs informally as individuals interact and make social exchanges among groups of people (Willis, 2007). The following three lifelong learning principles: 1) commitment to constructive engagement in learning, 2) commitment to individual and collective autonomy, and 3) lifelong learning and values education are relevant to this study in that they illuminate the reasons adults should and do continue to seek education and learning throughout life, and at every stage and age of life. The principle of commitment to constructive engagement in learning portrays learning as a process that can be acquired through both traditional educational intervention and life events (Bagnall, 2007). The second principle, commitment to individual and collective autonomy postulates that learning should promote independence which is preferable to dependence. Faure` et al., (1972 p. 207) discusses that learners should take personal ownership and responsibility for what they learn, how they learn, and in what location they learn. Lifelong learning and values education are the third principle that is congruent with



this research and the adult theory of andragogy regarding the preference by adults for self-directedness and the fact that the pursuit of education is usually done as a means of benefitting some aspect of the adults' life. This principle states that learning is comprised of many elements to include that it should be engaging, should focus on outcomes rather than what is taught, should be self-managed, should embed other life events, and should occur throughout life.

### **Educational Innovation and Technology Training for Older Adults**

Innovation in education involves not only a change or improvement to the status quo, but the creation and implementation of relevant and completely new ideas and ways of doing things (Kostoff, 2003; Mitchell, 2003). Thus, innovation may not only involve improvement, but a complete transformation. Analogous to the constant changes occurring within the discipline of digital technology that are having a dramatic impact on society, changes are also occurring in the United States, as population demographics constantly continue to shift towards an increasing life expectancy and thus, a predominantly older adult population (U.S. Census, 2016). Along with these changes comes the realization that each generation must evolve with the times. Every effort should be made to provide technological education to our older citizens not just in the U.S., but globally to assure they can successfully survive and thrive in a digital world.

When one thinks about innovation in education and technology today, visions of curricular design using some form of technological application or method of delivery are at the forefront of the thoughts of many educators. However, innovation in education does not exclusively involve using technology to deliver instructional content, but also allows students to use technology as fuel to spark imagination and creativity, to think outside of the box and identify unique solutions to everyday dilemmas. In this way technology is not simply viewed in education as a delivery tool for instruction, but also as a catalyst to unlock unique and forward-

thinking ideas. Such an occurrence can take place among adults, 55 years and older when learning to use computers to apply for jobs and continuing their training into the future. Who knows what entrepreneurial discoveries await these adults who as the targeted population for this study may design even more novel and effective methods for instructing their generation of learners in technology.

A review of the literature on teaching older adult's computer job skills reveals several areas where innovation is needed and if successfully implemented, can be an empowering vehicle towards improving career training programs and ultimately, the lives of participants. These areas include specially designed, age-appropriate training programs for older adults that incorporate the mental, physical, and psychological changes that occur with this population.

Conversations with program managers of federally funded, One Stop Career Training Centers, consistently disclose one major problem that exists with adult career technology training programs. It is as previously mentioned, the lack of any dedicated computer skills training program and none of course, geared specifically to the older adult population who are increasing in number and choosing to remain within the workforce. Not only is there a need for these programs but based on the instructional design elements for older adults discussed by Fisk (2009), they need to be of a short duration lasting less than 6 months, completely free, grant and/or corporate funded or low cost, and conveniently located within proximity to the communities where older adults reside to make attendance easily assessable. In addition, once trained, these adults need the ability to continue practicing their computer skills to maintain efficiency, so they can retain the new jobs the career training programs help them acquire. Currently, at most career training centers, once the applicant is assisted with the online job application process, that is often the extent of their job seeking computer usage or observation,

and the waiting begins. Perhaps from this quick, short term experience it is assumed that the future employee will no longer need to know how to, nor will use a computer at work or to apply for a job on their own at a later date. However, according to the literature, the better paying jobs most applicants are seeking usually require some basic computer knowledge and skills and are either unattainable or difficult to keep without them (Mishel & Bernstein, 2003). Additionally, the use it or lose it adage is applicable with adult learners who need continued computer skills training to remain proficient for the longevity of their life and career (Fisk, 2009).

Further discussions with career center training staff reveal that new employees who lack adequate computer skills often return to the Workforce Training Center in search of another job which increases recidivism rates and unemployment. They express that this creates frustration for the applicant and the training staff, as well as defeats the primary objective for the career training program. Research by Igbaria & Livari (1995) reflects on self-efficacy as an important precursor to learning, thus, it would seem plausible for career training programs to implement an instrument such as the “Attitudes Towards Computer Questionnaire” conducted with older adults to assess their feelings about using computers (Jay & Willis, 1992). The premise behind using this questionnaire is that if information regarding perceived computer use by older adults is not determined before implementing a computer training course, computer learning may be impeded, and continued use may not occur. The literature discusses that learning a new skill like how to use a computer requires a healthy self-concept which involves the presence of both confidence and competence by the learner (Cassidy & Eachus, 2002). This aligns with the fact that if an individual does not feel capable of, has a fear of, or for some reason does not like computers, this negative self-efficacy can adversely impact learning. The social learning theory of Albert Bandura (1977) that posits that only after an increase in self-efficacy can motivation to learn, and

actual learning take place is also implied here. It is the responsibility of computer technology training programs to deliver hands-on training within a supportive classroom environment that work towards improving the self-efficacy of older adults who score low on the Attitude Towards Computers Questionnaire.

An innovative strategy for using this assessment questionnaire would be to administer it prior to beginning training to determine the need to increase self-efficacy, and the desire and motivation to learn for each student. At some midpoint during computer training, another Attitude Towards Computers Questionnaire can be administered to determine if there is any change or improvement in the adults' attitude towards learning technology. If the results reveal there is little to no change since the first assessment, these adults should still receive minimal computer skills training, since it will provide them with a positive skillset for daily living. But, since they have been determined twice through assessment not to have an interest, it is recommended that training should cease in accordance with the theory of adult learning, andragogy, which states that adults resent and reject imposition and coercion of someone else's will upon them (Knowles, 1996). Career Training Centers can develop abbreviated computer skills training classes especially for older adults who need basic knowledge and skills for everyday living but have no interest in job skill computer training involving various applications and processes.

While desire and feeling capable are important variables to learning computer skills, once learned, it is just as important for older adults to continue computer use and training since memory declines with age (Lucas, Breen & Phillips, 2015). Computer education training options are proposed as an innovative way to help older adults sustain computer literacy over the long term. It has been suggested by Xie & Jaeger (2008) that monthly computer clubs, similar to book

clubs be established within local communities by older adults so they can have the convenience of accessibility and the benefits of socialization and learning with peers while practicing and honing their computer skills. This is a novel as well as doable idea that offers a way to solve an issue that has been discussed in the literature as needing to be addressed if older adults who are increasing in number due to longer life spans and are continuing to work, are to remain skilled in computers to apply for and retain a job in today's digital economy.

Appreciative inquiry provides an excellent model for establishing a plan of action to foster innovative change and redirect career training centers to offer programs that specifically cater to the needs of older adults. Initial meetings should occur with key stakeholders including program managers and trainers to discuss current computer assistance by staff for job applicants and the positive aspects resulting from this process; a job. To cause different training center personnel to visualize and adopt the use of a computer job skills training program that teaches applicants the skills needed to independently apply for jobs, a pilot study can be conducted with a center to show how training adults with the help of volunteers to use computers to apply for available jobs on their own has benefits for training centers. A survey conducted with staff on the advantages of this method can be shared with other centers. One benefit that training adults to independently use computers will provide career training centers is that it will free up staff to do other important things within the office. Additionally, when adults are adequately trained, career center workers should see a reduction in applicant recidivism rates and frustration over constantly trying to place them in a new job. The "Attitudes Toward Computers Questionnaire" used by Jay (1995) in his study with older adult learners, along with computer skills training should work synergistically to decrease the percentage of returning job seekers.

One final proposed innovation for technological education involves a collaboration

between universities and community career training centers. Every state in the U.S. has major universities that are highly regarded for either a certain research area or their sports teams. However, an established reputation for focusing their efforts on important issues affecting communities at the grassroots level is not always on the agenda. Unlike smaller community-based career training centers, large universities are afforded a wealth of scholarly expertise and resources (Johnson Butterfield & Soska, 2004). From a business standpoint, universities may not view their involvement in problems affecting the local community as a high priority, but businesses become successful by the patronage of the citizens of communities, so the two entities cannot be viewed as independent but are certainly dependent upon one another. Universities have the capability of identifying critical issues facing the communities and citizens surrounding them, such as the lack of current technological skills by a fast-growing segment of the population, adults 55 years and older, and the negative affect this can have on their future ability to obtain employment and live a long and productive life. Training can be provided to technically talented college students regarding the learning styles and best practices for teaching older adults. This presents a wonderful opportunity for universities to “pay it forward” by developing important relationships with community leaders and citizens, and to establish themselves as community advocates, ultimately rebranding their image in a most positive way. This new partnership would represent an innovative way for communities and universities to work together corporately and collaboratively to address and solve important problems facing individuals who may, like unemployed older adults, simply need a helping hand which if effectively addressed, will benefit many into the digital future (Jassawalla & Sashittal, 1998).

## **Summary**

This literature review served two purposes. First, the literature on the aging adult

population and their impact on the current U.S. job market and economy. Secondly, technological training of adults 55 years and older to include instructional design and best practice methodologies. The expansion of the older adult population requires attention particularly in modern day technology career training due to the large percentage of these adults who want to continue working. Whether they have remained or have plans to reenter the work force, digitalization of the global economy requires them to learn skills that will help them acquire and retain jobs.

Community-based programs with easily accessible and convenient locations offer advantages over traditional colleges in that they are strategically wedged into the fabric of the communities and lives of these older citizens who may be unable to travel to college campuses. Local career training centers often offer free programs that are privately, grant, state, and/or federally funded which is important for older adults who may be on a fixed income or unemployed and do not want to incur student loan debt at a later age in life, making these programs an attractive option. In addition to the civilian adult population, community career training centers also serve veterans who have left or retired from the military and are seeking new or better employment. State agencies and policy makers must place the well-being of older citizens at the forefront of their discussions and planned activities by developing new and innovative ways to address employment related issues such as technology skill development and training. These officials will be tasked with assuring that employment opportunities are available for older adults by educating the public and particularly employers through the use of increased statewide advertisement, seminars, and conferences on the importance of harnessing the wealth of knowledge, skills, and mentoring expertise that can be provided to their business or organization, and the necessity of them taking advantage of these attributes by making a

commitment to hire adults 55 years and older. Officials should make a concerted effort using these avenues to reimage and highlight the great attributes of older citizens within their communities, and perhaps offer financial incentives for hiring adults 55 and older. Employers need to recognize that hiring older adults is not a burden due to their age, but a positive asset and a win-win situation for both parties.

There is no denying that this is the 21<sup>st</sup> century of the digital revolution, and adults of the Baby Boomer generation who lack or have very limited computer skills and knowledge need to be trained to be brought current with technology. The research provided within this literature review can be used as a guideline for establishing federally or state funded computer training programs with support at the local level specifically designed to meet the needs and learning styles of adults 55 and older to help them successfully gain and maintain employment. Learning technology is not an obstacle for older adults and the methodology used should be adjusted to achieve the ultimate positive outcome. This is all attainable for our older adult population who are living longer, outpacing the younger population growth rate, and are ready, capable, and willing to continue sharing their talents by making important contributions to society. Chapter 3 details the study research design, methodology, data collection, and analysis.



## **CHAPTER 3**

### **METHODOLOGY**

This chapter presents the research design chosen for this study and begins with a discussion of the purpose, research questions, and significance of the study. The goal was to choose among various research methodological approaches that would best serve to answer the purpose and questions being explored with this research (Creswell & Plano Clark, 2011). The discussion continues with a description of the research design, participant selection, instrumentation, data collection, ethical considerations, data analysis, and limitations.

