ACCEPTING THE FUTURE: COMPARING THE ADOPTION OF TECHNOLOGY BY AGE COHORTS

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The following faculty members have examined the final copy of this thesis for form and content, and recommend that it be accepted in partial fulfillment of the requirement for the degree of Master of Arts with a major in Sociology.

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DEDICATION

I dedicate my thesis work and all future work that may come from it to my family and friends who have helped me so much along the way. To my friends Nicholas Sumner, Shivam Bhakta, Nicholas Gordon, Jessica Schachle, Pratik Bhakta, Amy Feldkamp, and Nathan Ly, who have been the best of friends and more supportive than I could have ever asked for. To the ladies of Red Hat who has been there for me as if they were all members of my family and teaching me compassion for those around me and to always do what is right.

Most importantly, I dedicate this thesis to my grandmother. I owe everything that I am today to my lovely grandmother. Not only has she cared for me my entire life, but she has given me the ultimate insight to the experiences of older adults in daily life. I will always do whatever I can to care for and speak out for my grandmother, as well as all older adults in our society.

Finally, I would like to dedicate this thesis to all older adults in our society. Sooner or later, most of us will become older adults and if we do not care for them now, the youth may follow in our footsteps and not care for us. Everyone has a story to be told and as the youth of our society, it is our job to listen so that the memories and experiences of our ancestors may be passed down and never forgotten.

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ABSTRACT

With ever advancing technologies becoming more integrated in our everyday lives, we must adapt and learn to utilize these new technologies in order to maintain a presence in society. One group that struggles to adopt and learn the processes involved with advancing technologies is the older adult population. Previous literature suggests that older adults tend to encounter multiple barriers when attempting to adopt technology including cost, technology fluency, purpose of use, and concerns over privacy and safety. Using data from the 2015 Current Population Survey (CPS) Computer and Internet Use Supplement, different demographic factors are analyzed for influences on age cohorts and their use of technologies. Age cohorts are broken down into: Generation Y, Generation X, and the Baby Boomer/Silent Generation. The overall goal is to see if additional factors, besides age, affect a person's adoption and use of technology. Findings indicate that older adults use less technology than younger people, but that occupation and location factors have the greatest influence on the adoption of technology.

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CHAPTER 1

INTRODUCTION

As society advances, so does the technology developed to increase comfort and convenience in our lives. Recently, it has been noted that human technology has been advancing at an exponential rate (Kurzweil 2006). But, with constant changes in technology comes the demand to adapt to using it. With this endless need to adapt, there is the possibility that some people, if not many, may fall behind in the world ran by technology. This could especially be the case when it comes to learning how to use advanced technology when many people have not used technology considered typical in today's culture for much of their lives.

Not using newer technology has led to many people have trouble adopting new forms of technology due to the massive amount of learning and change involved in the process. Of the groups that face these issues of adopting technology, older adults are some of the most vulnerable to becoming disengaged from society. This possible disengagement is due to the fact that younger adults are constantly allowing technology to become a bigger part of daily living. This means that younger people hold power over older adults. The possible disengagement from society by older adults who cannot adopt technology is a social issue because it can lead to isolation. A variety of factors including socioeconomic status, sex, education, occupation, and physical/mental ability play a major role in the adoption of technology use such as computers, smart phones, and the internet by older adults. The adoption of technology is what could possibly lead to the prevention of disengaging from society. This paper explores the question: Do older adults really use less technology than younger people?

This social issue is explored through the Modernization Theory of Aging, which explores the process of role loss and damages that can be suffered through a lack of ability to keep up with technological demands (Moody & Sasser 2015). Disengagement Theory is also used to explore reasons why an individual would disengage from society and states that this is due to older adults attempting to keep up with younger adults and children through technology and the sense of futility (Moody & Sasser 2015). This paper uses data from the Current Population Survey (CPS) to explore different traits of older adults and younger adults and what exterior factors could influence the use of technology (Flood et al. 2015).

Results suggest that older adults do not use technology as much as younger adults and that educational attainment is an influential factor in the overall adoption of technology. This study found that as educational attainment increased, so did the use of computer and internet technology. Additional results suggest that men, employed respondents, government and private workers, western region residents, and people without disabilities used technology more than others. When analyzed by age cohorts, almost half of the variation was explained by the separation of cohorts. However, occupation and location factors explained the most variation over technology adoption. Results between age cohorts also suggested that the adoption of technology based on disability might change in the coming years as younger age cohorts grow older.

In the overall conclusion, it is discussed that the influence of disengagement theory must be considered both ways: older adults disengaging from society and society forcing out older adults who cannot keep up with the constant advancements in society's use of technology. The main implication from this study suggests that older adults are at risk from becoming disengaged from society due to refusal to adopt technology, not being able to adopt technology fast enough to keep up with society, and/or not being able to maintain a constant adoption process of the newest technology as it becomes available. Although these specific motivations were not measured, they are implications of the study, as well as a possible outline for a continuing study.

CHAPTER 2

LITERATURE REVIEW

2.1 Use of Computer Technology by Age

With the ever-advancing intricacies of technology, there are several negative barriers that can prevent older people from accepting technology including lack of knowledge of a computer's capabilities, lack of confidence, and lack of understanding its value (Broady et al. 2010). Broady et al. (2010) state that there are many counteractive factors such as understanding relativeness of technology, understanding personal gain, and/or being influenced by others who utilize technology already. The results suggest that younger people and older adults can both be influenced and taught about technology in the same way, but that older adults may require more attention and time to be taught about computers due to the newness of the machines (Broady et al. 2010).

In one article that explores the use of technology, specifically by older adults, Wagner et al. (2010) states that the status of computer use by older adults is rapidly changing. Older adults are quickly becoming the fastest growing population of computer users according to the data shown (Wagner et al. 2010). According to Wagner et al. (2010), the main reason for the massive growth is due to the fact that the majority of the older adult population has, until recently, been the group who used computers the least. Since they have used computers the least when compared to other age cohorts, as more older adults start to adopt technology, they would become the fastest growing. In speculation, the main reason for this growth could be explained by the need to use the technology in order to maintain a level of engagement within society.

In many studies with the goal of testing the learning curve of new technologies, the samples do not contain older adults. It is common to see certain technology-based research groups containing younger people as they are often very familiar with technology formats such as computers, cellphones, and more (Dickinson et al. 2007). But, when older adults are included in these research projects, there must be changes to the methods due to many older adults not being as familiar with changing or advancing technology (Dickinson et al. 2007). Cognitive understanding and self-reporting are two major areas of methodology that are addressed as needing change as many participants may not be able to comprehend certain commands based on technology use (Dickinson et al. 2007). Dickinson et al. (2007) recommended that more time be allowed for older adults who are not experienced with technology because, when these issues are ignored, results tend to only be from participants well educated with technology and not from those who did not have a full understanding.

Many studies track the issues of usability of technology back to the designers and explore what is really thought out when designing technology for the general public. The challenges and issues are more than just performance and price, but more complex and multi-faced problems that many marketing and developing industries do not commonly recognize (Lee & Coughlin 2015). These problems include such factors as value, usability, affordability, accessibility, technical support, social support, emotion, independence, experience, and confidence (Lee & Coughlin 2015). It is also noted that confidence is one of the most crucial as blows to confidence can be common when older adults learning about technology hit barriers that can seem impossible to overcome (Lee & Coughlin 2015). Lee and Coughlin (2015) concluded that older adults need more attention and support at every step of learning newer technology in order to become avid users and consumers of new technology and that once developers and designers understand this and implement this research towards their products, older adults could potentially become more avid users.

One major aspect of older adults having a lack of knowledge when it comes to the use of computers is the attainment of medical assistance via computer and internet access. Many companies and programs have attempted to make life easier for older adults by providing access to medicines and health related information via the internet and computer access due to the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (Wright & Hill 2009). Implementation of technology for medical assistance would make the ever-advancing technology and simplifying system actually work more against the older adult population than it would help in many ways due to the learning curve of technology that older adults face (Wright & Hill 2009). This is also paired with the fact that technology usage such as the internet and computers greatly declines with age and that decreased income can lead to decreased availability in computer access (Wright & Hill 2009). In conclusion, this method of attempting to adapt the use of technology for older adults may not have been thought out that well and success might not be as obtainable as previously thought (Wright & Hill 2009).

Similar to the situational issues of technology dependence for medication, many older adults are now facing technology-related issues when it comes to regular payments such as bills, banking, and investments. Olson et al. (2011) conducted a study over internet use for financial transactions with a comparison between younger and older adults. Olson et al. (2011) stated that older adults preferred using a person on the phone in order to complete many of their financial needs whereas younger adults had little to no problem using the internet or an ATM. Although, older adults preferred not to use advanced technology for banking and financial practices, Olson et al. (2011) stated that the usage and frequency of technology was highly dependent on the domain of technology in question.

Throughout all of these studies involving older adults and the use of computers, one common theme is found: older adults are capable of accepting and adopting newer technology formats, but they need more time. This extra time is needed in order to build confidence and understand the general principles of technology that do not come to them as fluently as they do to younger adults who have had most of this technology all of their lives.

2.2 Use of Cellular Technology by Age

Another form of technology that older adults often have had to adopt in order to maintain presence in society is cellular technology. This could be any form of mobile device that allows users to maintain contact, use applications or the internet, and even basic computer functions. The research suggests that the older adult population, much like younger people, are influenced to use technology by social influence, enjoyment of different medias, self-actualization, and perceived safety benefits of having a mobile phone (Conci et al. 2009). Each of these factors actually influences older adults similarly to that of what younger people expect and experience with technology-based influence by having/using a mobile phone. Although there stereotypically seems to be a barrier between that of younger people and older adults when it comes to mobile phone technology, there is actually very little difference in motivations for use of a cellular device (Conci et al. 2009).

Along with similar motivations to younger adults, many older adults who have accepted and adopted cellular technology have also found a brighter side to life. Specifically, these products and services, such as cellular devices, can greatly increase the life quality for older adults as they age (Czaja & Schulz 2006). Different technologies that are explored include "smart" technologies that can assist older adults in the home setting through finding just the right settings or the potential success of telemedicine that could be utilized by older adults that cannot get out of the house every day to get to a doctor (Czaja & Schulz 2006). Another specialized area discussed by Czaja and Schulz (2006) is the technological advancement of education for older adults, which includes internet education, media learning, and telecommunications advances which all works to make as much information as possible readily available at one's fingertips. As of 2006, the amount of technology available to increase the life quality of older adults has been limitless, but this technology has yet to be fully utilized or brought into the marketplace to be made available (Czaja & Schulz 2006).