#### **Role of the Researcher**

As the researcher, my goal was to gather data that would provide understanding and student insight in the use of instructional best practices during computer training within the typical classroom setting. To effectively implement this research study, the researcher established rapport with both program staff and students to create an environment conducive to gathering the most unfiltered, unobstructed, and uninhibited data possible. This meant that my role as the researcher in the computer technology training classroom, was at times one of an unobtrusive observer and at other times interactive with program participants. Each role provided important and different perspectives of the study parameters. The qualitative methodological aspect of this study was flexible in that it allowed for unpredictability and standardization as it reflected the research environment. Dewalt and Dewalt (2011) discussed how this range in

research dynamics helps the researcher gain a more in-depth understanding of the quantitative variables, such as age, sex, lifestyle, beliefs, and processes that affect the overall research target.

### **Restatement of the Purpose and Research Questions**

The development of the Internet by the United States Department of Defense in the 1970's sparked the advent of the digital revolution. Adults born prior to the technology boom between 1946 and 1964 who are members of the Baby Boomer generational cohort, may not have taken the opportunity to learn new digital skills, resulting in a lack of these skills that have now become commonplace within our society. As a result, there exists a need for adult members of the Baby Boomer generation to become proficient in this area.

The purpose of this study was to explore the use and student perceptions of instructional best practices of community-based technology training programs when teaching adults 55 years and older computer skills. The results of this study can contribute to research aimed at depleting the current technological inequalities that exists between older and younger adults. To accomplish this, the following research questions were used to guide this study:

- 1. How are the best practices for teaching older adults reflected in the training program?*
- 2. What are students' perceptions of the computer training program?*

### **Research Design**

A convergent parallel mixed methods design was chosen for this research study. This design was most suitable for this research because it allowed for the triangulation of data to validate the results of independent instrument strands that could be merged in a complimentary fashion during data interpretation, providing a deeper understanding of the phenomenon being studied. Qualitative data was captured through student interviews and classroom observations and quantitative data was captured through the use of an observation guide and post class survey.

## **Study Criteria**

Following are several criteria that were used to determine the inclusion for each area of this research. First, each computer training center must have been an independent, non-credit, community-based entity easily accessible to local citizens. Secondly, the training site must have offered instruction in basic computer skills to adults 55 years and older. Third, the targeted study participants must have planned to or currently be enrolled in computer training classes offered by these community-based technology training centers. Fourth, the centers must have had instructors who were qualified in computer technology by having received either formal training in Information Technology, informal on-the-job, or short-term, non-degree instructional training. Exclusion criteria for this study were that community-based computer training centers must not have been a part of or situated within a higher educational institution setting and secondly, must have been located within close proximity of ten miles or less to residential communities. While each site differed, they were considered for this study because each offered basic and/or advanced computer skills training to adults 55 years and older, with the goal of positively impacting the digital divide through education in the technological skills necessary for these adults to live independently successful lives as active participants in modern day society.

## **Participant Selection**

The participants for this research study were purposefully sampled based upon their enrollment in a community-based technology training program that offered computer training, and their age as adults 55 years and older, inclusive of adults of the Baby Boomer generational cohort who were born between 1946 and 1964. According to Creswell (2013) purposeful sampling is useful for the qualitative aspect of this mixed methods research because it allowed persons and locations that met the criteria for the study to be investigated in order to contribute

data that would inform the chosen research. To enroll student participants, the help of the instructors was solicited on suggestions for which students met the study criteria to be considered for this study since they were more familiar with them than the researcher. Participants included civilian and veteran adults who have already retired and other participants who have not yet reached the retirement age of 65 years, and who enrolled in the technology training program for initial or retraining in computer skills for self-improvement, career advancement, or perhaps to obtain employment upon completion. It was also possible, according to the review of the literature on the increasing older adult population U.S. Census (2017), to enroll some study participants who had reached retirement age but were still working or seeking employment. Instructor participants were selected based on their employment to teach the training classes. This selection process was conducive to the purposes, available resources, and for assisting with answering the proposed research questions, which were important factors when choosing the parameters for this research study (Patton, 2015).

### **Participant Recruitment and Response Rates**

The total number of adults available for initial recruitment in this study was 18 students and 6 instructors for a total number of 24 participants. The actual participant response rate totaled 18; twelve students and six instructors or seventy-five percent of the recruitment rate.

### **Site Selection**

This research study was conducted within the computer technology classes of three senior computer training centers located throughout the southeast. Locations for this study were chosen based upon their accessible positioning within the community and having an established reputation among industry professionals and customers for offering excellent services for older adults. Thus, consideration was given to the complimentary relationship of these centers within

the communities in which they existed. Consumer ratings of senior community centers on goldenreview.com and senioradvisor.com were also reviewed when choosing the study sites.

### **Description of the Study Sites**

#### **Hometown Techs Computer Learning Center**

This center was located within a suburban community surrounded by homes and shops and was situated along the city bus route which was used by some of the students enrolled in the computer training programs to attend class. A large military base was located approximately four miles from this center. The minimum age for membership was sixty and membership was free. The computer classes were formally structured, offering an established training curriculum, learning assessments, and a training manual for students. Classes cost forty dollars per session and were offered twice a week for two hours over a four-week period. Desktop computer stations were provided for each student.

#### **World Wide Web Computer Training Center**

This center was in a suburban setting directly along a street with lots of shops and restaurants and was conveniently located around the corner from residential neighborhoods for adults who lived nearby and wished to attend classes. A Veterans Administration Medical Center was half a mile away. This was the newest of the three centers in this study and offered twenty different activities per month. The minimum age to join this center was fifty with classes averaging six students. Computer classes were offered free of charge for two hours weekly on basic computer skills and security and maintenance. The center provided each student with a laptop and some brought their own.

#### **Independent Seniors Computer Training Center**

This center was located in the midst of several residential neighborhoods. It had a

dedicated older adult population and offered approximately twenty-two different activities per month. The minimum age to join this center was fifty. Admission and computer classes were free of charge. Personalized, one-on-one computer classes were offered twice a month for one hour for a total of eight hours, thus accommodating approximately eight students. Students brought their own computers or tablets. Table 3 below presents information on each computer center.

**Table 3.** Community-Based Computer Training Centers

<b>Dimensions</b>	<b>Hometown Techs Computer Center</b>	<b>World Wide Web Computer Center</b>	<b>Independent Seniors Computer Center</b>
Locale*	Large City Suburban 199,500	Mid-City Suburban 103,000	Small Town Suburban 12,500
Total Membership	850	430	227
Minimum Age for Admission	60	50	50
Computer Class Cost	\$40	0	0
Number of Classes Offered Monthly	40	20	22
Class Format	Classroom	Open Forum	One-On-One
Average Number of Students per Class	6	6	8

\*Based on 2019 total city population of 200,000 or less.  
Retrieved from [worldpopulationreview.com/states](http://worldpopulationreview.com/states)

## **Instrumentation**

The following data collection techniques were used to answer the two research questions and included; interviews, observational field notes, an observation guide, and a Likert scale post-class survey. Study instruments were constructed to incorporate the seven recommended instructional best practices to capture relevant information about these features from the classes and the perspectives of study participants for answering the two research questions. Following is a discussion on the design and purpose for using each instrument chosen for this research.

### **Student Demographic and Instructor Credential Surveys**

Two online surveys were used for this research to quantitatively augment and expand the understanding of participants in relation to other research data. They consisted of an eight-question student demographic survey that addressed prior computer skills and usage, and a nine-question instructor credentialing survey that addressed their computer background and teaching experience. Demographic questions for student participants can be found in Appendix B and instructor credentialing questions can be found in Appendix C.

### **Student Interviews**

Information obtained from the literature review informed the choice of a semi-structured interview protocol. To illuminate the important role of the researcher in assuring the unique elements of qualitative research were adhered to, Xu and Storr (2012) conducted a study using a mock research project to teach and reaffirm with students the notion that with qualitative research the researcher is the instrument.

Ten open-ended interview questions were developed to obtain responses from study participants that answered the research questions on seven targeted instructional best practices (Dewalt and Dewalt, 2011). These seven best practices included: 1) course overview, 2) number

of concepts introduced, 3) pace of instruction, 4) hands-on practice, 5) task/lifestyle integration 6) feedback, and 7) break time. It was also important for the researcher to become adept in the art of hearing data and learning how to establish relationships that would cause study participants to converse openly (Rubin & Rubin 2005). Student interview questions can be found in Appendix D.

### **Observation Guide**

An observation guide utilizing a rubric rating scale and listing the seven instructional best practices was used by the researcher in the classroom to notate the use of any recommended best practices during the computer technology training and to what degree. This guide helped to streamline the reflective processing of the seven best practices including; 1) task-lifestyle integration, 2) course overview 3) slow pace, 4) hands-on practice, 5) one concept, 6) class breaks, and 7) feedback. Four andragogical features, though not the focus of this study, were also listed on the observation guide to assess their usage by students and instructors as discussed in the literature in conjunction with the best practices. These included for students: 1) shared knowledge and experiences, 2) benefit to student, and 3) expressed personal need, and 4) flexibility. The fourth andragogical feature “teaching flexibility,” related to the instructors and how students were taught. The rubric rating scale for the observation guide was as follows: 3 = High Use, 2 = Low Use, and 1= Not Used. An exhibit of the guide can be found in Appendix F.

### **Observational Field Notes**

The research journal is a written record that reflects the researcher’s personal thoughts and understanding of the study and professional activities undertaken during the study (Borg, 2001). A Mead notebook with three divider sections labeled with each study location was used for organized written observations. Each of the seven best practices was written on a single page



in each section for ease of note taking when observed. To protect the quality of the research field notes it was important for the researcher to be acutely aware of their own behavior and assumptions in relation to the study surroundings (Bogdan & Biklen, 2007). Researcher field notes are located in Appendix G.

### **Post Class Survey**

A survey is a system for collecting information (Sue & Ritter, 2012). Three methods commonly used to administer surveys are 1) telephone, 2) email, and 3) face-to-face. For this study a face-to-face method was chosen using a paper 4-point Likert scale post class survey which listed the best practices for students to select their level of satisfaction for each of the seven targeted instructional best practices. The post class survey was constructed using the following 4-point rating scale: 1) Very Satisfied, 2) Mostly Satisfied, 3) Mostly Unsatisfied, and 4) Not Satisfied. In addition to the best practices, students were asked to rate their overall level of satisfaction with the course. The post class survey can be found in Appendix E.

### **Data Collected**

This research study was conducted at three senior computer training centers that offered computer classes to civilians and veteran adults aged fifty years and older. Insight into the training programs and individual perspectives was gained through semi-structured interviews with student participants using response saturation and member checking, through classroom observations using an observation guide and researcher field notes, and student responses on the post class survey.

Permission to conduct the research was obtained from the program managers or directors for each study site prior to beginning the study by an email letter sent from the researcher. Upon receiving IRB approval, located in Appendix H, students and instructors were provided with a

study introduction letter, located in Appendix A, and a paper copy of the informed consent by the researcher that explained the details of the study. Students and instructors at each site were given a week to review the study information prior to deciding to participate in the study. The following week the researcher met with the classes, read and discussed the information in the informed consent, and answered questions.

### **Student Demographic and Instructor Credential Surveys**

Class instructors at each site were provided with a link by the researcher to electronically disseminate the informed consent with attached survey questionnaires. Once students and the instructor agreed to participate in the study, they were briefed by the researcher on how to provide their consent by clicking the attached survey link at the bottom of the informed consent which led to a demographic questionnaire to gather background data on student participants and a technology credential questionnaire for instructors to gather information regarding their computer training and teaching background. All survey data was stored on a password protected computer in a private box drive that could only be accessed by the researcher. Survey Monkey was the online instrument used to collect the surveys.

### **Student Interviews**

The discovery of each participants' perception of community-based technology training programs gave this study an interpretive focus. After a review of the literature, it was important to put a voice to this research. Words and meaning gained through qualitative interviews added depth to the study design (Johnson & Christensen, 2004). The ability to observe research subjects within the natural in situ setting was helpful when reconciling interactions occurring within the classroom and how they supported the theory of social constructivism and learning which was used to form the theoretical framework for this research study (Willis, 2007).