One element to studying cellular device use by older adults that has yet to be addressed is how older adults might use said technology compared to younger adults. Age does not necessarily determine the use of cellphones, but rather the type of use (Fernández-Ardèvol 2011). This is seen through younger people using cellphones for texting, internet, and social media versus the use for calling and email by older adults (Fernández-Ardèvol 2011). The use of cellular devices is based not just on ergonomic and usability issues, but on a need for the mobile communication aspect (Fernández-Ardèvol 2011). For example, older adults are seen as more likely to be family oriented and use their cellular devices to communicate with family and loved ones, but they are still most likely to use their cellular devices in the event of an emergency or other situation where it seems to be the most efficient communication tool rather than for casual conversation. Fernández-Ardèvol (2011) concluded that older adults are currently the last group to accept and adopt the use of mobile technology and sharing media/internet browsing/emailing are the main uses of mobile technology by older adults. Despite this finding, their numbers are still rather low compared to the rest of the population.

Lindley et al. (2009) stated that the attitudes of older adults towards technology stems from their desire to keep in contact with people that they consider important to them. Maintaining contact with friends and family is seen as worthy of learning the newer forms of communication through technology (Lindley et al. 2009). Many of the participants of the study declared that often their friends and family were quite busy when telecommunications were attempted, but that it was usually understandable and that they would try to find other times to talk (Lindley et al. 2009). Lindley et al. (2009) concluded that older adults placed high value on being able to communicate with their loved ones and that they also placed great importance on being able to respond to their conversation partners' demands for different technology-based communication methods.

When discussing additional forms or motivations to use cellular technology, it is best to address the interface of said technology (specific types of physical technology and how a person uses them). In recent years, many cellular devices have fully transitioned from a physical keyboard with buttons to touchscreens. Touchscreens have presented a problem for older adults when attempting to use cellular technology due to potential cognitive and motor function issues that develops with the natural aging process as well as the comprehension of the buttonless interface itself (Stößel et al. 2010). After a study by Stößel et al. (2010), older adults were reported to have been slower in their performance of using touchscreen interactions with devices than the younger test subjects, but that they still had little to no problems completing the required tasks (Stößel et al. 2010). Older adults preferred single-finger gestures as opposed to multi-finger gestures that younger people used (Stößel et al. 2010). Older adults also preferred physical key input methods and produced fewer typing errors than younger people using a physical keyboard or touchscreen (Stößel et al. 2010). Stößel et al. (2010) concluded that older adults should be able to use different resources available to them to adapt to technology and not be forced to adapt to newer methods if it is not preferred by them.

An alternative viewpoint to observing the use of cellular technology by older adults is to look at a relatively new form of cellular communication: video communication. Video communication involves the use of both cellular technology and internet technology to allow the users to communicate via video chatting. Research performed by Milliken et al. (2012) explored the use of different video communication methods by 16 older adults and used a qualitative and quantitative combination method to explore why and how they were using this technology. Results showed that many older adults were using video communication methods in order to fulfill the needs of entertainment, current events, and sports-related updates rather than using video communications for social purposes with friends or loved ones (Milliken et al. 2012). Milliken et al. concluded that no participants had to be "convinced" to use this type of technology, but very few used it for much outside of entertainment. It was noted that the value of video communications to the older adults was relative to what could be gained based on their personal needs (Milliken et al. 2012).

In addition to the uses of voice and video communication within cellular technology, there are also applications. Applications can vary in use and intricacy, but are usually designed to improve efficiency or productivity of a cellular device or at least make life easier for the user (Plaza et al. 2011). Many strengths and weaknesses were explored during a study and included usage by older adults, quality of life for older adults, health aspects, and safety/security/privacy (Plaza et al. 2011). Of these different aspects, usage was found to be one of the most interesting; contrary to many stereotypes of older adults and technology, many older adults did, in fact, use technology such as mobile phones on a regular basis (Plaza et al. 2011). Plaza et al. (2011)

concluded that health related applications and security applications, designed to improve security for different forms of technology, were found to be the most consumed by older adults.

The central theme found throughout the study of cellular technology and use by older adults was that their motivation dictated how much they chose to use it. It seemed as though the different studies could not agree on a similar motivation as some suggested that it was all about the need to communicate with family and friends where others suggested that it was based on media consumption. But, that could just be based on the samples selected and what the participants felt was more important to them. Nonetheless, the research did show that personal desire was a major factor concerning the use of cellular technology by older adults.

2.3 Use of Internet and Media Technology by Age

The third form of technology that can sometimes impose issues to older adults is the internet and media technology. Referring back to the Czaja and Schulz article (2006), the internet provides a variety of useful services and products in an attempt to make our lives easier and more convenient. The issue with internet and media access technology is that it can be very dangerous due to the misleading sites and misinformation available to the general public.

A common type of internet and media technology utilized by older adults has mostly been email (Sayago & Blat 2010). Different aspects that were observed through this study included social circles (groups of people with which one communicates), frequency, relationships with other technologies, and the patterns/content of communication via email (Sayago & Blat 2010). Results suggest that there are more cognitive issues surrounding the use of emailing technology by older adults than there are physiological issues caused by aging (seeing, hearing etc.) (Sayago & Blat 2010). In conclusion, Sayago and Blat (2010) suggest different modifications to be made to emailing systems in order to make accessing and navigating said system easier for novice technology users such as cutting out unnecessary portions of an emailing system that could potentially distract or confuse the user.

Dickinson & Hill (2007) performed a study over older adults' use of internet communication and media outlets such as facetime, Facebook messenger, skype, etc. in an attempt to assess how many older adults still rely on email as a primary technology-based communication format, despite ever-increasing applications and programs that allow for smoother and more efficient communication. The communication issues that develop with aging such as hearing loss, vision loss, and short-term memory loss are also addressed as potential barriers in utilizing communication technology (Dickinson & Hill 2007). Dickinson & Hill (2007) concluded that loneliness and perceived irrelevance of computers are two major issues between adults and technology communication utilization and that as more older adults began relying solely on telephones (cellular and home), rather than writing letters for communication, they noticed positive aspects such as hearing voices of loved ones and not needing to wait days for a return letter. The amount of effort put towards learning to utilize technology-based communication is directly related to the desire to communicate and email is popular among older adults because it is informal and more similar to writing letters than that of telecommunications (Dickinson & Hill 2007).

In an earlier article published by Dickinson et al. (2005), the success of a newly developed software that is capable of introducing the internet to older adults in a smooth and simple process was explored. In order to assess the inclusiveness and usability of the software by older adults, it was tested by teaching older adults who had never used the internet before to set up an email account online (Dickinson et al. 2005). This study was done in addition to a control group who used the general commercial version of the software which was more generic and less specific. Dickinson et al. (2005) concluded that the program in the study was very easy to use and preferred over the commercial program. This decision was due to its simple interface and medium speed of educating the users and that the simple and friendly interface gave the users a positive experience that increased their desire to learn about and use additional internet systems passed the emailing system (Dickinson et al. 2005).

Similar to the previous study, Eisma et al. (2004) studied a project known as Usable Technology for Older People – Inclusive and Appropriate (UTOPIA) which works to involve older adults in the early stages of development of technology for older adults. This method of development helps to build a more diverse base of input and create better technology that is easily accessible to older adults and is a major contributor to raising awareness of issues that prevent older adults from learning about/experiencing technology (Eisma et al. 2004). UTOPIA worked to improve attitudes towards technology by older adults, user-friendly interface systems, and learning support from developing companies in order to better their product design for older adults (Eisma et al. 2004). Eisma et al. (2004) also addressed the issues surrounding terminology differences between older and younger adults. This was done by labeling "computer speak" as a barrier between technology and older adults as well as younger people and older adults (Eisma et al. 2004). In the study's conclusion, the use of technology declined with age, but established easier to use technology methods that relied less on "computer speak" that could greatly decrease the declining rate of technology use with age (Eisma et al. 2004).

In a more recent, concentrated study, Pfeil et al. (2009) studied similarities and differences between age groups when using the social networking site known as MySpace. The purpose was to compare teenagers to older adults and the social capital they hold due to their involvement on the social networking website while data was collected via automatic collection tools available through social networking websites. (Pfeil et al. 2009). Although younger people tended to have more friends and a larger social network within their own age cohort, older adults tended to have a much more diverse friend groups leading the authors to believe that they had more types of social capital available where as younger people tended to have mostly one social capital, but much more of it (Pfeil et al. 2009). In addition to this, younger people were more likely to use different forms of media through MySpace and tended to be centered more around themselves and self-actualization. Self-actualization involves creating one's identity based on environmental and social influences. Older adults tended to focus more on informative and official self-description (Pfeif et al. 2009).

The central theme found throughout the research over internet and media usage by older adults was that emailing is the most commonly accepted use. Even the research performed by designers mostly addressed the process of making email account creation easier for older adults. Many reports also suggested that with a simplified method of using the internet and media technology, older adults felt more confident in their use of the technology and even wanted to learn more. As time advances, it is possible that older adults may move on to newer forms of internet and media technology use in order to stay in society's loop just as many have moved from hand-written letters to email now.

For this project, variables from the Internet and Computer Use Survey were used to measure certain traits that could define technology use. These variables included possession or access to a computer in the home, at a friend's house, in school, or at the library. The variables also included questions over the specific use of a computer or the internet such as for work, email communication, telephone communication, or for entertainment purposes such as gaming.

Email communication tends to be one of the main forms of technology consistently seen as a form of technology adopted by older adults as it is one of the earlier forms of technology that has become widespread.

2.4 Technology Acceptance Model

A common model that appeared throughout the previous research was the Technology Acceptance Model (TAM). The TAM has been used for some time in research to predict how people will accept a new technology as it is introduced to society (Ramón-Jerónimo et al. 2013). The TAM is concerned with the intrinsic/extrinsic relationships of use, meaning that it examines the relation between internal beliefs and external variables that can affect one's acceptance and use of a certain technology (Conci et al. 2009). As previously stated, the work with this model suggested that the older adult population is influenced to use technology by social influence, enjoyment of different medias, self-actualization, and perceived safety benefits of technology (Conci et al. 2009). Many results produced through the lens of the TAM have suggested that older adults have a different sensitivity towards processing information of new and advancing technology; meaning that individuals might not be as comfortable or as quick to understand certain types of technology as younger adults (Ramón-Jerónimo et al. 2013). This sensitivity is potentially based on their different needs and lifestyles and could be a potential reason for seeing certain forms of technology, such as the internet, as an unneeded luxury more than a necessity in life (Ramón-Jerónimo et al. 2013). This difference in sensitivity comes from both younger adults as well as different sensitivity compared to the various needs among other older adults.

2.5 Socioeconomic, Occupational, and Location Factors

In addition to age as a possible influence on technology use and acceptance, there are also occupational factors that play a major role. These factors include socioeconomic factors, employment status, employment type, occupation, and union status.

One of the common factors that has been noted in research to affect the use of technology among older adults is their current socioeconomic status. Socioeconomic status refers to an individual's current financial placement among others in society and is dependent on how much money one has available to purchase necessities and additional items. Correa (2015) noted that their findings suggested there is a huge gap in socioeconomic status when it comes to using technology within the family. Correa (2015) also stated that lower socioeconomic families had the largest gap between parents and children. The usage inequality was addressed as families with the lowest amount of finances available for additional expenditures often had the children who had more technology-based knowledge than their parents (Correa 2015).

In a similar study of the family power distribution when discussing technology, Ma et al. (2016) reported that middle-aged adults who still had a spouse and a higher socioeconomic status were more likely to use smartphones than other older adults. Unlike much of the previous research that suggest security and social environment influences as main factors in technology use, this study stated that cost was the major factor for Chinese older adults (Ma et al. 2016). In conclusion, perceived usefulness of a smartphone was a major contributor as to whether or not older adults found the cost to be worth the technology and the idea of usefulness could often be accredited to socioeconomic status and marital status (Ma et al. 2016).

Marchibroda (2015) studied the current state of technology adoption by older adults and what barriers still exist that prevent them from fully grasping usage of newer technology. The concerns reported by older adults included privacy, cost, and lack of reimbursement (Marchibroda 2015). These concern-based issues are due to the ever-changing threats of hacking and information theft, rising prices of new technology, and the quick depreciation of technological devices; all of which can be related back to one's socioeconomic status as more excess money would allow for one to better protect themselves while using technology (Marchibroda 2015). Marchibroda (2015) noted that in order for older adults to fully utilize technology, there must be advancements made in order to make it easier to use and affordable. The market around technology has been changing in recent years as many computers and cellular devices come with cheaper, not as powerful options in order to better serve those with a lower socioeconomic status.

Education might be one of the most important occupational factors to affect the use of technology. Education is even more important with recent developments in the constant increase in reliance on technology within education. According to Gell et al. (2013), increases in educational attainment have a positive relationship with increases in technology use. College level educated and above participants reported having the highest uses of technology (Gell et al. 2013). Czaja et al. (2006) studied the use of technology within older adult and younger adult populations in relation to education.

Education was found to follow a similar pattern as socioeconomic status in that the lower the level of educational attainment, the lower the use of technology was (Czaja et al. 2006). In addition, older adults with higher levels of education were found to have reported less technology anxiety and more interest in learning about or using various forms of technology (Czaja et al. 2006).

In another study over the use of technology when discussing education, Gibson and Lurvey (2017) recently performed a study over the utilization of technology in early educational settings and how said technology use would create a concept of technology in the future. This study was done via a self-reported survey that assessed the perceived importance of technology in relation to the history of technology use from respondents (Gibson & Lurvey 2017). Gibson and Lurvey (2017) found that a higher frequency of technology use in early educational settings lead to a higher perceived importance of technology in later learning environments. Gibson and Lurvey (2017) end their article with the advice: as technology advances, both in education and in our general lives, we must investigate the perceptions and importance placed on technology by society in order to maintain an understanding of the importance of technology taught in our education system. To observe the level of educational attainment, this variable will be measured by an educational attainment variable that spans from less than high school diploma to professional degrees. It is possible that, if more time spent on education leads to prolonged use of technology and emphasis on the importance of said technology, attaining a higher level of education could be accompanied by a stronger socialization towards the perceived importance of technology.

Employment status is yet another factor that could have influence on technology use. Specifically, employment status is whether or not a person has a job, is retired, or out of the work force. According to DiMaggio et al. (2004), sixty-five percent of workers with a status of employed were found to be habitual internet users. This was a substantial number compared to the thirty-seven percent of participants that were considered unemployed or not in the working force who reported being habitual users (DiMaggio et al. 2004). To observe employment status, this variable will be measured by an employment status variable that includes a variety of employment status options.

Employment type and occupation are interrelated and can also influence the use of technology amongst individuals. Employment type refers to who someone might work for; government, corporation, self-employed, etc. Meuter et al. (2003) studied displays of anxiety towards technology and the use of self-service technology. Blue-collar workers who worked for the government or corporations were more skeptical of self-service technologies and shopping from home than white-collar workers (Meuter et al. 2003). Those with white-collar jobs and even those who were self-employed were more accepting of technology in various uses and did not show a significant amount of anxiety towards technology compared to blue-collar workers (Meuter et al. 2003). People working jobs (various occupations, but mostly white-collar) while attending college also demonstrated technophobia and anxiety towards technology (Meuter et al. 2003). This fear shows us that people at different ages, not just older adults, can face barriers when adopting technology.

Contrary to the previous article, Kwon and Chidambaram (2000) noted that occupation, as well as many other factors, did not have an effect on the use of technology; specifically, cellular technology. But, it was noted that those who had to use cellular technology for work-related purposes reported more stress and anxiety when using said technology for work compared to using it for everyday life (Kwon & Chidambaram 2000). These reactions to work-related cellphone use determined that technology use, when employed under certain conditions can be increased, but that said use may not always be the healthiest habits due to overuse of a work-related cellphone potentially causing stress (Kwon & Chidambaram 2000). To observe employment type, this variable will be measured by a worker class variable that includes types of employers that respondents work for. Workers referred to as “private” workers work on a wage/salary basis, but for private companies/organizations where workers who are referred to as “wage/salary” workers are employed in the public sector working for public entities. There are also individuals who are classified as not working.

Union status is another occupational factor that could potentially influence the use of technology. With technology increasing the efficiency of communication, more groups and organizations are taking advantage of it. One example that is known for needing effective communication methods is within worker unions. Fiorito et al. (2002) performed a study over the utilization of technology for communication and organization within unions. Information technology was found to be extremely important when it comes to the practical needs of worker unions (Fiorito et al. 2002). Although organizing was greatly improved, overall effectiveness was still mixed in unions’ opinions (Fiorito et al. 2002). The main message to be gathered is that with the effectiveness of technology on union organization, those in unions should be expected to be using technology more often than workers outside of a union. To observe union status, this variable will be measured by a union status variable that lists involvement with a union.

Alongside occupation factors, location factors must be considered as affecting the acceptance and use of technology. Location factors can include region and residence type. Each plays a slightly different role in defining location and could have different influencing factors.

Region specifically refers to the area-based location within the United States and is divided into the Northeast, Midwest, West, South, and Southeast. Of these areas, DiMaggio et al. (2004) reported that technology use was highest in the Northeast and far West. On the other hand, the Southeast participants reported having the lowest use of internet and technology (DiMaggio et al. 2004). In more detail, state reports indicated that the lowest population use percentage was found in Mississippi with forty-nine percent while Alaska was found to be the highest with sixty-nine percent (DiMaggio et al. 2004). One could infer that with lack of convenient location and climate, such as in Alaska, citizens might need to use technology more for communication and purchasing. To observe regional living, this variable will be measured by a region of residence variable that categorizes respondents into one of four regions.

DiMaggio et al. (2004) also noted that type of residence played a role in the use of technology as well. Suburban areas had the highest reports of using the internet, among other technologies, with fifty-seven percent of participants being habitual users (DiMaggio et al. 2004). Rural participants also reported high proportions of habitual users at fifty-three percent DiMaggio et al. 2004). Metropolitan participants had the lowest percentage of habitual users with only forty-nine percent (DiMaggio et al. 2004). Much like the findings amongst the states, one could infer that with a metropolitan residence, the opportunity to purchase goods and socialize is much more available in person compared to those living in rural areas. Although this variable is not used during analysis due to issues within the data and the weighting system specifically affecting this variable, DiMaggio et al. (2004) does make a strong case for the residence location as an important factor when considering the use of technology.

2.6 Identity Factors

Many factors related to a person's identity can alter their views and, ultimately their use, of technology. Identity factors include sex, race/ethnicity, marital status, type of family environment, and children in the household. Sex, one of the main areas studied when discussing the use of technology, is quite important. Much of the previous research focussed specifically on women's use of technology. Pfeil et al. (2009) noted that when assessing technology use via social media, women, older and younger, reported more online interaction as opposed to their male counterparts.

Loe (2010) performed a research study on the everyday technology use of older women in New York. Loe (2010) states that it can often be assumed that older adults, especially women, are not as familiar with technology, but that many actually are active and creative with their uses of technology in the home on a day-to-day basis. Through the use of in-depth interviews, Loe (2010) determined that many older women have plenty to do with technology in the home such as the use of newer technologies in the kitchen for experimental cooking, gaining new knowledge from the various media outlets available on multiple technology sources, and learning about the different medical issues that they have witnessed or experienced throughout their lives. Although older adult women may not be the most familiar with the ever-advancing technologies of tomorrow, they can still utilize technologies in the household in order to make constant changes to everything going on around them in life (Loe 2010).

Another study that focusses on the use of technology by older adult women comes from Nägle and Schmidt (2012), who focused on reluctance to accept the use of a computer for tasks in everyday life. This study aimed to observe the issues through the Unified Theory of Acceptance and Usage of Technology (UTAUT) method which is a meta-method that includes eight different acceptance models ranging from behavior to social influences and beyond (Nägle & Schmidt 2012). This model accurately covers the different aspects that older adults face when it comes to the need to use a computer. Nägle and Schmidt (2012) determined that the use of a computer by older adult women is determined by expected performance gains and facilitating conditions and that social influences do play some part, but that said use is not a major factor. Nägle and Schmidt (2012) also concluded that there may be the need to accept the fact that older adults, men and women, do not see technology, such as a computer, as a valuable tool to fulfill their needs in day-to-day life. Although this theory will not be tested in this project, it is one to consider in research relating to technology. To observe biological sex, this variable will be measured by a sex demographic variable that consist of male and female options.