A total of twelve semi-structured interviews were conducted with student participants at the following three community computer training centers, Hometown Techs Computer Center, World Wide Web Computer Center, and Independent Seniors Computer Center. Interviews were digitally recorded using an Olympus digital recorder without listing any names or other identifiers, stored on a password protected micro SD card and locked in a file cabinet in my office. Scheduling of interviews occurred before or after class with the consent of the students, were conducted privately in a separate room, and lasted approximately one hour. It was important to be cognizant of scheduling interviews around the class sessions as several retired students had planned vacations. Interview questions were first pilot tested with five students and found to be clear and well understood. Email addresses for each student was obtained to electronically send the transcripts. Prior to beginning the interviews, the researcher explained the interview purpose and process and shared the list of questions in paper format with the students then took them away. This helped increase student comfort level. Students were informed by the researcher that their interview would remain confidential and their names would not be used in the interview, and then asked permission to be recorded. Participants' permission to be interviewed and the study location were recorded prior to beginning the interview.

During interviews students were asked questions about their past computer experiences, their motivation for enrolling in the class, and about their perceptions of the best practices. The researcher provided students a list of the best practices and asked which ones they felt were most important and why, and in what order they would rate each in preference when learning computer technology. The researcher projected a calmness and an openness to listen in order to alleviate any interviewee hesitation to answering the questions. This technique resulted in all student interviewees displaying comfortable verbal interactions with the researcher. Students

were verbally and emotionally expressive and seemed to enjoy sharing their thoughts and having someone willing to listen. Member checking was accomplished by the researcher paraphrasing and summarizing during the initial interview process and again through a follow up email of transcribed interviews with each participant requesting clarification and if any necessary changes needed to be made to the transcript. At the conclusion of each interview, the researcher thanked the student and discussed that they would receive an emailed copy of their interview transcript within three days, on a specified day. Interviews were transcribed using Google Voice, and organized by location to manage and document themes (Xu & Storr, 2012). Once transcribed, a second member check was conducted using an emailed “Follow Up Interview” sheet with each question typed in red font with a space below to type any changes to their interview questions or if no changes, to reply with the words, “No Changes” that was typed in red font in the instructions. Students were instructed that they would need to respond in three days, by a certain date or it would be assumed they did not wish to make any changes to their interview, and it would be accepted as complete in its’ current format. All students replied to the email request, with one student adding a clarification comment that was updated in their transcript by the researcher. To do this the researcher added the changes using color coded text to allow for easy location if additional changes were later requested. Allowing participants to revisit and edit their interview helped to assure accuracy and increase study trustworthiness, credibility, and validity (Rubin & Babbie, 2008).

### **Observation Guide**

Observations using the guide were conducted twice for one hour at each study site. Two observation guides were printed, dated, and labeled with the center name for each location. If a best practice was observed it was recorded with a hashmark in the margins, tabulated, and then

circled under the corresponding rubric rating. An arbitrary number for each rubric category was established by the researcher based on the number of observations as follows: High Use = 4 or more times, Low Use = up to 2 times, and No Use = 0 times. Andragogical features observed when used with a best practice were circled.

### **Observational Field Notes**

Observations using field notes for each technology training class were conducted twice for one hour on separate days at each location by the researcher to assess if and which of the best practices were used by instructors when teaching. Andragogical features as expressed by students were notated when used along with the best practices since they are relative to adult learners and supported the context in which the practices occurred. Researcher field notes were written in a notebook with tabbed sections which were labeled and organized by study site. A general description of each location, the computer classroom, the best practices and the context in which they occurred, as well as other observations were written in the field notes. Written data was carefully read, and notes added as needed after each visit, then summarized and typed.

### **Post Class Survey**

At the conclusion of each training class, a Likert scale post-class survey was administered in paper format to student participants to gather their perceptions of the best practices used and to gather their opinion of their overall class experience inclusive of whether they felt their enrollment goals were met. Students were asked to rate their perception of the instructional best practices used during their computer training by placing a check mark in the row next to the best practice and in the column for their satisfaction rating of choice. Completion of this anonymous survey required approximately 5 minutes. Surveys were placed in a box labeled with the center name by each participant.

## Cross Validation

To reduce researcher bias and increase study validity, triangulation of data was employed by gathering data from several sources to include computer instructors and students and using six data collection tools including a student demographics survey; an instructor credential survey; student interviews, which employed response saturation and member checking; a researcher observation guide; researcher field notes; and a post class survey. Instruments used to answer the two research questions and data collection sources used are shown below in Table 4.

**Table 4.** Research Questions and Data Collection Sources

Research Questions	Interviews	Observation Guide	Observational Field Notes	Post Class Survey
*How are the best practices for teaching older adults reflected in the training program?		X	X	
**What are students' perceptions of the computer training program?	X			X

\*Research Question 1

\*\*Research Question 2

Two of the technology training programs for this study, Hometown Techs and World Wide Web, were offered for two hours each session, with one being offered in four-week blocks, and the other one for up to five weeks, with a monthly topic of focus. The Independent Seniors Computer Center location offered classes twice per month for one hour per student. Data was collected at these three training centers over a period of ten weeks. A data collection timeline is displayed in Table 5.

**Table 5.** Research Study Timeline

<b>Data Collection Activity</b>	<b>Hometown Techs Computer Center</b>	<b>World Wide Web Computer Center</b>	<b>Independent Seniors Computer Center</b>
Classes Start	Spring 2019	Spring 2019	Spring 2019
Instructor Credential Survey	X	X	X
Student Demographic Survey	X	X	X
Student Interviews	X	X	X
Observation Guide and Field Notes	X	X	X
Student Post-Class Survey	X	X	X

*Note.* N = 10 weeks

The researcher visited each site and gathered general data on the study location and on the participants and instructors per site using the data collection process discussed above. For this study the researcher was a full observer taking field notes, as it was deemed the best method to identify the best practices used within the training classes. The presence of adult learning

principles as discussed in Malcolm Knowles' Theory of Andragogy (1996) was also noted as these occurred in conjunction with instructional best practices. Data sources included student demographic and instructor credential surveys, student interviews, observational field notes, an observation guide, and a post class survey, along with data description, location, length of time for data collection, total number of participants, and frequency of site visits as shown in Table 6.

**Table 6.** Data Collected

<b>Data Type</b>	<b>Data Description</b>	<b>Number of Participants</b>	<b>Frequency</b>	<b>Location</b>	<b>Length</b>
Survey	Instructor Credentials	6	1	Training Class	5 mins
Survey	Student demographics	12	1	Training Class	5 mins
Interview	Student perceptions of program	12	1	Center	1 hour per student
Online Follow up Interview	Student Member Checking	12	1	Home Office	10 mins
Observational Field Notes	Notes on teaching style & program structure.	N/A	2 per site	Training Class	1 hour per visit
Observation Guide	Notation of exhibited best practices	N/A	2 per site	Training Class	1 hour per visit
Post Class Survey	Student post class survey	12	1	Training Class	5 mins

*Note.* N = 18



## **Data Analysis**

The purpose of this mixed methods study was to explore instructors use of and students' perceptions of instructional best practices in computer technology classes for adults 55 years and older. Data analysis provided an avenue for the researcher to progressively gain insight and understanding of the study phenomenon through the use of three repetitive procedures: 1) organizing and managing data with files; 2) reading, scripting notes, and reflecting upon them descriptively using comparisons and categories to interpret data context; 3) and classifying and organizing separate data strands. Each of the research instruments were organized into four separate folders and categorized under surveys, interviews, observations, and documents.

## **Quantitative Analysis**

### **Observation Guide**

Data obtained from the observation guide was analyzed by manually counting the total number of hashmarks made by the researcher in the side margins next to each best practice and then circling the appropriate best practice ranking based on a previously established arbitrary ranking by the researcher of, High Use = 4 or more times, Low Use = up to 2 times and No Use = 0 times. This was done for each study location followed by the calculation of a mode for each best practice meeting the statistical requirements. Two practices, course overview and breaktime which were expected to only occur once received a rubric guide rating of High Use = 3 if observed, or No Use = 1 if not observed. Andragogical features were recorded by circling the associated letter(s) as observed in connection with a best practice over the two visits. The statistical mode for each best practice was determined and organized in a table for each site.

### **Post Class Surveys**

Student post-class surveys were first organized using an excel spreadsheet, then analyzed

utilizing three statistical methods for each of the seven best practices and the eighth category of “overall class experience.” The following three statistical calculations were performed for each best practice and the overall class experience category: percentage totals, the mean, and the mode.

## **Qualitative Analysis**

### **Student Interviews**

The qualitative aspect of this mixed methods research was an iterative process and important when categorizing data gathered on the recommended seven best practices for instructing older adults learning computer technology (Fisk, 2009). To explore the use, to determine the extent to which this research aligned with existing literature on instructional best practices for teaching older adults, and to consider additional relevant findings during the interview process, hybrid a priori coding was chosen to analyze student interview data. Hybrid A Priori coding utilizes a deductive methodology for pre-existing theoretical concepts that were established prior to analyzing the data, which for this research were the seven best practices, and also allowed the researcher to perform an inductive data analysis by identifying important themes that emerged from the interview data (Boyatzis, 1998).

Ryan and Bernard (2003) discussed several ways data themes are recognized and categorized in qualitative research. One popular method for developing themes was to listen for repetitive word patterns used by participants in relation to what was being researched, as these signaled areas of importance when used often by individuals and groups of people. While the researcher needed to have a keen ear and open mind to identify repetition, they also needed to recognize how the repeated words were most often used. This method, known as key word in context, was especially helpful in assisting the researcher with analyzing a priori inductive

thematic data, which involved first reading and manually identifying repetitive best practices within the text, and then performing an electronic word search to ascertain all text locations.

Once transcribed, student responses to their perceptions of the most important best practices when learning computer skills and why were manually counted for each training center, recorded, placed in a table, and ranked by frequency, from most to least for combined study sites. This organizational method was used to establish a record for the comparison of interview results to those obtained at the end of the class, when students completed the post class survey.

Digitally recorded interviews were transcribed into text using Google Voice, alphanumerically coded, and organized by listing them in the order obtained under the heading of each of the three research locations. Transcribed interviews were then printed and read several times by the researcher. During these multiple reads, the researcher noted the location of pre-existing codes within the text as well as relevant emergent themes by handwriting memos and reflections in the margins. This allowed the researcher to gain experience with hand analysis as well as establish a connection with the interview data. Computerized qualitative transcription software analysis was not used.

### **Development of Emergent Themes**

Following the guidelines for hybrid a priori coding, the researcher continuously reviewed the data to identify interesting and important themes within the interview text. This process served to enhance the data by providing a more in-depth understanding into the thoughts and feelings of participants. The opportunity to uncover intriguing themes aside from the seven preestablished themes provided a realm of welcomed discovery during the data analysis. Creswell (2013) supports the process of the researcher allowing themes to emerge naturally from the data instead of relying solely on preconfigured codes because this method can impede the

researcher's ability to identify important themes that after review, may escape recognition then later arise from the analysis of the data. Five emergent code categories were built from the interview data and except for one category, had three to four key supporting phrases each. Emergent thematic codes were identified based upon their uniqueness while at the same time relating to the pre-existing codes, the research questions, and their relevance to this study.

Both pre-existing and emergent themes were color coded to correspond to similarly color-coded interview text, indicating the text source from which the theme was captured. For more efficient referencing, categorized themes and phrases were formatted in a table that displayed the alphanumeric identifier source for each subcategory. The process of organizing and consolidating the data allowed for the recognition of patterns that were critical when analyzing.

### **Observational Field Notes**

Field notes for each computer center were analyzed similarly to student interviews with the sole focus on the best practices and not emergent themes, by carefully reading and rereading the writings to identify the context in which the practices were presented. Data was then organized, categorized, and placed in a table depicting repetitively present best practices. This method used to organize the field notes allowed the researcher to analyze and make important cross comparisons among the three centers between what the researcher observed and what students revealed during their interviews. A comparative analysis between data obtained from the observation guide and field notes using a statistical mode was calculated across all sites.