Race and ethnicity can play a major role in the use of technology alongside other personal traits. Referring back to the Gell et al. article (2013), white, educated, married, males were found to be the most avid technology users of all social demographics. In fact, larger percentages of black, Hispanic, and other racial minorities had reported that they do not use as much technology as the white population (Gell et al. 2013). In a similar article by Jackson et al. (2008), younger people were assessed for technology use with one third of the sample being black and the rest Caucasian. Results demonstrated that black males used technology the least in the sample, while black females used the internet the most, but black females utilized other technologies in relatively low amounts (Jackson et al. 2008). To observe race and ethnicity, this variable will be measured by a combination of a race variable and an ethnicity variable that gives multiple race choices for respondents.

Marital status is another identity factor that must be considered to make a difference in the acceptance and adoption of technology. The influence of marital status on technology use could stem from the need to communicate with a spouse, as well as the influence from one spouse to another to use technology. Referring to the Ma et al. (2016) research previously discussed, younger older adults who still had a spouse were more likely to use smartphones than other older adults. Older adults were often influenced by their partner to be more involved with communicating and the acceptance of technology (Ma et al. 2016). From this, we can gather that social influences, such as marital status, do play a significant role in the acceptance and adoption of technology. To observe marital status, this variable will be measured by a current marital status variable that contains multiple marriage categories for respondents to be as specific as possible.

Children in the household may be one of the most important identity factors due to younger generation's use of technology. As we saw with marital status, social influences can play a major part in the acceptance and adoption of technology. When assessing younger users who may be more adapted to the use of technology, the influence could be even stronger. Referring back to the Correa (2015) study, younger generations within a family and younger age cohorts within a culture generally tend to have more knowledge and experience with technology and therefore hold more influence over older adults when it comes to learning and using said technology. With this bottom-up power inequality, not only can younger people influence older adults to use technology, but they can also potentially determine the way that older adults may learn it (Correa 2015). To observe the number of children a family might have, this variable will be measured by a number of children in the household variable that allows respondents to state how many children are living within the household.

2.7 Impairments, Disabilities, and Health

Impairments and disabilities are issues that affect older adults, as well as all technology users throughout their lifetime. Each impairment (visual, audio, and mental) and physical disability can hinder the use of certain technologies and, at the same time, create demand for other forms of technology. Ball (2006) studied technology being used to assess the ability of drivers in order to increase driver safety for everyone on the road. Certain types of technology were used for driver assessment, driver rehabilitation, and vehicle/highway technologies (Ball

2006). Driver assessment includes multiple new technology-based tests that assess a driver's vision, reaction time, and comprehension (Ball 2006). Technology advancements in medicine and virtual rehabilitation have greatly assisted those who have issues with cataracts or are prone to being a part of a vehicular crash after experiencing a traumatic vehicle-related accident (Ball 2006).

In a study performed by Gell et al. (2013), older adult technology use was observed while taking activity-limiting impairments and disabilities into consideration. The use of internet, communication, and email were observed along with social demographics and health characteristics such as disabilities (Gell et al. 2013). Physical limitations were noted to greatly decrease the amount of technology utilization and vision and memory impairments also reduced the use of technology (Gell et al. 2013). Gell et al. (2013) concluded that the promotion of assistance with disabilities and impairments could be most useful through email and text messaging as these systems were not affected as drastically as other systems that do not have accessibility options.

Schulz et al. (2015) examined the trends following older adults as people are living longer or are surviving with a disability longer and how technology could potentially increase their life quality while living with the effects of aging. This was done by exploring different types of technology available to assist older adults in their health such as monitoring, diagnosis, and treatment (Schulz et al. 2015). These technologies have a variety of areas they can assist with including physical/mental health, mobility, social interaction, safety, and day-to-day activities. Schulz et al. (2015) concluded that technology can be developed in order to assist older adults in their health issues, but that the technology must be made to be easily accessible and easy to use.

Copelton (2010) studied how technology can potentially influence older adults to increase physical activity and health. Interviews and observations were done over a 5-month time span and included members of a hospital-based walking club to assess the use of pedometers by older adults (Copelton 2010). Many older adult participants could not state a reason why they did not use their pedometer, but simply stated that they just never saw a need to use it (Copelton 2010). The older adults came to the conclusion that they had no interest in using technology to count steps or create fitness targets, but that they just wanted to walk with their group (Copelton 2010).

Czaja (2015) studied the assistance of older adults by different technologies that would assist them by making life with physical disabilities easier. One of the main features studied was the use of artificial intelligence and user-friendly interfaces on robotics to assist with physical training. But, with cognitive systems, there is often skepticism by older adults as this is done through robotic devices and artificial intelligences in order to work as a coaching mechanism (Czaja 2015). Assistive devices include anything that monitors or senses health for older adults (Czaja 2015). Czaja (2015) discusses how the technology is becoming more user-friendly due to its ability to be worn externally with little settings to change as far as accessibility and comfort. EHealth applications are discussed as harder to use for older adults to this day as eHealth applications are based on mobile communications technology such as smart phones (Czaja 2015). This basically means that, without adequate knowledge on using smart phones, older adults cannot access or utilize eHealth applications. Czaja (2015) concluded that there are many technology-based assistance entities for health and impairments/disabilities that are not being utilized by older adults due to cost and lack of knowledge/training, but as the older adult population increases, more people are utilizing the benefits.

When studying the views on technology in relation to health needs, Chen and Chan (2013) determined that the majority of the older adult participants reported having positive views towards technology and using it. Individuals whose views were negative towards the idea of using technology discussed the health-related possible issues such as social isolation, addiction, and physical health issues that could develop from being around the technology too much (Chen & Chan 2013). The use of technology is based upon three distinct areas: the person, the technology, and the environment; the environment also meaning any needs for health assistance with technology (Chen & Chan 2013). Chen and Chan (2013) concluded that older adults are most likely to use technology based on the perceived benefits of health and communication and if the benefits are great enough, they will attempt to break the technological barriers that stand in their way.

Another study over the use of robotic technologies to assist older adults with impairments and disabilities focused on the interactions from a robot designed to help and enhance the health of older adults (Neven 2010). More than just the robot, the research examines the relationship between the robot, the older adults who were a part of the test, and the robot designers. Neven (2010) believed that the use of the robot could be potentially useful for assisting older adults who were in need of physical, mental, or cognitive health assistance, but older adults tended to believe that the type of person that this robot would help most was someone sad, frail, and alone. Most older adults who were test subjects determined that they, themselves, did not fit this description (Neven 2010). Many of the ideal images of technology users described by the older adults were also influenced by different forms of media and not solely based on what the designers intended (Neven 2010).

In another study of the technology developers behind systems for older adults, Garçon et al. (2016) reported on the issues of technology assistance for older adults as a lack of concern for user-friendly interfaces and easy to learn technology which negatively affected older populations due to computer technology being so new in society. Garçon et al. (2016) determined that the lack of concern for making this technology easy for older adults to use is a pertinent issue that is often neglected by developers and found that this is especially the case in most lower to middle income countries around the world. It was recommended by the authors that the developers needed international attention drawn to their technology development in order to be influenced to create technology that is easier to use by older adults with a lack of knowledge on technology use and various impairments and/or disabilities (Garçon et al. 2016).

In an older study, Mayhorn et al. (2004) attempted to understand the process involved in designing technology that is fit to work with cognitive issues associated with the aging process. One feature of this research is that it is performed under the belief that cognitive function decline is not directly related to aging and that many older adults will retain cognitive functionality (Mayhorn et al. 2004). In fact, much of this reading addresses the development of technology for older adults with the possibility of user memory loss in mind. The conclusion stated was that whatever interface is being designed, it should have a consistent pattern presented to the user in order to avoid confusing a habitual user with new information (Mayhorn et al. 2004). A lack of consistency could potentially create questioning of one's own cognitive function; ultimately becoming more accessible for older adults with a mental impairment or disability (Mayhorn et al. 2004). To observe disabilities and impairments of individuals, these variables will be measured by a series of four variables that asks about a specific disability/impairment: vision, hearing, physical disability, and mental disability.

CHAPTER 3

THEORETICAL MODEL AND HYPOTHESES

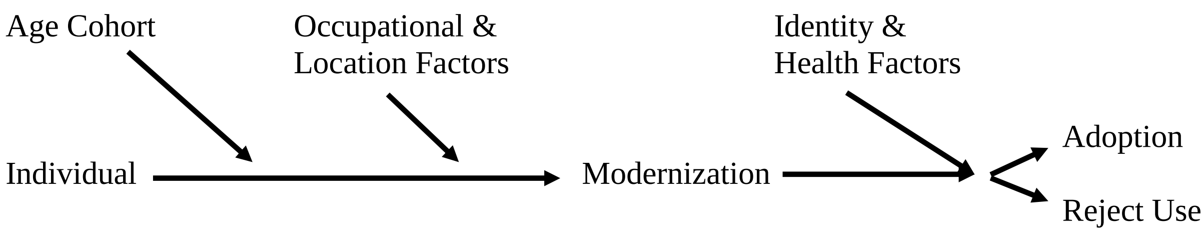

Figure 3.1 Combination Model

This paper introduces a combination model that incorporates the effects on an individual of age, occupational, location, identity, and health factors, which leads to an individual deciding to adopt technology for use or to reject the use of technology which could result in disengagement from parts of society. The major independent variable at play is age. This study aims to look at the individual based on age cohort to explore technology adoption and use. This study is meant to explore the idea that older adults have a harder time accepting and adopting new technology. The effects of occupational settings and location status are then presented in this model, before actual modernization, due to the expenses of technology and forced interactions with technology (through work-related activities or access to technology in a location). By maintaining a presence in the work force or attaining a certain level of education, an individual may be forced to adopt technology in order to complete required tasks. Additionally, the location of an individual may play a role in the amount of technology utilized by older adults when comparing urban, suburban, and rural living.