### **Ethical Considerations**

This study employed the concept of epoch` to eliminate researcher bias and was based on the ethical guidance principles of Kant for conducting research. Kant's Categorical Imperative states that "humanity should be treated as the end and not ever as the means," Kant's Perfect

Duty which emphasizes the “integrity and wholeness of a person,” and Kant’s Imperfect Duty which is limited to specific circumstances like improving the plight of humanity (Allison, 2011). These three principles embody the main categories of ethics in research: protection from harm and risk to participants, informed consent, right to privacy, confidentiality, and anonymity, research integrity and quality, and ownership of data and conclusions. With these principles as the foundation for this research, I did not foresee any ethical dilemmas relating to the study participants and parameters.

### **Summary**

This chapter began with a review of the purpose for this study, which was to explore the use and student perceptions of instructional best practices when teaching computer technology to adults age 55 years and older enrolled in community-based technology training programs. The research questions were restated and how they interacted with the study instruments. The following data collection techniques were involved in this research and included: (a) online surveys, (b) interviews, (c) observational field notes, (d) an observation guide, and e) a paper survey. Participants were purposefully sampled to include adults age 55 years and older who had enrolled in a community technology training program and the teachers that offered instruction in computer technology. Two technology training centers, Hometown Techs Computer Center and Independent Seniors Computer Center had the highest and equivalent participant response rates, and World Wide Web Computer Center had the lowest. Ethical issues involving this programmatic research that incorporated human subjects as student participants have been outlined by stating the three guidelines of Kant (Allison, 2011). Integrity and privacy issues were discussed regarding the storage and safeguarding of data. Implementation details and a summary of the findings for this study are presented in the following Chapter 4.

## CHAPTER 4

### RESULTS

This chapter includes the findings of the research questions, which guided this study. The purpose of this mixed methods research study was to explore the use of instructional best practices by community-based technology training programs and the perceptions of enrolled adults 55 years and older. This study highlighted the importance of teaching older adult's computer technology by addressing existing inequalities among generations in technological skills. The two research questions for this study were as follows:

1. *How are the best practices for teaching older adults reflected in the training program?*
2. *What are students' perceptions of the computer training program?*

Data obtained through the use of an observation guide and from the researcher's field notes were used to answer the first research question. The second research question was addressed with data obtained from student interviews and a paper post class survey of students. The following results for the sample population were obtained from online instructor and student surveys.

#### **Instructor Credential Survey**

Six instructors participated in this study. Males represented the largest portion of instructors for the three computer training centers with a total of 67% (n=4). An estimated 50% (n=3) of all center instructors were members of the Baby Boomer generation. Actual age of participants was not collected to maintain privacy. This estimation was based on available instructor survey selection of age ranges between 51 to 80 years. To meet the criteria of a Baby

Boomer instructors must have been born between 1946 and 1964 and as of the year 2019 be between 55 and 73 years of age. Results for the Instructor Credential Survey are in Table 7.

**Table 7.** Instructor Credential Survey


<b>Demographics</b>	<b>Hometown Techs Computer Center</b>	<b>World Wide Web Computer Center</b>	<b>Independent Seniors Computer Center</b>
6 Instructors	4	1	1
2 Females	2	0	0
4 Males	2	1	1
1 Veteran	1	0	0
Age Range	71 – 85	41 – 50	51 – 60
Estimate of Baby Boomers	2	0	1
Computer Training Background	Informal & Formal	Formal	Informal
	On-the-Job Short Term Program Two-Year College	Microsoft Office Course, Auto Desk Laser Technology	On-the-Job
Years of Teaching Experience	7 – 36	8	11
Favorite Class to Teach	Windows 10 Digital Photography	Computer Security	Various Topics of Student Interest
Favorite Class Setting	Classroom	Open Forum	One-On-One

*Note.* N = 6

## Why Teach Older Adults Computer Technology

Comments provided by instructors on the instructor credential survey indicated the importance and support for teaching older adults computer technology to positively impact the present digital divide between older and younger adults. The instructional best practice most often cited by instructors across all study locations as important when instructing older adults was the ability to provide immediate feedback. Reasons given by center instructors on the survey for teaching adults 55 years and older technology were interesting and provided a rich and deeper insight into their motivations. The instructors' philanthropic needs and desires related conceptually to the other reasons provided in that their humanitarianism can lead to adults becoming educated in computer technology while also gaining social connections and independence to function in society. This conceptual relationship is depicted below in Table 8.

**Table 8.** Why Instructors Teach Older Adults

<b>Philanthropy</b> 	<b>Education</b>	<b>Socialization</b>	<b>Independence</b>
Give Back to the Community	To Educate, Empower  Promote Technology Safety	To Prevent Depression & Isolation	Promote Independence
Gain Personal Enjoyment	Increase Computer Literacy	Socialize with Others	
Satisfaction of Helping Others		Communicate & Share Life with Family	



## **Student Demographic Survey**

A total of eighteen students, six per class, were enrolled at each study location. Twelve students or 75% of the total, agreed to participate in this research study and completed the demographic survey. This included the following number of students from each of the three computer centers: 1) five from Hometown Techs, 2) two from World Wide Web and 3) five from Independent Seniors. Students ranged in age from the mid-50s to the mid-80s with the majority of the adults located at Hometown Techs and the World Wide Web computer centers. There was a diversity of ethnic backgrounds including European and African American, American Indian, and adults of Hispanic origin. The predominate racial groups represented, totaling over 80% (n = 10) were European American and African American. Females comprised the majority of the computer class student population at a total of 75% (n = 9), and only a small percentage, 25% (n = 3) were male. Nearly 60% (n = 7) of adults were estimated to be a member of the Baby Boomer generational cohort with most of these students, 42% (n = 5) enrolled at the Hometown Tech computer training center. Two veterans totaling 17% of the student population and who were both male, one Army and one Navy, participated in the study. Educational backgrounds spanned from a high school diploma, 25% (n = 3) to a college degree, with nearly half, 42% (n=5) of students possessing a bachelor's degree and three out of the five of these adults indicating on the survey that they had obtained an engineering degree. Data collected on older adults remaining within the workforce after retirement was represented by over a third of the study population to include 33% (n = 4) of the adult participants. When rating their computer skills on a scale of good, fair, or poor, most students, 67% (n = 8) rated their skills as fair or poor while only a small percentage, 33% (n = 4) rated their current computer skills as good. Results for the online student demographic survey are shown below in Table 9.

**Table 9.** Student Demographics

<b>Demographics</b>	<b>Hometown Techs Computer Center</b>	<b>World Wide Web Computer Center</b>	<b>Independent Seniors Computer Center</b>	<b>*Total Number and Percent Total</b>
Total participants	5	2	5	12 (100%)
Males	2 Males	--	1 Male	3 (25%)
Female	3 Female	2 Females	4 Females	7 (75%)
Age Range	70 - 85	70 - 80	55 - 85	70 – 75 = 42% 76 – 80 = 33%
Baby Boomers Estimated	5	1	1	58%
Ethnicity	3 European Americans	1 European American	2 European Americans	EA = 50% AA = 33%
	1 African American	1 American Indian	3 African Americans	
	1 High School	1 High School	1 High School	HS = 25% BA/BS = 42%
	1SomeCollege		1 Trade	
	3 Bachelors	1 Bachelors	1 Associate 1 Bachelors	
Veteran Status	1	0	1	Veteran = 17%
Employment Status	1=Yes	0 =Yes	3 =Yes	Employed = 33%
Computer Skills Rating	2=Good 2=Fair 1=Poor	1=Good 1=Fair	1=Good 3=Fair 1=Poor	Good = 33% Fair/Poor = 67%

\*Percentages are represented based on results above N=1. African American = AA, European American = EA, High School = HS, Bachelors = BA/BS

## **Research Question One**

### **Observation Guide**

Direct observations of the computer classroom offered the most efficient method for answering the first research question: “How are the best practices for teaching older adults reflected in the training program?” Classroom observations occurred twice for one hour over several visits. Visual results of the computer training classes were rated using a rubric scale on the observation guide and revealed three best practices, 1) providing students with a course overview, 2) instructors incorporating real world examples into the lesson by making the material being taught relatable to older adults, and 3) providing personal feedback, each received a high use rating of three on the rubric rating scale among all three computer training centers. Results for the most prevalent andragogical feature that was observed among the instructors for each study site was the ability of the teachers to show flexibility throughout the training process when needing to adjust the flow of the lesson to demonstrate a task or answer questions. The best practice with which instructor flexibility was most often observed was with hands-on practice when students needed assistance performing a task or had a question regarding one that was demonstrated. Rubric rating results for the observation guide were: High Use = 3 indicated lots of use (4 or more observations) of a best practice, Low Use = 2 indicated very little use (up to 2 observations) of a best practice, and Not Used = 1 indicated the best practice was not used. Observations of an overview of the course being provided just once resulted in a high use rating since this was the number of times expected for this practice. The abbreviations for the andragogical features observed and shown in each table are as follows: SE = shared experiences, PN = expressing a personal need, B = student benefit, and F = instructor flexibility while teaching the class. Following are observation guide results for each computer training center.

Of the seven best practices being researched for this study, six of them were readily on display in classes at Hometown Techs Computer Center. Only one best practice, “teaching one concept at a time” received a low use rubric rating score of 2. The observation guide provided a concise method for notating each displayed best practice and aligned with written classroom observations. Table 10 displays the observation guide results and observed andragogical features.

**Table 10.** Observation Guide - Hometown Techs Computer Learning Center

<b>Best Practice</b>	<b>Rubric Rating</b>	<b>Andragogical Feature</b>
Task/Lifestyle Integration	3	SE, PN, B
Course Overview	3	F
Slow Pace of Instruction	3	F, B
Hands-On Practice	3	F, PN
One Concept Taught	2	B
Break Time	3	PN, B
Feedback	3	F, PN, B

*Note.* N = 7

Four of the seven recommended best practices were observed to be in high use in classes at the World Wide Web Computer Center, which represented slightly more than half of the best practices targeted for this research and included: 1) task/lifestyle integration, 2) course overview, 3) slow pace of instruction, and 4) feedback. Three best practices; one concept taught at time, providing break time, and hands-on practice, were not observed. One best practice, slow pace of

instruction, was rated low use, as the pace of instruction was often observed to be quick.

Observation guide ratings for each best practice and andragogical feature as observed during class sessions at the World Wide Web computer training center are shown below in Table 11.

**Table 11.** Observation Guide - World Wide Web Computer Training Center

<b>Best Practice</b>	<b>Rubric Rating</b>	<b>Andragogical Feature</b>
Task/Lifestyle Integration	3	SE, PN, B
Course Overview	3	F
Slow Pace of Instruction	2	PN
Hands-On Practice	1	–
One Concept Taught	1	–
Break Time	1	–
Feedback	3	F, PN, B

*Note.* N = 7

Well over half of all the best practices being explored for this study were observed to be in use at Independent Senior Computer Center making this location the second ranked among the three study locations for using most of the best practices. These included the following five best practices: 1) task/lifestyle integration, 2) course overview, 3) one concept taught, 4) slow pace of instruction, and 5) feedback. Two best practices, hands-on practice and break time were not observed during the training class. Results of the observed best practices for Independent Seniors Computer Center are shown in Table 12.