After the effects of an individual's age, occupational and location factors, modernization directly affects the individual's path towards accepting technology or disengaging from society.

Modernization Theory states that advancing technology will alter an older adult's life and can give the sense of role loss (Moody & Sasser 2015). Role loss is when an older adult feels as though they have lost a certain role in their life due to their own aging process and the advancements of society (Moody & Sasser 2015). This feeling of role loss can come from a variety of technology-related situations. The key part of the definition is that while society is advancing, not adopting technology can be a factor that could lead to the feeling of role loss. Another outcome, more pertinent to this study, is that without maintaining technology fluency, an older adult may fall out of contact with younger adult friends and family due to lack of communication technology use. This could cause an older adult to disengage from their role, thus leading to a situation where role loss could be experienced. With modernization having a major influence on a person's psyche and feelings towards technology, the experiences had when attempting to master technology can play a major role along the way to acceptance or refusal to adopt technology. It is also important to consider that society may force older adults out of their roles due to inability to quickly adopt the use of technology.

After the effects of modernization, other independent variables such under identity and health can affect an individual as well. Independent variables within these factor groups include sex, race/ethnicity, family and marital statuses, and a variety of impairments, disabilities, and health factors. Older adult females are often thought to be the family members having the most difficulty adopting newer forms of technology, but past studies have shown that they tend to persevere and still learn newer types of technology. Previous research has shown that white males are often the biggest users of various forms of technology which would lead one to ask questions relating to the availability of technology for other races and/or ethnicities. Marital status has also shown to greatly affect the use of technology. More specifically, older adults still married tend to use technology more often in order to maintain contact with other individuals from the family.

Impairments and disabilities have found to have great effect on the use of technology by older adults. These effects are due to recent advancements that allow technology to assist individuals with different forms of impairments and/or disabilities. This need for the use of technology is due to the fact that many medical providers and prescription processes have online features in order to attempt to make the system easier, despite not actually making the interface easier, for older adults with accessibility issues.

After the effects of modernization and the additional independent variables, an individual could be forced to make the decision on adopting technology in order to continue to feel as though they are maintaining a presence in society. If they choose to adopt technology, they will still have to learn how to use it, but they will be able to maintain the technological expectations of society and remain present. If they reject the use of technology or cannot manage to learn at an acceptable rate, they may face the possibility of disengagement. Disengagement Theory states that when an individual feels hopeless towards maintaining society's expectations, they may choose to withdraw and disengage from society, ultimately isolating themselves from social interaction (Moody & Sasser 2015). Again, it is important to remember that society may choose to disengage older adults as well due to their inability to quickly adopt and utilize technology. Disengagement Theory works in both directions: individuals removing themselves from society and society forcing out individuals (Moody & Sasser 2015). To be more specific to this research, if an individual rejects technology or cannot learn to use it, they could potentially feel role loss to a point where they can no longer maintain, or wish to maintain, their presence in society and, in the end, disengage from society as a whole.

3.2 Combination Model Hypotheses

The hypotheses for this thesis are related to the logic path of the combination model previously discussed.

1. Generation Lucky Few/Baby Boomers will report using less technology than Generations X and Y.
2. Individuals with more education will report using technology more than individuals with less education.
3. Individuals who identify as employed will report using more technology than those who identify as unemployed.
4. Individuals with government employment will report using technology more than those who reported other forms of employment.
5. Individuals who live within the western U.S. region will report using more technology than those in any other region.
6. There will be no significant difference between the sexes when it comes to reported uses of technology.
7. Individuals who identify as white will report using more technology than all other races/ethnicities.
8. Individuals with health, impairment, or disability factors will report using more technology than those without disabilities or impairments.

CHAPTER 4

METHODS AND DATA

4.1 Data

In order to complete this research, the dataset was derived from the 2015 Current Population Survey (CPS) (Flood et al. 2015). The CPS is the government's main source for finding information over employment and unemployment within the United States. The CPS conducts interviews from 56,000 households each month. Each household is selected on the basis of residential location. This is done in order to represent the nation, the state, and more specific areas. Once a household is selected, it is interviewed once a month for four consecutive months in a year, and then again, the next year at the corresponding time. This allows for proper comparisons to be made throughout time. In addition to employment, the interviews collect information over demographic traits such as: age, sex, race, marital status, education, and family.

For the purpose of this thesis, age restrictions were applied. In order to compare the use of technology by adults only, a minimum age restriction of 18 was applied. Additionally, those serving in the armed forces, working for the family without pay, or attending high school were also removed from the dataset in order to further clean the data. All other variables were selected without restrictions. The dataset also utilized a final composite weight applied for the computer use supplement (discussed below) and general data from that year.

In addition to the general results from the CPS interviews, the 2015 edition includes a Computer and Internet Use Supplement conducted in July. This survey included information, from available households, over the use of the computer and the internet from any location by the household as well as the individual household member. Questions from this supplemental interview included a variety of questions over technology that expanded past the basic computer concept. Other items discussed in the interview included Smart TVs, Smart Boxes for media consumption, cellular and mobile devices, and the various settings where certain technology might be used. The survey also asks questions concerning the specific use of the internet. These areas include email, social networking, and video calling. Each of these elements adds another level of the use/consumption of technology. The overall sample size came to 40,290 respondents.

4.2 Variables

4.2.1 Dependent Variable

The dependent variable is an interval/ratio index. The source for the index came from 10 questions over the use of various forms of technology such as electronic gaming, internet use, etc. This came from a variety of questions concerning the use of computers and the internet for different purposes. Some topics covered considered the use of computers/internet for email, gaming, telecommunications, and job searching. Questions were in a 1=yes, 2=no format and were recoded to a 0=no, 1=yes format.

4.2.2 Model Segments

4.2.2.1 Age

Age is the primary independent variable and is broken down by age cohort. This means that the nominal variable contains ages from Generation Y (youngest) to Generation Lucky Few (LF) (Oldest). The data initially presented the ages as whatever respondents wrote in, but for this project, the data was recoded into categories. There were three categories created: 0=Generation Y, 1=Generation X, 2=Generation Lucky Few/Baby Boomers (LF/BB). Years of birth were used to determine the age cohort categories with Generation LF/BB being 1929-1964, Generation X being 1965-1982, and Generation Y being 1983-1998. These year-ranges were derived from the Population Reference Bureau categories (Carlson 2009). Birth years were subtracted from 2015 in order to find the age ranges to be used for the cohort separation and are: Generation LF/BB being ages 51-85, Generation X being ages 33-50, and Generation Y being ages 18-32. Age was top coded at 85, meaning that some people might be older than 85, but were listed as 85 in order to narrow the age range.

4.2.2.2 Socioeconomic, Occupational, and Location Factors

Education was recorded as an ordinal variable ranging from 0=children too young for school (which was removed) to 46=graduate level education. The categories created were 0=less than high school education, 1=high school diploma/GED, 2=associates degree, 3=bachelor's degree, and 4=master's degree, and 5=doctoral or professional degree. A Scheffe test was then performed on this variable in order to combine values with a smaller sample. From this test, the variable was, once again, recoded as 0=less than high school education, 1=high school diploma/GED, 2=associates degree/some college, 3=bachelor's degree or above. Those who were still in high school full-time were removed from the sample due to having a much different lifestyle that could potentially affect the data.

Employment status was another nominal variable that consists of being 20-22=different types of unemployment, 10-12=different types of employment, 30-35=different types of "not in labor force," and 36=retired. This variable was later recoded as 0=unemployed, 1=employed, 2=not in labor force, and 4=retired. Those within the armed forces were removed from the sample. A binary variable was also created that was coded as 0=unemployed (which included unemployed, not in labor force, and retired) and 1=employed. The binary employment variable was selected for use in the multivariate analysis.

Employment Type is a nominal variable that describes the type of job that an individual might have. The options for this variable consisted of 10-14= various forms of self-employment, 20=wage/salary position, 21-23=private employer, 24-25/27-28=various forms of government employment. This variable was later recoded into 0=not working, 1=self-employed, 2=wage/salary position, 3=private work, 4=government worker. Respondents who identified as private workers still worked in a wage/salary position but did so under a private employer. Workers classified as "wage/salary" workers worked for public employers (neither private, nor government) on a wage/salary-based payment plan. Unfortunately, with the data produced, there were no public wage/salary workers in the data. This coding system was chosen as a compromise between the original coding of the data and the necessary recoding for this study.

Union Status takes into account the interaction an individual has with a union for their occupation. The available responses were 1=no union coverage, 2=involved with a union, and 3=union coverage, but not a member. The data for this variable was later recoded into 0=no union coverage and 1=union involvement or coverage.

Region was a nominal variable expressing the location of an individual within the U.S. This variable contained the possibilities of living in the 11=New England Division, 12=Middle Atlantic Division, 21=East North Central Division, 22=West North Central Division, 31=South Atlantic Division, 32=East South-Central Division, 33=West South-Central Division, 41=Mountain Division, and 42=Pacific Division. This variable was later recoded as 0=Central U.S., 1=Eastern U.S., 2=Western U.S., and 3=Southern U.S. Dummy variables were also created for later analysis.

4.2.2.3 Identity Factors

Sex, another nominal variable, compares the use of technology between 1=males and 2=females. In order to better compare and discuss the results, this variable was recoded to 0=males and 1=females.

Race/ethnicity, a nominal variable, looks at the use of technology based on an individual's race and ethnicity. The original variables were separate as race and ethnicity, but were recoded to combine the two in order to show the specific race and ethnicity all at once. The original data for race was coded as 100=white, 200=black, 300=Native American, 650-652=Asian/pacific islander, 700=other single race, and 800-830=multiple mixed races. The ethnicity variable was originally coded as 100=Mexican, 102=Mexican American, 103=Mexicano, 104=Chicano, 108=Mexican, 200=Puerto Rican, 300=Cuban, 400=Dominican, 401-500=other Spanish locations. This variable was recoded to 0=non-Latino and 1=Latino. The variables were then combined as 0=white, 1=black, 2=Asian/Hawaiian/pacific islander, 3=Hispanic, and 4=Native American/Eskimo. A dummy variable was also created for every minority race/ethnicity. For example, the black dummy variable was coded as 1=black and 0=everyone else.