**Table 12.** Observation Guide - Independent Seniors Computer Training Center

<b>Best Practice</b>	<b>Rubric Rating</b>	<b>Andragogical Feature</b>
Task/Lifestyle Integration	3	SE, PN, B
Course Overview	3	F
Slow Pace of Instruction	3	F, PN, B
Hands-On Practice	1	B
One Concept Taught	3	F, B
Break Time	1	–
Feedback	3	F, PN, B

*Note.* N = 7

### **Observational Field Notes**

Field notes written on the best practices observed aligned with the observation guide. Results showed the use of at least four or more, although different, best practices at each training center. When comparing researcher field notes and observation guide results across all study sites, results were similar with three best practices, 1) course overview, 2) task/lifestyle integration, and 3) feedback, being consistently observed, while hands-on practice and breaktime were not observed at two locations. The statistical mode results for six of the best practices are shown in Table 13. These include 1) task/life integration, 2) course overview, 3) feedback, and 4) slow pace of instruction which each received a mode score of three equating to a high use rubric score rating at most study locations. Two of the observed best practices, break time, and

hands-on practice received the lowest mode score of one among all study sites, which equated to a rubric rating of no use. Statistical mode results for all study locations are shown in Table 13.

**Table 13.** Observation Guide Best Practices for All Sites

<b>Best Practice</b>	<b>Mode</b>
Task Lifestyle Integration	3
Course Overview	3
Feedback	3
*Slow Pace of Instruction	3
Break Time	1
Hands-On Practice	1

\*Slow Pace of Instruction received high use rating for only 2 of the three study sites.

### **Research Question Two**

To answer the second research question, “What are students’ perceptions of the computer training program?” the following two methods were used: interviews and a post class survey.

#### **Student Interviews - A Priori Coding for Best Practices**

All twelve student participants agreed to be interviewed. When discussing which best practice students felt was most important when learning computer skills and why, students’ responses revealed a few widely shared priorities, and one best practice that was only somewhat valued. Of the 12 students interviewed, 75% (n = 9) felt that learning one concept at a time was a top priority, followed closely by hands-on practice and feedback which were both selected by 67% (n = 8) of students. Receiving break time during class received the lowest ranking with only

25% (n = 3) of students selecting it as important when learning. Results showing student preference among the seven best practices are in Table 14 in descending order of frequency.

**Table 14.** Student Perceptions of Most Important Best Practices from Interviews

<b>Student Perceptions</b>	<b>Selection Frequency</b>
One Concept Taught	9
Hands-On Practice	8
Feedback	8
Slow Instructional Pace	7
Task/Lifestyle Integration	7
Course Overview	4
Break Time	3

*Note.* N = 7

In addition to the a priori codes, five hybrid themes that were relevant to this study emerged from the interview data. These themes once identified, revealed interesting data within the text and included: 1) motivation to learn, 2) student recommendations, 3) staying connected, 4) fear, and 5) impact of technology. Seven out of twelve students interviewed or nearly 60% (58), reported they would like to receive a certificate of completion at the end of the computer training class. Results for emergent themes that were built from student interview data are shown below in a table organized by code category themes. Keyword explanatory phrases from student



interviews have been included under each emergent theme category. Table 15 below shows the categories and relevant emergent themes from the interview data.

**Table 15.** Emergent Interview Themes and Categories

<b>Emergent Themes</b>	<b>Motivation to Learn</b>	<b>Student Recommendations</b>	<b>Staying Connected</b>	<b>Fear</b>	<b>Impact of Technology</b>
<b>Key Phrases</b>	Feeling left behind	Skill-based classes	Impress friends	It's frightening	Just ask Alexa
<b>Key Phrases</b>	Gain independence	Frequent classes		Internet hacks	
<b>Key Phrases</b>	Current with society	Provide certificates	Use iPhone to call	Scared of technology	
<b>Key Phrases</b>	Outdated skills		Learn Tech from grandkids		

*Note.* N = 5

**Emergent Themes**

Several interview transcripts revealed rich and unexpected data. Following are excerpts obtained from personal communication with students that support the emergent themes.

Comments from the following transcript mimic the title of this study and underpin this research

by providing a deeper understanding at a personal level for why older adults feel that learning computer technology and remaining independent and current with today's society is important.

### **Motivation to Learn**

This student vividly expressed what motivated them to enroll in the computer class:

Well, I felt like I was being kind of isolated and left behind, so I thought I needed to learn computers to keep up with what's going on in the world (Participant WIN103, personal communication, April 25, 2019).

### **Staying Connected**

Learning computer technology to stay connected with family and friends was mentioned often among students as a motivating factor for enrolling in a computer training class. One student offered an interesting comment on the importance of enrolling in a training class that relates to physical needs and making a human connection. This student shared the following:

It's important for me as a senior to learn computer technology because I think it makes me more alert, I think you need to exercise your brain instead of just sitting at home watching TV or doing nothing. I got a 3-wheel bicycle I like to ride, and I like coming down here and being with other people. I'm in my 80's and you just need to get out and be with other people (Participant DGIP101, personal communication, April 22, 2019).

### **Fear**

The literature discussed fear as a cause for hesitancy among older adults needing to learn computer technology and the importance of addressing this area. Smith, Flowers and Larkin (2009) looked at how fear can act as a barrier for these adults. A student described fear this way:

You know, a lot of people are scared of technology. And the older you get and the less you know, nobody wants to be made a fool of, nobody wants to be embarrassed (Participant WIN101, personal communication, April 17, 2019).

### **Impact of Technology**

An unexpected comment was shared by a student on the use of artificial intelligence that may be important for future research regarding its' effect on the motivation to learn technology:

I have a cell phone. I have a tablet. Most of the time I just ask Alexa when I'm at home (Participant COMIR101, personal communication, April 26, 2019).

### Student Post Class Survey

At the conclusion of the training program, students were asked to complete a post-class survey on the seven-targeted instructional best practices by rating their level of satisfaction for each one used during the training class with the following rating options: 1) Very Satisfied, 2) Mostly Satisfied, 3) Mostly Unsatisfied, and 4) Not Satisfied. In addition to the best practices, students were asked to provide their overall level of satisfaction with the course. Over 92% (n= 11) of students were very satisfied with the computer classes. Table 16 shows the results for students' satisfaction with the best practices and the overall class experience with calculated percentages, statistical averages, and the mode for each response category.

**Table 16.** Student Post Class Survey Results

Best Practice	Mode	Very Satisfied	%Total Responses	Mostly Satisfied	% Total Responses	Mostly Unsatisfied	% Total Responses	Not Satisfied	% Total Responses
Overall Experience	4	11	92%	1	0%	0	0%	0.00	0.0
Course Overview	4	10	83%	2	17%	0	0%	0.00	0.0
Feedback	4	9	75%	3	25%	0	0%	0.00	0.0
Pace of Instruction	4	8	67%	4	33%	0	0%	0.00	0.0
Task/Lifestyle	3	8	67%	3	25%	1	0%	0.00	0.0
Break Time	4	8	67%	0	0%	4	33%	0.00	0.0
# of Concepts	4	7	58%	5	42%	0	0%	0.00	0.0
Hands-On Practice	3	4	33%	7	58%	1	0%	0.00	0.0
Sum	30	65		25		6.00		0.00	0.0
Count (N)	8	8		8		8.00		8.00	
Average (mean)	3.75	8.13		3.13		0.75		0.00	

### **Merged and Compared Results for Student Interviews and Post Class Survey**

Personal feedback was found to be the most valued of the best practices with respect to research question two on students' perceptions of the instructors' use of recommended best practices for teaching adults 55 years and older computer technology. This best practice emerged among the top three highest ranked and received the highest satisfaction rating among students across all study sites when comparing both the interview, (#3) and post-class survey (#2) results.

The results for the best practice that received the highest number of responses among students when interviewed during the class session was having lessons taught one concept at a time (n = 9). Once the classes ended, the results for the post class survey indicated a different student preference for receiving a course overview of the lesson (n = 10). Hands-on-practice received the second highest response rate, comparable to feedback among students when interviewed as being very important when learning new technology skills, but received a range of ratings from a low “*very satisfied*” rating to a higher “*mostly satisfied*” rating, to a “*mostly unsatisfied*” rating on the post class survey. These results are shown in table 17 below.

**Table 17.** Merged and Compared Results for Student Interviews and Post Class Survey

<b>Best Practice</b>	<b>Student Interviews</b>	<b>*Post Class Survey</b>
Course Overview	4	10
Feedback	8	9
Slow Pace of Instruction	7	8
One Concept Taught	9	7
Hands-On Practice	8	4

*Note.* \*Post class survey results are based on a “Very Satisfied” rating for comparison

## Summary

This chapter presented the findings of the observations, interviews, and survey used to answer the two research questions on how the classes were being conducted and how the students felt about the training they received. The four research instruments used provided triangulation of data and were helpful when observing the best practices and gaining insight from the teachers who employed them, as well as student perceptions of the learning process for adults 55 years and older. Members of the Baby Boomer generational cohort were the focus of this research because they comprise the largest population group in the United States who were born during a period in history prior to the technology boom. Results revealed this cohort was well represented in both the instructor and student participant categories.

The one best practice that was highly and consistently rated among all seven best practices explored and among data gathered using all study instruments, across all study locations, was feedback. Students expressed their desire for help often, and instructors readily and patiently provided feedback during classroom observations. Finally, nearly sixty percent of interviewed students stated that they would appreciate receiving a certificate of completion at the end of the training class as recognition for improving or acquiring new computer skills. This outcome was surprising given the fact that the intensity of the elation exhibited by the adults who would like to receive the certificate was just as great for those adult students who expressed during interviews that receiving a certificate of completion at their age and stage in life was pointless. These findings have implications for educators of older adults because they address ways to motivate, enhance, and improve learning outcomes, independent living, and ultimately the quality of life for this population. Chapter 5 provides a summary of the findings, conclusions of the study, and recommendations for future research.

## CHAPTER 5

### DISCUSSION, FINDINGS, CONCLUSION, RECOMMENDATIONS, IMPLICATIONS

#### Discussion

Although there has been substantial improvement over the years in the number of older adults who have adopted and used current technology, the percentages of adults who have reached retirement age and who use technology, compared to younger adults, is still significantly less. For example, according to Anderson and Perrin (2017), only slightly more than a third (32%) of adults 65 years of age and older own a computer or tablet compared to nearly 100% of younger adults age 30 to 49 years old. The concern here is that at the current population growth rate, within the next ten years by 2030, adults 65 years and older who represent a low percentage of technology use compared to younger adults and who may plan to remain within the workforce, are expected to comprise over 20% of the U.S. population (Administration on Aging, 2016). This study sought to assist with transforming this trajectory with contributions to current research on the information gathered from classroom observations and student responses on the use of recommended best practices within the independent community-based classroom setting as well as gathering the thoughts and opinions of the adults being impacted by the training. As lessons progressed, students seemed to realize the importance of not just being taught one concept at a time, which might have made learning a task less complicated, but knowing what would be taught by receiving an overview of the course so that they could link the subject to the

tasks was just as important while learning and for memory recall afterwards as evidenced from results during class interviews and later results at class completion on the post class survey. These lesson preferences expressed by students seemed contrary to what instructional best practice one might have believed to be of primary concern when learning at an advanced age; having lessons taught at a slow pace. Although the literature shows that working memory for all adults begins to decline by age forty and can show signs of marked decline as we continue to age, (Salthouse, 1996) this best practice was not believed by students to be the most important among the available choices. Perhaps older students, at least for this study, which was comprised of a small sample of participants, feel that if the instructor provides an overview of the course and teaches one concept at a time, they can grasp it regardless of how fast or slow it is taught. One other interpretation of these results could mean that by choosing “one concept at a time” as most preferable during interviews, students may have equated this with receiving a “slow pace of instruction which was also, though less often expressed by older adults, as important when learning computer skills.”

As mentioned in the previous chapter, hands-on-practice received the second highest response rate, comparable to feedback among students when interviewed as being very important when learning new technology skills, but received a variable range of ratings from a low “very satisfied” rating to a higher “mostly satisfied” rating, to a “mostly unsatisfied” rating on the post class survey. Perhaps this variation in satisfaction ratings can be interpreted to mean that while adults believed hands-on practice was very important when teaching them computer technology, they varied in opinion about its’ use during class because according to researcher classroom observations documented in the observational field notes and guide, as well as comments made during interviews, students did not have the opportunity to utilize this practice in two out of the

three training centers. Students in these two centers who never practiced what was being taught may have come to view teacher demonstration as hands-on practice. For example, being told where to locate a specific key once on the computer without repeatedly performing any tasks on how to use it which was often observed at these two centers, could have been believed by students who never received hands-on practice to represent the act of practicing.