Marital status is a nominal variable as well. The variable from the original data contained the following responses: 1=married (with spouse being present or 2=absent), 3=separated, 4=divorced, 5=widowed, or 6=never married/single. This variable was later recoded as 0=married (which includes spouse present and absent), 1=separated/divorced/widowed, 2=never married/single.

Children in the household is listed as a continuous variable. This variable was later recoded as 0=0 children, 1=1 child, 2=2 children, 3=3 children, and 4=4 or more children. The variable was also recoded as a binary of 0=no children in the household and 1=children in the household.

4.2.2.4 Impairments, Disabilities, and Health

Data was also provided about the impairments and disabilities of the respondents. These variables included: visual impairment, audio impairment, and physical disability. Each of these variables was a 1=yes and 2=no response in the original data. Each variable was recoded to be a 0=no disability and 1=has disability in question. Additionally, a scale was created to assess the number of disabilities an individual might have. A binary was also created as 0=no disability and 1=at least one disability.

4.3 Analyses

For this analysis, univariate, bivariate, and multivariate tests were performed using the CPS data. The univariate test explored the basic characteristics of individual variables using statistics such as mean, median, and standard deviation. The groups of interest are the three age cohorts being examined. After univariate analysis, bivariate tests were used to evaluate significant differences found between groups. Bivariate tests included an ANOVA performed on the dependent variable(s) and the independent variables by age cohort. The use of the ANOVA, in addition to zero-order correlations, independent t-tests, and chi-squared, determined any major differences between the age cohorts. As the univariate and bivariate tests were completed, a multivariate analysis was used to determine the effects of independent variables on the dependent variable(s) and whether or not said effects were impacted by age cohort. A multivariate analysis consists of ordinary least squares (OLS) multiple regression analysis.

CHAPTER 5

RESULTS

5.1 Univariate Analysis

Use of computer and internet technology ranged from 0, meaning that they did not use any internet or computer technology, 10 meaning that they used a variety of internet and computer technology with an average of 4.3, which indicates that respondents used computer and internet technology for a small number of reasons (see TABLE 1.1). The distribution of this sample, based on technology use, followed a very normal curve with a slight positive skew.

With age being the most important independent variable, the youngest age selected was 18 after age restrictions and the oldest age was 85. The average age of the respondents was 47 (see TABLE1.1). The distribution of age did not follow a normal curve and had a positive platykurtic skew. Once separated into age cohorts, Generation LF/BB (ages 51-86) represented 42.7%, while Generation X (ages 33-50) represented 32.9%, and Generation Y (ages 18-32) represented 24.4% of the sample (see TABLE 1.2).

Almost 6% of the respondents had not attained a high school diploma or GED while 25.4% reported having a high school diploma or GED. Just over 31% reported having some college or associate's degree while just over 37% had attained a bachelor's degree or higher (see TABLE 1.3). Of the 40,290 respondents in the sample, 67% were listed as employed. 3.3% reported being unemployed while 13.5% were not in the labor force and 16% reported being retired (see TABLE 1.4.1). Approximately 53% of the respondents were employed by a private employer while over 10.4% were employed by a government occupation, 7.4% reported as being self-employed, and over 29% reported not working (see TABLE 1.5). In addition to their work, 98% of respondents had no interaction or coverage with unions and 2% reported having some interaction or coverage with unions (see TABLE 1.6). Central U.S. region residents accounted for 22% of the sample, 37.5% of the respondents lived in the eastern U.S. region, 23% of the respondents lived in the western U.S. region, and 17% of respondents reported living in the southern U.S. region (see TABLE 1.7).

Within the sample, over 52% respondents identified as female and almost 48% identified as male (see TABLE 1.8). The majority of the sample was white with 69% while both black and Hispanic respondents each composed 12% of the sample. Asian/Hawaiian/Pacific Islander respondents composed 5.4% of the sample. Mixed Race respondents composed 1.3% of the sample and Native American/Eskimo represented less than 1% of the sample (See TABLE 1.9).

Almost 50% of respondents reported being married. 22.6% of respondents reported being separated, divorced, or widowed while 27.7% reported being single and/or never been married (see TABLE 1.10). Over 63% of respondents reported having no children in the house. Over 16% reported having one child in the house while 13% reported having two children in the house. 5% of respondents reported having 3 children in the house while 2% reported having 4 or more children in the house (see TABLE 1.11.1).

When asked about a variety of disabilities, 1.3% of respondents reported having a vision disability, 2.8% reported having a hearing disability, 5.7% reported having a physical disability, and 2.7% reported having a mental disability (see TABLE 1.12.1). Over 90% of the sample reported as not having any disabilities while 9.7% of the sample reported having at least one disability of any type (see TABLE 1.12.2).

5.2 Bivariate Analysis

One-way analyses of variance were conducted to evaluate the relationship between age cohorts and use of technology and number of children within the household. Generation Y reported the highest mean for use of technology with Generation X reporting the second highest for technology use, and Generation LF/BB using the least amount of technology. Technology use reports were statistically significant from each other. A relationship between age cohort and technology use does appear to be strong ($F= 2820.570$, $p<.001$) and generalizable to the population (see TABLE 2.1).

Generation Y and Generation LF/BB reported, on average, less than 1 child in the home, while Generation X reported, on average, more than 1 child in the home. The differences between generations were statistically significant. A relationship between age cohort and number of children in the household appears to be strong and generalizable to the population (see TABLE 2.1).

A zero-order correlations test was performed over age of the respondents, educational attainment, number of children in the household, and use of computer and internet technology. Age of the respondents was found to be negatively correlated (-.39, $p<.001$) with the use of technology. The younger a respondent was, the more technology they reported using. Age of the respondent was also found to be negatively correlated (-.21, $p<.001$) with the number of children in the household. The younger the respondent, the more children within the household they reported. Educational attainment was found to have a correlation with the use of technology (.30, $p<.001$). As one attained a higher level of education, their use of technology increased. (see TABLE 2.2).

A one-way analysis of variance was conducted to evaluate the relationship between technology use and educational attainment (see TABLE 2.3). The results demonstrate that, as one attains a higher level of education, their use of technology rises. Those with less than a high school diploma or GED use the least amount of technology whereas those with a professional or doctoral degree use the most amount of technology. Use of technology difference among groups were statistically significant from each other. A relationship between technology use and educational attainment appears to be strong ($F=1328.518$, $p<.001$) and generalizable to the population.

A one-way analysis of variance was conducted to evaluate the relationship between technology use and employment status (see TABLE 2.4.1). The employed group appears to use technology the most with the unemployed group close behind. Those within the retired group use technology the least with almost one whole unit behind the next closest group. Use of technology difference among groups were statistically significant from each other. A relationship between technology use and employment status appears to be strong ($F=1758.163$, $p<.001$) and generalizable to the population.

An independent samples t-test was conducted to evaluate the hypothesis that those are employed use technology more often than those who are not employed (see TABLE 2.4.2). Employed individuals reported using technology more often (4.7) than individuals who were not employed (3.5). The difference was statistically significant ($t=-63.344$, $p<.001$), and is meaningful according to Cohen's d test ($d>.20$).

A one-way analysis of variance was conducted to evaluate the relationship between technology use and worker class (see TABLE 2.5). Those within private and government work groups were found to have very similar levels of technology use. Use of technology difference among those not working and various worker classes were statistically significant from each other. A relationship between technology use and employment status appears to be strong (F=1467.753, p<.001) and generalizable to the population.

An independent samples t-test was conducted to evaluate the hypothesis that workers with union interaction use technology more often than workers without union interaction (see TABLE 2.6). Workers with union interaction reported using technology slightly more (4.5) than those without union interaction (4.3). The difference was statistically significant (t=-3.586, p<.001), but not meaningful according to Cohen's d test (d<.20).

A one-way analysis of variance was conducted to evaluate the relationship between technology use and region of residence (see TABLE 2.7). Residence within the western region of the U.S. were found to use technology the most followed closely by those living in the central U.S. Those living in the eastern U.S. closely followed those in the central U.S. while those living in the southern U.S. reported the least amount of technology use. Use of technology difference among groups were statistically significant from each other. A relationship between technology use and region of residence appears to be strong (F=25.614, p<.001) and generalizable to the population.

An independent samples t-test was conducted to evaluate the hypothesis that females use technology less often than males do (see TABLE 2.8). Females reported using technology just slightly less than males with an average use of 4.2 out of 10 compared to the male's average use of 4.4 out of 10. The difference was statistically significant (t=-8.687, p<.001), but not meaningful according to Cohen's d test (d<.20).

A one-way analysis of variance was conducted to evaluate the relationship between technology use and race/ethnicity (see TABLE 2.9). The mixed race group appeared to have the most use of technology with the Asian/Hawaiian/Pacific Islander group close behind. The Native American/Eskimo group reported the least amount of technology use. Use of technology difference among groups were statistically significant from each other. A relationship between technology use and race/ethnicity appears to be strong (F=30.752, p<.001) and generalizable to the population.

A one-way analysis of variance was conducted to evaluate the relationship between technology use and marital status (see TABLE 2.10). Those within the never married or single group reported the most use of technology while those in the separated, divorced, or widowed category reported the least amount of technology use. Those within the married category were above the separated, divorced, or widowed group, but fell quite far behind the never married or single group. Use of technology difference among groups were statistically significant from each other. A relationship between technology use and marital status appears to be strong (F=740.230, p<.001) and generalizable to the population.

An independent samples t-test was conducted to evaluate the hypothesis that those with children in the household use technology more often than those with no children in the household (see TABLE 2.11). Individuals that had children in the household reported using technology slightly more (4.5) than individuals that did not have children in the household (4.2). The difference was statistically significant (t=-12.676, p<.001), but not meaningful according to Cohen's d test (d<.20).

An independent samples t-test was conducted to evaluate the hypothesis that those with a disability use technology more often than those without a disability (see TABLE 2.12). There were four types of disabilities within the test: vision, hearing, physical, and mental disability. Those without a vision disability reported using more technology (4.3) than those with a vision disability (3.6). The difference was statistically significant (t=8.606, p<.001), and is meaningful according to Cohen's d test (d>.20). Those without a hearing disability reported using more technology (4.3) than those with a hearing disability (3.4). The difference was statistically significant (t=18.598, p<.001), and is meaningful according to Cohen's d test (d>.20). Those without a physical disability reported using more technology (4.4) than those with a physical disability (3.2). The difference was statistically significant (t=34.183, p<.001), and is meaningful according to Cohen's d test (d>.20). Those without a mental disability reported using more technology (4.3) than those with a mental disability (3.7). The difference was statistically significant (t=11.953, p<.001), and is meaningful according to Cohen's d test (d>.20).

5.3 Multivariate Analysis

The dependent variable was normally distributed and there were over 40,000 cases. Tests of the residuals did indicate some problems influenced by outliers, but there was a small number of outliers revealed by tests. Although no independent variables had a correlation of .70 or above with another independent variable, the scatterplot did not indicate a heteroscedasticity dispersion. The Mahalobnis distance test gave a value of 313.539 and the centered leverage value test reported a value greater than three times the mean, but the p-p-plot was in-line and the Cook's distance test value was 0.001. The difference made by removing outliers was minor, so the outliers were kept in the sample.

An ordinary least squares regression analysis was conducted to evaluate how well the variables age cohort, sex, race/ethnicity, educational attainment, employment status, employment type, union status, urban living status, region of residence, family type, number of children in the household, and disabilities predict the use of technology (see TABLE 3.1). Respondents who were a member of the age cohorts Generation X and Generation LF/BB saw a decrease in use of technology as compared to those in the age cohort Generation Y. Those in Generation X were found to use technology .532 less units than Generation Y while those in Generation LF/BB were found to use technology 1.369 less units that Generation Y. These relationships were statistically significant.

Results over educational attainment found that as educational attainment increased, so did use of technology. Those with a high school diploma used technology more than those without a high school diploma by .367 units. The amount of technology use increased all the way to a bachelor's degree or above, who used technology 1.595 more units than those without a high school diploma. All of these relationships were statistically significant. Results demonstrated that respondents who were employed used technology .117 units more than those who were unemployed. This relationship was statistically significant. Results over type of employment showed that self-employed workers, private workers, and government workers each used technology more than those who were not in the labor force. Those who identified as self-employed used technology more by .717 units. Those in private work used technology more than those not working by .696 units while those in government work used technology more than those not working by .808. These relationships were statistically significant. Respondents who have interactions with a worker union used technology less than those who did not interact with a worker union by .198 units. This relationship was statistically significant.

Results over region of residence indicated that residence in the eastern U.S. used technology less than those living in the northern U.S. by .022 units while those living in the western U.S. used technology more by .103 units than those living in the northern U.S. and those living in the southern U.S. use technology less than those living in the northern U.S. by .132

units. These relationships were statistically significant, excluding the eastern residence. Results over marital status indicated that those who have not been married used technology more than those who were married by .168 units. This relationship was statistically significant. Results for disabilities indicated that as the number of disabilities increased, use of technology decreased by .067 units. These relationships were statistically significant.

Being female demonstrated a small drop in technology use (.026) less units than being male. This relationship was statistically significant. Results over race and ethnicity found that respondents who identified as black, Native American, and Latin used technology less than those who identified as white by .085 to .307 units. However, those who identified as Asian or mixed race/ethnicity used technology more than those who identified as white by .038 to .273 units. All race/ethnicity variables, excluding Asian, were statistically significant.

When comparing standardized betas, three variables were found to have a difference above 0.200: Generation LF/BB, associate's degree, and bachelors or above. Having a bachelor's degree or above had the greatest effect with a standardized beta of .395. With a standardized beta of .347, being in the age cohort Generation LF/BB seems to have the second greatest effect on one's technology use. Having some college/associate's degree (.274) also seem to have great effect on the use of technology as well. Also, when comparing standardized betas, two variables were found to have a difference of 0.015 or below: black and Native American status. Both of these variables had a standardized beta of .011 to 0.014, indicating that these variable characteristics have less effect on the use of technology. All of these relationships were statistically significant.

As predicted in my hypothesis, those in the LF/BB age cohort reported using technology less often than generation X and Y age cohorts. Respondents who reported having a higher educational attainment reported using technology more than those with lower educational attainment, as predicted by my hypothesis. Respondents who were employed did use technology more often than those unemployed, as predicted by my hypothesis. Contradictory to my hypothesis about disabilities, most respondents with a disability reported using technology less than those without a disability. Also, contradictory to my last hypothesis, there was a difference in significance between the sexes when it comes to reported uses of technology.

The adjusted R^2 is .255 ($p<.001$) for the OLS regression model containing all three model segments, so that over a quarter of the variance in technology use is explained by all of these variables in combination (see TABLE 3.2). When the occupational and location factor is removed, the R^2 value decreases to 0.194. When the identity factors are removed, the R^2 value decreases to 0.253, and when the age factors are removed, the R^2 value drops to 0.196. Therefore, occupational and location factors have the greatest impact on technology use while the age cohort factors have the second greatest impact on technology use and identity factors have the least impact on technology use. The age cohort's factors account for 48% of the unique variance, occupational and location factors account for 50% of the unique variance, and identity factors account for 2% of the unique variance. Based on the results of the variance, the logic model is correct in assuming that technology use is greatly influenced by occupational and location factors, as well as age cohort factors. While the identity segment within logic model does include disabilities, that group of variables does not have nearly as much influence as the other two.

Referring back to the TAM model discussed in previous literature, "social influence" is listed as one of the key factors in accepting technology (Conci et al. 2009). Through the combination model, it is clear that social factors such as membership to an age cohort or occupation and location do play very important roles in whether or not an individual uses technology. The TAM also states that many older adults see certain forms of technology, such as the internet, as a luxury rather than a necessity (Conci et al. 2009). This could be a potential explanation for why the older adults in the sample do not use as much computer and internet technology. There is also potential for the TAM to express how different factors such as social influence and self-actualization might affect the use of technology among younger people.

Of the main differences between the cohort models in the OLS regression, the adoption of technology in relation to having an impairment/disability was noted to change. Older adults with disabilities were less likely to use technology by .065 units and that was found to be statistically significant. Age cohorts Generation Y and X, although not statistically significant, were found to use technology more with disabilities by .061 and .025, respectively. The interesting message here is that younger people seem to be more comfortable accepting technology assistance for their disabilities and impairments whereas older adults are rejecting technology if they have disabilities or impairments.

CHAPTER 6

DISCUSSION, LIMITATIONS, IMPLICATION, AND CONCLUSION

6.1 Discussion

Studies of age, occupation, location, identity, and disability factors influence the use of technology. For example, scholars of gerontology suggest that older women are the bearers of family contact, meaning that they must maintain communication for the family members as they spread throughout the land. Because of this position within the family, they might be more likely to use communication technology in order to maintain contact. Other scholars suggest that individuals with higher education might have more experience and acceptance of technology as it is more commonly needed in today's society for the completion of school work, learning, and coordinating events with peers.

At the multivariate level, an OLS regression revealed that, when all factors are controlled for, Generation X and LF/BB use technology less than those who belong to the age cohort Generation Y. This difference in technology use could be attributed to the fact that younger people have grown up with this technology as opposed to older adults who are being introduced to this technology later in life. This data did support hypothesis 1 as Generation LF/BB used less technology than Generations X and Y. Further supporting the pattern of younger people using more technology, the OLS Regression also revealed that Generation X uses less technology than Generation Y.

Referring back to Broady et al. (2010), this could be due to the many counteractive factors that prevent older adults from understanding the relativity of technology such as personal gain. Another factor that previous literature suggests that, according to Dickinson et al. (2007), even when technology is designed with older adults in mind, little influence or testing is done in the presence of older adults. Most technology is often design-tested by younger adults, even when made for older adults (Dickinson et al. 2007). The previous research supports the findings of older adults using less technology than younger adults and even gives possible insight as to why. One example, when looking at internet specifically, Sayago & Blat (2010) stated that one of the most common utilizations of the internet by older adults was for email. From this study, several elements of internet use compose the dependent variable of technology. Even if most of the older adults are using the internet for email communications, that is but one of the many uses that are measured. That being said, it would have been possible to do an analysis just using this specific variable.

When assessing the use of technology use based on education when controlling for all other factors, the OLS regression found that with a higher level of educational attainment, respondents used more technology. As discussed in the first paragraph of this section, this could most likely be attributed to the changing environment of higher learning and the dependency on computer technology. Each additional level, in terms of educational attainment increased the amount of computer technology used, supporting hypothesis 2. Previous literature by Gell et al. (2013) stated that there is a positive relationship between technology use and educational attainment. Czaja et al. (2006) even stated that educational attainment followed a similar pattern of influence to one's socioeconomic status, which further supported the decision to replace income with education as the proxy independent variable. Finally, Gibson and Lurvey (2017) addressed how introducing technology early on in the educational setting socialized individuals to have perceived importance of technology later in life. With the use of technology increasing at higher levels of educational attainment, it supports the idea that continued exposure to technology could increase the perceived importance of said technology throughout one's life.

When controlling for all other factors, the OLS regression found that individuals who were employed did, in fact, use more technology than individuals who were not employed. This supported hypothesis 3 and could most likely be attributed to a similar pattern as seen with higher education: more adoption of technology in the environment. As technology advances to make our lives easier, it is most likely going be incorporated into daily work lives as time moves on. The concept of technology becoming incorporated into our daily lives could come in the form of voluntary adoption or forced adoption. This is supportive of previous literature by DiMaggio et al. (2004) who stated that employed individuals were habitual users of internet media and resources.

In a further analysis on technology in the workplace, it was found that government workers do use technology more than people not working, but not more than private workers; rejecting hypothesis 4. Although, private workers and government workers, when compared within the OLS regression, were almost the same. This higher use of technology could most likely be attributed to the need for modernized record keeping demands within the occupation types which are moving towards becoming completely digital. Previous literature reviewed explored contrasting ideas of employment type's influence on the use of technology. While Meuter et al. (2003) discussed that those within private or government employers were more skeptical of newer technologies, Kwon and Chidambaram (2000) stated that employment type had little to no effect on the use of technology. Findings by Meuter et al. (2003) contradicted my findings in that government workers and private workers were found to use technology more than other worker types.