This chapter summarizes the key highlights and findings of this study for each research question, followed by conclusions and suggestions for future research.

### **Research Question One**

*How are the best practices for teaching older adults reflected in the training program?*

**Finding I:** Community-based technology training programs utilized most of the expert recommended instructional best practices for teaching adults 55 years and older computer technology but lacked the use of some key features.

Most of the computer training programs for this study delivered content that utilized four out of seven of the recommended instructional best practices. These included: 1) making the course content relatable to older adult students by integrating computer tasks into everyday life, 2) presenting a course overview of what was being taught, 3) providing lots of personal feedback and 4) providing instruction at a slow pace. As discussed in the literature by Fisk (2009) and Merrill (2012), the use of these best practices was effective in teaching this population as evidenced by the students' ability to recall prior steps from previously taught material. Based on my classroom observations and conversations, the teachers at these three study sites were very knowledgeable about computer technology but did not have knowledge of the best practices. Comments from the instructors did, however, often align with research about teaching older adults computer technology.



According to the results of the instructor credential survey, most of the instructors were not trained in computer technology nor adult education at a traditional four-year institution or two-year college, but were trained in a short-term training program, or on the job, such as through military training. However, at least four of the seven best practices were being used at each of the independent, community-based computer training centers. This establishes a good base to start from when offering instructor training on these practices in the future.

Since the teachers at the sites I visited had been teaching older adults for many years, some for well over a decade, they may have learned to integrate the best practices through trial and error. Another possible way they could have begun to use the practices may relate to the fact that over half of the instructors are of similar age and may have known through personal experience what worked well when instructing this population. For example, one instructor mentioned during conversation with me that students with physical limitations performed computer tasks much easier and quicker when they used the trackball mouse. This aligns with the literature that states that the use of a trackball mouse can reduce hand stress and injury with older adults learning computer technology (McMillian, 2006).

**Finding 2:** One best practice was consistently used by instructors at all study sites.

Of the seven best practices studied, feedback was most often displayed by instructors who immediately provided it for students whenever needed. This is consistent with the literature that discusses that older adults require feedback that is delivered with positivity, patience, and immediacy to avoid learning the concept being taught incorrectly (Carter & Beier, 2010). This immediate feedback, which was evident throughout class observations, appeared to be most welcomed and helpful for students who as a result, displayed the ability to correctly perform certain tasks when prompted by instructors during subsequent class sessions.

**Finding 3:** Two important best practices, hands-on practice and breaktime were not observed at two of the three study sites.

Observations and survey data results indicated that hands-on practice and break time were not offered as part of the computer curriculum at two of the senior training centers, which constituted over half of the study locations. These findings with respect to hands-on practice contrasts with the literature, which indicates that especially with older adults, repetitive physical execution of tasks promotes habit, and the repetition through hands-on practice thus becomes engrained within the long-term memory, increasing the likelihood of future recall (Bean & Laven, 2003). The second recommended best practice not offered except by student request, and which only occurred once during my visits, was allowing time for student breaks. According to the literature (Fisk 2009) taking a break during class for a duration of at least 15 minutes provided an important physical element to the teaching and learning process. Of course, scheduled breaks allow for the human body to function efficiently without students having to ask to be excused and to disrupt the class, while also risking missing some of the lesson while away. But according to Fisk (2009), breaks also help the human body in other important ways by allowing the brain and mind time to pause and prevent information overload, giving older adults the opportunity to rest, regroup, or even review the lesson.

### **Research Question Two**

*What are students' perceptions of the computer training program?*

**Finding 1:** Most adults 55 years and older believed being taught one concept at a time was the most important instructional best practice when learning computer skills.

Of the seven best practices, “one concept at a time” was expressed by students during interviews as the most important when instructing them in computer technology. This was an

unexpected outcome of this study since the average age for adult participants in this study was 70 to 75 years. Research by Stayer and Kramer (1994) showed that adults of this age group processed information at a rate two times slower than younger adults in their twenties. Additionally, this research showed that one other reason for slower processing among older adults was due to their taking more time to make certain they are performing the tasks correctly versus younger adults. Because of this, it was expected that the best practice of “slow pace of instruction” would have been selected as most important. While teaching at a slow pace was mentioned as important during several student interviews, it was not the primary concern of students when learning. This revelation of information on older adult learning justifies why it is important to not simply impart a practice or procedure but as occurred during this study, to ask the recipients what they think about it.

**Finding 2:** One recommended best practice was not perceived as important when learning computer technology skills.

Break time was not viewed by most students as very important when interviewed. Students were quite opinionated when asked their thoughts about being offered break time during the two-hour class session. Some students who were offered a break and in favor of it were appreciative, but even among those students, others who were offered breaks were adamantly opposed to them, stating they were a complete waste of time and resulted in a loss of concentration. Perhaps some credence can be given to students who commented that break time interrupts the learning process, because Fisk (2009) mentions in his training recommendations that it is important for teachers of older adults to review the material taught before the break once students return to class to improve retention. Because most of the teachers at the senior computer training centers were not formally trained, they might have been unaware of the importance of

offering breaks. Providing lessons without offering any break time may contribute to student confusion due to information overload about what was learned, especially when new concepts are introduced.

### **Other Important Findings Relevant to this Research Study**

**Finding 1:** Adults age 55 and older which is inclusive of those of a more advanced age of over 70 years who were enrolled in this study, have both a desire and ability to learn new technology skills.

This study revealed that retirement does not mean adults take a long-term vacation from the routines of life by sailing off into the sunset. Quite the contrary was exhibited by the retired students in this study who made improving and increasing their computer literacy a priority. In fact, several students had retired and decided to re-enter the workforce and others had not retired but continued to work many years past retirement age, well into their seventies. Several of these adults stated during interviews that they attended the computer classes to learn or improve their technological skills for their jobs. Continuing to work after reaching retirement age was discussed in the literature as one of the reasons why adults 55 years and older enroll in computer training classes (Employee Benefit Research Institute, 2018). As one student mentioned during their interview, “No student ever missed a day of class and some even took the city bus to get here, even if it meant sometimes arriving a little late” (Participant WIN101, personal communication, April 17, 2019). From this statement it is evident that these adults not only have the drive and determination to learn new technology, but a belief that they can learn it. This sense of self-efficacy was discussed in the literature as the motivating force behind adults taking the initiative to learn something new, like computer technology (Igarria & Livari, 1995).

**Finding 2:** Veterans represented only a third of the total study participants.

It was believed that the veteran population would comprise a least fifty percent of the study participants, particularly since one study site was located near a very large military base, and another close to a Veterans Administration hospital. A few veterans who had retired from the military were participants in the study, including one veteran of the younger Baby Boomer age group who had not yet reached retirement age and had received a job as a result of skills acquired through their participation in the computer training classes. Overall, veteran enrollment was still much lower than expected. Perhaps this can be attributed to the fact that most of the student participants were women, 67%, compared with only 33% percent males, and the students who were veterans were all males. While the computer training center population of civilian females was much higher than that of males, females represent a very small percentage of the total veteran population of only nine percent (Census.gov, 2016) contributing to a smaller possibility for female veterans to enroll in the computer classes, since they are fewer in number compared to males. Discussions with directors of other senior computer training centers revealed that some Veterans Administration hospitals offer computer classes. Perhaps this could have attributed to limited enrollment in the computer classes at independent community centers.

**Finding 3:** Students felt that gaining computer knowledge and skills would decrease their dependence and increase their independence.

Several comments from older adults during interviews revealed that they resented relying on the assistance of others when they wanted to use a computer, whether to send an email, order something from the Internet, or pay a bill online, and that enrolling in the computer training class would help them regain their independence. Student feelings regarding being dependent on family and friends were heartfelt and resonated along the lines of feeling a loss of control over life situations. Below are some interview responses to the question “Why did you decide to

enroll in this computer training program?” that address students’ motivations and perceptions about being technologically dependent:

- “I hate being dependent on others”  
(Participant COMIR101, personal communication, April 26, 2019).
- “To become independent and not have to always ask others for computer help”  
(Participant WIN102, personal communication, April 17, 2019).
- “To transact my personal business online”  
(Participant DGIP101, personal communication, April 22, 2019).
- “So that someone can show me the steps and then let me do it myself”  
(Participant COMIR104), personal communication, May 10, 2019).
- “To help with interviews and to get a job”  
(Participant COMIR104), personal communication, May 10, 2019).

The second principle of lifelong learning, a commitment to individual and collective autonomy, states that learning should promote independence, which is preferable to dependence. The goal of each computer training program for this study was to educate adults 55 years and older on present-day computer technology skills so students can live independently as they once did in the past.

Older adults perceived that the skills they learned in the computer training classes would help them to get back into the game of life and be confident that they now have the knowledge and skills to effectively engage with others and society. One of the reasons provided by a teacher on the instructor credential survey for training older adults in computer technology was the opportunity to educate and empower them to become safe and independent and to help them avoid depression and loneliness. Research by Diaz-Lopez, Liria, Auilar Parra, and Padilla-Gongora (2016) support the reasons provided by this instructor on the importance of older adults learning computer technology to remain functionally independent in today’s digital society and the need to remain socially connected. According to the lifelong learning principles (Willis,

2007) pursuing education and training as individuals get older can facilitate independence by increasing opportunities for employment and the ability to remain productive in society.

## **Conclusions**

Conclusions for this research study were derived from implementing both qualitative methodologies (e.g., student interviews and classroom observations), and quantitative methodologies (e.g., an observation guide and a post-class survey) to engage adult students and instructors of independent, community-based of technology training programs. The information gained from each of these sources helped inform the findings for the two research questions regarding the computer trainers' use of seven expert-recommended instructional best practices for teaching older adults technology and the students' perceptions of their instructors' use of these practices when teaching them computer skills.

Technology training programs that are situated locally, near residents offer adults 55 years and older access to a service that these individuals might not otherwise obtain. Without receiving this training, these adults may continue to be left at the mercy of others to help them function in a world that has drastically changed from the days when they were younger. These technological changes require older adults to likewise make changes or remain left behind in life, society, and the world as it progresses forward digitally.

It is very satisfying to know that there are community technology training centers that realize the magnitude of the digital divide problem for older persons who once lived a fully functional and productive life and have now lost some of their functionality and connectedness as a result of a change that they did not invite, but which was inevitable. The students in the three training programs exhibited fortitude and a strong desire to "catch up" and gain their lifestyle and independence back with renewed skills and knowledge necessary to not only survive but

thrive in the 21<sup>st</sup> century. These students as well as their instructors were on a mission to partake of all that society has to offer by diligently coming to the community centers to participate in the computer training classes week after week.

The results of this research revealed that perhaps even without prior knowledge of the instructional best practices that are recommended when teaching older adults of the Baby Boomer generation and beyond, that technology trainers have already incorporated most of the techniques that are useful and effective, but can improve with the addition of a few others.

Data gathered from adult students is contrary to mainstream ideas about older adult learners, which often inaccurately depicts this population as fearful and even incapable of learning new technology due to the aging process and subsequent slower comprehension. However, the findings of this study show that older adults are not only willing to take the leap and persistently learn new technology, but they are also very capable of doing so. While a significant amount of research has shown that with an increase in age comes a decline in various mental and physical processes, this does not prevent older adults from learning when they are instructed utilizing certain approaches which have been shown to enhance their ability to comprehend and retain information. Although this study was conducted with a small sample of older adults, the findings can add useful information to the current body of research on the methods that independent, non-credit, community-based computer technology programs use to instruct older adults and on what those adults believe works best when they are taught.

### **Recommendations**

The following recommendations are provided for consideration by leaders of community-based technology training programs that offer training for individuals ages 55 and over. Managers, directors, and instructors who seek to improve their programs may find these



recommendations, based on the statements offered by participants and observations noted from this small study, to be informative. While this list of recommendations is not intended to be a generalization of findings, it is a list of practices that were supported by the individuals who participated in this study.

- Program directors and instructors should be provided information on the instructional best practices through seminars offered either directly or online by businesses that serve senior adults so they can become knowledgeable about them.
- Instructors should be encouraged by program managers and directors to use the best practices through providing teaching incentives such as certificates of recognition for achieving optimal learning outcomes with older adult students. This would be particularly helpful with the two best practices, hands-on practice and break time, which were shown in the literature to be important for training older adults but were not used by two community training centers in this study.
- Older adult students should be provided the opportunity to evaluate and provide feedback on the instructional practices used within their classrooms at intervals throughout the year to gather useful information on how effectively they are working or what improvements or changes are needed from the students' perspectives.
- Community technology training centers should conduct area market research on veteran computer training programs, especially if they, like two of the computer training centers for this study are located in close proximity to veteran facilities. If a need is determined, these programs should attempt to increase veteran enrollment through active recruitment efforts using social media, announcements in newsletters, and with the distribution of brochures at organizations that serve veterans.

## **Implications for Future Research**

- This study was limited to senior computer training centers that tended to have an older adult population that were mostly retired and fewer adults of pre-retirement age. A similar study at a location that caters to a younger adult population could provide a perspective across a wider spectrum of the Baby Boomer generational cohort and may generate findings that differ.
- Interview findings from this study indicated that older adults would prefer to be trained in separate classes based on their current skill level versus all skill levels being combined in one class as was the case for the classes in this study. Future research that looks at older adult learners enrolled in computer technology classes based on skill levels could provide insight into the effect and impact this grouping has on adult learning.

## **Summary**

Community-based technology training programs represent the heartbeat of a community because residents can attend programs located near where they reside that do not require any complicated admission requirements or accumulation of debt to enroll because many classes are private, state, or federally supported and can offer classes free of charge with just a simple registration process. This is a good situation for both the centers who must report their attendance levels if receiving funding from certain agencies, and for local residents who are looking for a convenient, no non-sense learning experience. Since instructors at these training facilities are often volunteers and may not be required to or not be formally trained in teaching and learning, it is a good idea for program managers and directors to assure a level of uniformity with instruction and curriculums offered by providing scheduled seminars.

For older adults, including those of the Baby Boomer generation, these training centers not only provide instruction in a skill set that is a necessary and integral part of life in the 21<sup>st</sup> century, but as was expressed by many of the student participants in this study, they offer an escape from isolation and loneliness, especially for widowed adults, by allowing socialization with like-minded people. This mixture of learning and connectiveness with others is exactly what is needed to encourage older adults to feel comfortable when seeking to learn or improve their technology skills. One student mentioned during their interview that initially they were ashamed to enroll in the computer class because of their advanced age until they learned there was another student older than them, encouraging them to sign up and begin the training.

There are a limited number of independent, community-based computer technology training centers designed specifically for educating adults 55 years and older. Results obtained from this research study included working adults who enrolled in the training program to learn or update their computer skills. This was supported by information in the literature regarding adults living and working longer, even past retirement (EBRI, 2018), making it imperative that they be trained in the technology skills needed to perform their job. It is my hope that this research will open doors resulting in increased interest and funding for the creation of several senior computer training centers in every community. If enacted throughout the country, this would make great strides towards assuring that every older adult who so desires can walk or drive down the street or around the corner and learn to use a computer. It is also my hope that once learned, older adults will continue to retain their skills through the establishment of their own community computer clubs that meet often to connect socially and digitally, and to share knowledge and skills thereby reducing isolation and depleting the present digital divide.

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## **APPENDICES**

## Appendix A: Study Introduction Letter

Greetings:

You are invited to take part in a research study on the teaching methods used by community technology training programs when training older adults. This message is being shared with you by your computer technology instructor with the understanding that your class is offered on a totally voluntary, interest-based admissions basis and is non-credit.

The purpose of this study is to explore the use of best practice teaching methods by technology training programs when teaching adults 55 years and older computer technology and to obtain your perceptions of these practices and the training program. It is our hope to identify and illuminate your thoughts of the teaching methods as they affect your learning process and outcomes, and ultimately impact your quality of life in the 21st century.

The study is being conducted by a researcher named Daphne Phillips, a doctoral candidate at the University of South Florida. The Institutional Review Board (IRB) Number for this study is 00038866.

Any adult who meets the following criteria are invited to participate in this study:

- Is 55 years of age or older.
- Enrolled in a community-based (non-college/university) computer technology training program.
- Are interested in assisting with ways to increase the education and training of older adults in technology and sharing your thoughts on what you feel is most effective.

If you agree to be in this study, you will be asked to:

- Complete a brief, 5-minute student demographic questionnaire.
- Instructors will complete a 5-minute technology credential questionnaire.
- Meet with the researcher for one 40-minute interview that will be digitally recorded.
- Review an email of your interview transcript and reply in one week with any changes if you wish to make any to your original interview responses.
- Complete a 5-minute post-class survey in paper format.

Your total time commitment for this study is approximately 1 hour. This study is voluntary. If you decide to join the study now, you can still change your mind during or after the study. You may stop at any time. There will be no payment for participation in this study.

Any information provided will be anonymous and kept confidential. The researcher will not use your personal information for any purposes outside of this research project. The researcher will not include your name or anything else that could identify you in the study reports. You will be provided with an approved consent form before any information will be requested. You may ask any questions you have now or later by contacting the researcher, also known as the Principle Investigator.

## Appendix B: Student Demographic Survey

Thank you for completing this brief questionnaire for this study. Your answers are completely anonymous, and your time and effort are very much appreciated.

1. What is the name of the center where you are taking Computer Classes?

\_\_\_\_\_ **Hometown Techs Computer Training Center**

\_\_\_\_\_ **World Wide Web Computer Training Center**

\_\_\_\_\_ **Independent Seniors Computer Training Center**

2. \_\_\_\_\_ Male      \_\_\_\_\_ Female

3. \_\_\_\_\_ Single      \_\_\_\_\_ Married      \_\_\_\_\_ Widowed      \_\_\_\_\_ Divorced

4. **Education:**      \_\_\_\_\_ Some High School      \_\_\_\_\_ High School Graduate/GED

\_\_\_\_\_ Trade School      \_\_\_\_\_ Associate      \_\_\_\_\_ Bachelor's Degree

\_\_\_\_\_ Master's Degree      \_\_\_\_\_ Other (Please List) \_\_\_\_\_

4a. **Veteran**      \_\_\_\_\_ Yes      \_\_\_\_\_ No *If No, skip to question 5.*

4b. **Branch of Service:**      \_\_\_\_\_ Army      \_\_\_\_\_ Navy      \_\_\_\_\_ Marines

\_\_\_\_\_ Air Force      \_\_\_\_\_ Coast Guard

If you are a Veteran, what was your job in the military?

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4c. Where and what year did you last serve on active duty?

Location: \_\_\_\_\_

4e. Year you last served on active duty: \_\_\_\_\_



5. **Age Group:** 55 – 59 \_\_\_\_\_ 60 – 64 \_\_\_\_\_ 65 – 69 \_\_\_\_\_ 70 – 73 \_\_\_\_\_  
74 – 79 \_\_\_\_\_ 80 – 85 \_\_\_\_\_

6. **Ethnicity:** Black or African American \_\_\_\_\_ Asian American or Alaskan \_\_\_\_\_  
American Indian or Alaskan \_\_\_\_\_ Hispanic or Latino \_\_\_\_\_  
White, Non-Hispanic \_\_\_\_\_ Another race \_\_\_\_\_  
Native Hawaiian or Pacific Islander \_\_\_\_\_

7. **Employment Status:** Employed (Full or Part-time) \_\_\_\_\_ Retired \_\_\_\_\_  
Unemployed and Seeking Employment \_\_\_\_\_ Unemployed and Not Seeking \_\_\_\_\_

7a. Did you use any technology in your last job and if so, what was the job and what type of technology did you use? \_\_\_\_\_ Yes \_\_\_\_\_ No

7b. Job Title?  
\_\_\_\_\_

7c. If Yes, What type of technology? \_\_\_\_\_

8. How would you rate your current computer skills? (**Place an X next to your answer**).

Excellent \_\_\_\_\_ Good \_\_\_\_\_ Fair \_\_\_\_\_ Poor \_\_\_\_\_

## Appendix C: Instructor Credential Survey

Thank you for completing this brief questionnaire for this study. Your time and effort are very much appreciated.

1. Please choose the name of the center where you teach technology classes.

\_\_\_\_\_ **Hometown Techs Computer Learning Center**

\_\_\_\_\_ **World Wide Web Computer Training Center**

\_\_\_\_\_ **Independent Seniors Computer Training Center**

2. Gender: \_\_\_\_\_ Male \_\_\_\_\_ Female

3. Age: 30-39 \_\_\_\_\_ 40-49 \_\_\_\_\_ 50-59 \_\_\_\_\_ 60-69 \_\_\_\_\_ 70-79 \_\_\_\_\_ 80-90 \_\_\_\_\_

4. What made you decide to teach seniors technology? \_\_\_\_\_

\_\_\_\_\_

5. What is your favorite computer class to teach and why? \_\_\_\_\_

\_\_\_\_\_

6. Where did you learn or receive formal education for computer technology?

\_\_\_\_\_

7. How long have you been teaching computer technology? \_\_\_\_\_

8. Please list all technology certificates, degrees or other credentials below:

\_\_\_\_\_

\_\_\_\_\_

9. Where else have you taught technology classes?

\_\_\_\_\_

## Appendix D: Student Interview Questions

1. Why did you decide to enroll in this class?
2. What motivates you to learn to use technology/computers?
3. Do you currently own or have access to a computer?
4. Do you currently or have you used computers or computerized equipment on your job?
5. What type of digital equipment do you currently or did you use?
6. What do you hope to learn by taking this computer class?
7. What ways are most helpful for you when learning to use computers?
8. Which 4 of the following practices are most important to you when learning and why?
  - a) Slow Pace of Instruction
  - b) Lessons Taught One Concept
  - c) Course Overview Provided
  - d) Hands-On Practice
  - e) Task/Lifestyle Integration
  - f) Receiving Personal Feedback
  - g) Receiving Break Time
9. What barriers do you face when learning computer technology?
10. What advice do you have for instructors teaching computer classes?

**Appendix E: Student Post-Class Survey**

Place an **X** in the column next to the Teaching Method that best describes your answer choice. Have you received or are you currently seeking employment where you can use your new computer skills? (Place an X next to your answer): YES \_\_\_\_\_ NO \_\_\_\_\_

<b>Teaching Method</b>	<b>Very Satisfied 4</b>	<b>Mostly Satisfied 3</b>	<b>Mostly Unsatisfied 2</b>	<b>Not Satisfied 1</b>
<b>Course Overview</b>				
<b>Feedback</b>				
<b>Slow Pace of Instruction</b>				
<b>Task Lifestyle Integration</b>				
<b>Break Time</b>				
<b>One Concept Taught</b>				
<b>Hands-On Practice</b>				

Please indicate Job and computer/digital use:

---



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What suggestion would you offer to better teach older adults?

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Thank you for taking the time to participate in this survey.

## Appendix F: Instructional Best Practices Observation Guide

Date	Site A	Site B	Site C	
Best Practice	High Use 3	Low Use 2	Not Used 1	***Andragogy
*Task-Lifestyle Integration	Lots of use of Task/Life	Very Little use of Task/Life	No evidence of Task/Life	SE F B PN
Course Overview	Major Course Overview	Very Little Overview	No Course Overview	SE F B PN
Slow Pace Instruction	Lessons Taught Slowly	Very Few lessons taught slowly	Lessons taught quickly	SE F B PN
Hands-On Practice	Lots of Hands-On Practice	Very Little Hands-On Practice	No Hands-On Practice	SE F B PN
** One Concept	1 concept taught per lesson	At least 2 concepts taught per lesson	3 or more concepts taught per lesson	SE F B PN
Break Time (Length)	10 to 15- minute break	Less than 10-minute break	No break time	SE F B PN
Feedback Task (T) and/or Question (Q)	Lots of personal attention/feedback	Minimal personal attention/feedback	No personal attention/feedback	SE F B PN

\*Refers to technology tasks that support a students' current personal activities, i.e. learning how to email via the computer to communicate with family or friends versus using a cell phone or land line.

\*\*A lesson refers to the introduction of a new topic or concept not the entire class session.

\*\*\*Andragogical features observed will be notated by a corresponding letter(s) as follows:

- 1) Shared knowledge & experiences (**SE**)
- 3) Course/Teaching Flexibility (**F**)
- Benefit to student (**B**)
- 4) Expressed personal or professional need (**PN**)

## **Appendix G: Researcher Field Notes**

### ***Hometown Techs Computer Learning Center***

This location is within a community surrounded by homes and shops and is situated along the city bus route which is used by some of the students enrolled in the computer classes. A large military base is located approximately four miles from this senior center. This senior center has its' own YouTube video and uses technology to advertise on four popular social media sites. It is listed as one of the best senior centers in the state according "to seniorcenter.us. The minimum age for membership is 60 years old and membership is free. The computer classes however, cost \$40 per session. The program coordinator and instructors mentioned that the fee is charged because it acts as a motivator for students to attend classes versus previous erratic attendance and a higher recidivism rate experienced when classes were offered for free.

### ***The Computer Classroom Setting***

The Computer Learning Center consists of two large computer labs equipped with 10 desktop computer stations used solely to train older adults in computer technology, digital photography, and security and maintenance. The center motto is "Where Peers Enable Peers." This is true because a few of the instructors were once students. Rooms are large and well-lit with bright fluorescent ceiling lights and comfortable seating. Each computer is equipped with an external click mouse; however, external trackball mice are available at request or if the teacher sees the necessity. The instructor noted that students with physical limitations perform computer task much easier and quicker when they use the trackball mouse. Classes are offered twice a week for 2 hours for 4-week sessions. Instructors mentioned they like to keep the classes small (8 students or less) so they can offer more personalized feedback to students. The most popular training class is Windows 10. The Windows 10 class averages around 6 students per session and

the Digital Photography and Security & Maintenance classes average around 4 students. Students made lots of comments on how they will use what they learn in the Windows 10 class in their personal lives. These included: 1) Communicating with family & friends via email in both text & photo on the computer, 2) Banking & Paying bills online, and 3) Making online purchases. The instructor took a picture of the class, put it online, and taught the students how to locate it, name and place it in a folder, and then create another folder within that folder, and ultimately attach it to an email. The students expressed really liking and learning this and having a picture to share of their accomplishments

### ***World Wide Web Computer Training Center***

This center is located on a major road with lots of shops and restaurants and is conveniently located around the corner from residential neighborhoods. A Veterans Administration Medical Center is also located half a mile away. It is the newest of the 3 centers in this study, has a large, open design and offers approximately 20 different activities per month from line dancing to creative art, and a computer class. The minimum age to join this center is 50 and it is free of charge. There is no charge to enroll in the computer class.

### ***The Computer Classroom Setting***

The computer class is located within a large room with both large windows providing natural light as well as lots of fluorescent ceiling lighting. Perhaps due to lots of natural lighting, during my visits, the instructor did not use the ceiling lights. The room is not equipped with any computers but does have lots of long tables and chairs for seating. Laptops are provided to students by the center for use during each class and brought to the class by the instructor. Some students do bring their own laptops. Computer classes are offered once a week for 2 hours on basic computer skills and security and maintenance and average approximately 6 students.

Classes are advertised each month by the center and registration is on a weekly basis with the same students attending regularly.

This instructor provided a course overview at the beginning of each class session beginning with teaching students on the basic features of a computer, i.e. keyboard, mouse, on/off button, etc., and progressing through basic instruction on keyboard symbol meanings and functions, and how to print from researched websites and email. Lessons were projected onto a large white wall at the front of the classroom and are relatively easy to view and understand as the instructor used the mouse and highlighting to emphasize material. However, students were often not provided the opportunity to practice what is being taught, but a mostly told the location and what things meant on the keyboard.

Students often interjected personal experiences regarding internet and technology safety use issues to include shopping in person at the grocery store, Walmart, or the gas station and online with the suggestion of using a prepaid debit card instead of your personal one that is attached to your bank account to avoid credit card skimming and online hacking fraud. The researcher noted that there was a keener awareness and emphasis on digital safety among this class than at the other study locations. Perhaps this can be attributed to regular discussion during every class about the importance of technology safety in comparison to it being taught formally and contained within one class at one other study location but is not as regularly emphasized in other classroom topics of discussion at any of the two other centers. made lots of comments on how they will use what they learned in the Windows 10 class in everyday life. Observations included three or more concepts being taught at once due to student inquiry and the instructors desire to accommodate students by answering all their questions. This often led to the lesson



transitioning into other directions for several minutes before the instructor would refocus the students back to the lesson topic.

No breaktime was offered. Students simply left during class if they needed to and then returned. One student commented during her interview that they feel breaks are a complete and unnecessary waste of time. It appears the students have become accustomed to and satisfied with no breaks being offered and the instructor does not appear to be aware of but may already know the student's opinion regarding taking breaks and decided not to offer them.

### ***Independent Seniors Computer Training Center***

This center is located within the midst of several residential neighborhoods. It is the second highest rated in the state among the 3 centers in this study and has a large dedicated older adult population that travels to many locations within and without of the city in comparison to the other 2 sites. It offers approximately 22 different activities per month from line dancing for physical activity to Pistol Packing Seniors for security training. The minimum age to join this center is 50 and admission is free of charge. There is no charge to enroll in the computer class.

### ***The Computer Classroom Setting***

The computer class is located within a small room with a large desk for the instructor and several chairs to accommodate the student and instructor. There is fluorescent ceiling lighting providing adequate room lighting and no windows. Perhaps the small room size is preferred to create intimacy between the instructor and student due to the classes being offered one-on-one. Students bring their own laptops or tablets. Personalized computer classes are offered twice a month for 1 hour per student and a total of 10 hours, thus accommodating approximately 10 students. Class registration occurs monthly.

For these classes the course overview was provided by the student when they informed the instructor of what they need to learn on their computer. At which time the instructor proceeded with teaching the student what they personally wanted to learn.

The instructor exhibited lots of patience when speaking with each student and obviously had an established relationship with most of them because he spoke based on their knowledge and skill level. This seemed to reduce the amount of misunderstanding and questions, although students did ask any questions about task, they needed clarification.

While lots of demonstration was noted, there was no hands-on practice exhibited. Some students commented during the interview that they would like more of this to help with tasks recall.

## Appendix H: IRB Study Approval Letter



RESEARCH INTEGRITY AND COMPLIANCE  
Institutional Review Boards, FWA No. 00001669  
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799  
(813) 974-5638 • FAX(813)974-7091

4/1/2019

Daphne Phillips

RE:

Exempt Certification IRB#: Pro00038866 Title: The Left Behind Generation: Instructional Practices of Community-Based Technology Training Programs to Increase the Technological Literacy of Older Adults.

Dear Dr. Phillips:

On 3/31/2019, the Institutional Review Board (IRB) determined that your research meets criteria for exemption from the federal regulations as outlined by 45 CFR 46.104(d):

(1) Research, conducted in established or commonly accepted educational settings, that specifically involves normal educational practices that are not likely to adversely impact students' opportunity to learn required educational content or the assessment of educators who provide instruction. This includes most research on regular and special education instructional strategies, and research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

As the principal investigator for this study, it is your responsibility to ensure that this research is conducted as outlined in your application and consistent with the ethical principles outlined in the Belmont Report and with USF HRPP policies and procedures.

Please note, as per USF HRPP Policy, once the exempt determination is made, the application is closed in ARC. This does not limit your ability to conduct the research. Any proposed or anticipated change to the study design that was previously declared exempt from IRB oversight must be submitted to the IRB as a new study prior to initiation of the change. However, administrative changes, including changes in research personnel, do not warrant an Amendment or new application.

## Appendix H cont'd

We appreciate your dedication to the ethical conduct of human subjects research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

A handwritten signature in black ink, appearing to read "Kristen Salomon", followed by a horizontal line.

Kristen Salomon, Ph.D., Chairperson  
USF Institutional Review Board

## **Appendix I: Reflections on the Dissertation**

Once my dissertation topic came to fruition, what I enjoyed most was being out in the community meeting and talking with people to collect my data. I liked hearing their perspectives, which for my research involved what older adults thought about how they were being taught computer technology. As each phase of my research continued, I became more engrossed in what I was finding out about how these adults learn and it was very interesting to observe the process.

### **My Study Population**

Prior to beginning to collect my data, I had some preconceived notions about how the classes would be conducted, how the teachers would be, and how the students would be. I thought the setting and the people would be outdated and that as a younger adult, I would bring a breath of fresh air to the place. To my surprise, not only were the classrooms current in design and the Dell computer stations and laptops current in technology, but the adult students were delightful and ready to forge ahead full speed. There was a mixture of skill levels within each class, so it was interesting to witness the resulting play on different dynamics between the students and the teachers. Teachers had to be skillful at helping students at both ends of the computer skill spectrum while trying to stay on course with teaching the curriculum at the same time. They did this very well without ever making anyone feel undervalued, which I found was a major contributor to the student's continued motivation to learn. Thus, the instructors had a great impact on the learning process of older adult students both mentally and emotionally.

### **Collecting My Data**

Rather than exploring pre-existing instructional concepts as I did for part of my research, I preferred discovering new and unexpected ones as I was able to do when I decided to use hybrid a priori coding to analyze my interview data. This type of research takes the stigma and boredom out of the routine of just looking at the expected and writing about it. Through this experience, I learned that I thrive on discovering the unexpected. I believe that conducting interviews are very important and should be included in most research studies involving people, because through the effective use of this instrument, the researcher can uncover something completely different and maybe even spectacular than what they had previously expected that can be used to enhance and provide a deeper understand and explanation for their study. I would always want to know what people are thinking and incorporate this into my future research. I also learned that I enjoy mixed methods research for the very reasons that it was begun in the early 2000's which includes the opportunity to provide a more comprehensive picture of the results obtained. For my small research study, it was very helpful for me to view and show the statistical results for the teaching methods used in comparison to the qualitative findings.

### **Future Research Interest**

My study revealed three areas that I would be interested in researching in the future. First, I would like to explore a younger Baby Boomer population who are of pre-retirement age,

were born prior to the technology boom, and are still working, to determine the effects of technology on these not-yet-retired workers and learn about any possible adjustments or concerns they are facing within the workplace. Secondly, I would like to learn more about the population of Baby Boomers who do not attend senior centers, regarding how they are being affected by 21<sup>st</sup> century technology and what steps if any they are taking to learn it. Finally, I would like to investigate the effects of artificial intelligence on an adults' motivation to learn technology.

As a researcher I learned that while age is a descriptive number, no entire group of people are alike based solely on this description and people mature physically and mentally at different levels. While there were some older adult students in my study who appeared to struggle due to being new to learning computer technology as well as possibly experiencing age-related cognitive decline, there were others who were very sharp. This awareness of the variability in aging changed my perception of older adults. We are all masterfully and uniquely designed.

### Final Thoughts

I became a part of my dissertation and it became a part of me. I think this was an inevitable occurrence of the entire process of reviewing an enormous amount of literature, then conducting the research, and finally arriving at the results you expected or that you totally did not. Each phase of the dissertation process continuously informs the other until you reach the culmination of the reason you began the study. And even then, research is an iterative process where your dissertation will hopefully spark other research that will work cumulatively to help solve a problem, which for this study was to contribute to current research on ways to decrease the digital divide. You often hear about people working on their doctoral degree, but as a result of going through this process, I am now convinced you never really know what that means until you experience it yourself.