In terms of region of residence, people within the western region did use more technology than any other region, according to the OLS regression. This could be attributed to a variety of factors including many urban/suburban settings in the western region, more occupational demands for the adoption of technology, and so on. This result did support hypothesis 5. It should also be noted that the western region was the only region to report higher use of technology compared to the North. The southern region even reported a significant drop in technology use compared to the other regions. Referring, once again, to DiMaggio et al. (2004)'s previous literature, residence of the Northeast and far West regions reported using technology the most. This did support the findings in this study.

Hypothesis 6 suggested that there would be no significant differences in technology use based on sex. When controlling for all other factors, it was found that females did report using less technology than males. Although this result was significant, the difference was rather small. This result does create some confusion as this opposes the possibility that older females might be the ones keeping communication within the family, but that could be explained by hypothesizing that they are not utilizing technology to perform in said family role or that maybe older males are taking up said role as well. The results of this section fit the previous literature by Loe (2010) in that Loe reported how women tend to be less familiar with different times of technology. In fact, Loe (2010) reported that most forms of technology that women reported comfort and familiarity with were household technologies (types of technology not included within the data used). Nägle and Schmidt (2012) also reported that older women were more reluctant to accept computer technology for tasks in everyday life, which could be a possible explanation to the results found in this study.

Those who identified as mixed race, when controlling for all other factors, were found to use more technology than those who identified as white. This result rejects hypothesis 7 and could have a number of explanations. However, these results contradict findings from Gell et al.

(2013), who stated that white educated, married, males were found to be the most avid technology users. However, Jackson et al. (2008) stated that black females used internet technology the most during their study. Either way, none of the findings in previous literature agree with the findings found in this study.

Hypothesis 8, which stated that individuals with disabilities/impairments would be more likely to use technology than those without, was rejected by the OLS Regression when controlling for all other factors. There was a minor, but significant drop in technology use for respondents who also reported having at least one type of disability or impairment. Findings from previous literature by Ball (2006) and Schulz et al. (2015) contradicted findings in this study by stating that certain types of technology would influence people with disabilities to utilize technology. On the other hand, findings by Gell et al. (2013), Copelton (2010), and Czaja (2015) all stated findings over the lack of technology that is being utilized by people with disabilities or impairments; especially by older adults with disabilities or impairments. Results from the age cohort models suggest that younger adults do tend to utilize technology more with more disabilities, but that is not the case for older adults.

6.2 Limitations

In terms of limiting issues, type of technology use questioned and data weight restrictions on different types of income were the two most influential limitations. When discussing types of technology, there are multiple ideas that come to someone's mind and many different definitions known to the general public. As seen in the literature review, there are different types of technology that each have their own set of obstacles for new users. The data only contained questions over the internet and computer use by respondents. This leaves out two major areas of common technology utilized by the general population: cellular technology and digital media technology. Although there were questions that asked about phone use or gaming through the internet, there are many other uses that were not questioned. Having more data over different types of technology used could have given a more in-depth look at the spread of technology use based on age cohort.

Secondly, due to compatibility issues across the general CPS and internet supplement, an income variable was not available for this project. This put a major limitation on the study as income was predicted to be a major influential factor on the access to and use of technology. Education was chosen to replace income as a major influential factor for access to and use of technology. Education was chosen as a proxy for socioeconomic status as it is a factor comparable to socioeconomic status. Much like income, metropolitan-living was another variable that had to be removed due to compatibility issues. More emphasis was placed on region of residence in order to compensate for the limitations of the metropolitan-living variable.

The representation of educational attainment in this sample was considerably high compared to the national average. This is a limitation as the sample is not representative due to focusing more on higher educated people. It is possible that those with lower educational attainment might have been removed from the sample due to having missing data or may have neglected to take the survey to begin with.

Another minor limitation would be the fact that technology has been advancing so quickly during the 2010's. As this data was collected in 2015, making it nearly three years old, I would predict that the results of these tests have already changed. There are also new forms of technology that could influence the use of computers and the internet such as smart homes and wearable technology. I consider this a minor limitation due to the fact that with a constant increase in technological output, this will be an issue no matter how fast a study is performed. As a byproduct of the data being outdated in terms of technology, there is also the possibility that more older adults have probably adopted additional forms of technology by this point.

6.3 Implications

The major implication from this study is that in the currently, older adults have shown to be using less computer and internet technology. Previous literature stated that, even for adults who are willing to adopt technology, they must do so at a slower pace. This puts the majority of older adults at risk for disengagement from society due to many factors. The first is that refusing to accept newer means of communication could lead to less communication with younger members of society overall. Second, society seems to have less patience and concern for older adults who are attempting to learn to adopt different forms of technology, putting those who want to adopt technology at risk of being pushed out by society. Finally, with the exponential rate of technology advancement, even for those older adults who want to adopt the newer technology and can do it before society loses patience, they may not understand that this is a continuous process and that there is no “finish line” to fully understanding the current technology.

Referring back to the partitioning of variance, it was found that, within the combination model, the age cohort segment had the greatest influence on the adoption of technology. Older adults within Generation LF/BB used technology less than those in Generations X and Y. This means that, for a variety of possible reasons, age cohort is a powerful determining factor in whether or not someone will choose to adopt technology. It is likely that this pattern could change over time as Generation Y eventually becomes the older population and this behavior of adopting the newest technology becomes a regular socialized pattern among all age cohorts.

Going back to Hypothesis 8, older adults with disabilities tended not to utilize technology, but younger people with disabilities did show an increase in adoption of technology. One possible explanation for this could be that older adults with disabilities and/or impairments may have lived with their disabilities and/or impairments longer, if not all of their lives. Because of this, they might not see a reason to go through the trouble of learning new technologies this late in their lives. Younger people, on the other hand, might have an easier time becoming accustomed to using assistive technology since they have the benefit of growing up with technology and being introduced to assistive technology at an earlier age.

With age cohorts being a major factor in determining the adoption of technology and previous literature addressing the lack of older adults involved in technology development (especially technology being developed specifically for older adults), we must focus on ways to better incorporate older adults into the technology development process. One change this might include is holding technology development companies more accountable for their testing processes and how under-representative some of their testing groups may be. If technology is being designed for older adults, these companies should listen to the input of older adults and older adults should be there for the testing and final development stages.

In terms of society, the implications from this study suggest that society must focus on educational attainment and the influence it can have on the amount of technology used. We must be willing to accept that as time moves forward, so will technology in the classroom and that is not a negative feature. Older adults did not have as much technology in their educational setting throughout life, therefore it was not perceived as important, but for younger adults, technology may be perceived as more important. Therefore, the introduction and acceptance of technology in the educational setting may have an influence on technology in our society overall.

CHAPTER 7

CONCLUSION

In conclusion, it can be said that older adults do not use technology as much as younger and middle-aged adults. When discussing the disengagement of older adults based on technology, it is important to remember that: society rejecting older adults for their lack of ability to quickly adopt technology is just as likely, if not more likely, than older adults purposefully disengaging from society due to their rejection of technological norms. In our culture, we tend to forget or leave behind older adults and all of the knowledge and wisdom they have. With the advancements made in technology as of today, we have the ability to give older adults an outlet so that they may spread said knowledge and wisdom, but we must make sure not to let society push them out simply because it takes them longer to fully adopt technology.

Results suggest that with higher education, people will be more inclined to adopt technology in their daily lives. In order to avoid disengagement of older adults in the future, we must apply more emphasis to the importance of education and the influences it has on our lives. For older adults in the current time, unless going back to the institution of education is an option, we must emphasize to younger adults that older adults do need more time to experience and adopt technology and that design companies should focus more on the needs of older adults when designing “easy to learn” technologies. Easy to learn technologies are even more crucial for older adults as more health care encounters are taking place online.

Many different influential factors are in play when determining how much technology an individual will use in their day-to-day lives. Besides age, education was found to be one of the most influential factors in the adoption and utilization of technology. With higher educational attainment, more respondents utilized technology. I foresee this trend to increase in significance and intensity as education levels rise and technology advances. I believe that socioeconomic inequality will slow this advancement of technology, but not stop it. This is because as newer, more expensive forms of technology are introduced, older forms that are still available drop in value and become more affordable. Future studies and continuations of this study would include a focus on older adults and the differences between biological sex and the use of technology, a stronger and more specific data set that could explore additional types of technology, and even forming this study into a type of comparative study to see how the results of these tests change over time. A comparative study could be performed by repeating this study every two years and after there are enough samples collected from this repeated study, the results could be compared in order to see how technology adoption has changed with more younger adults becoming older adults.

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APPENDIX

Univariate Tables

TABLE 1.1: Age, Weekly Earnings, and Technology Use Descriptive Statistics

	Range	Mean	Std. Deviation
Age as of 2015	18-85	47.015	16.767
Computer and Internet Use	0-10	4.311	1.950

Source: 2015 Current Population Survey
N= 40,290

TABLE 1.2: Frequencies of Age Cohorts

	Frequency	Percent
Generation Y	9831	24.4
Generation X	13249	32.9
Generation LF/BB	17210	42.7

Source: 2015 Current Population Survey
N= 40,290

TABLE 1.3: Frequencies of Educational Attainment

	Frequency	Percent
Less than High School Diploma/GED	2358	5.9
High School Diploma/GED	10236	25.4
Associates Degree/Some College	12718	31.6
Bachelors/Graduate/Professional Degree	14978	37.2

Source: 2015 Current Population Survey
N= 40,290

TABLE 1.4.1: Frequencies of Employment Status

	Frequency	Percent
Unemployed	1323	3.3
Employed	27054	67.1
Not In Labor Force	5432	13.5
Retired	6481	16.1

Source: 2015 Current Population Survey
N= 40,290

TABLE 1.4.2: Binary Frequencies of Employment Status

	Frequency	Percent
Not Employed	13236	32.9
Employed	27054	67.1

Source: 2015 Current Population Survey
N= 40,290

TABLE 1.5: Frequencies of Worker Class

	Frequency	Percent
Not Working	11750	29.2
Self-Employed	2975	7.4
Private	21366	53.0
Government Work	4200	10.4

Source: 2015 Current Population Survey
N= 40,290

TABLE 1.6: Frequencies of Union Interaction

	Frequency	Percent
No Union Coverage	39504	98.0
Involved/Covered by Union	786	2.0

Source: 2015 Current Population Survey
N= 40,290

TABLE 1.7: Frequencies of Residence Region

	Frequency	Percent
Central U.S.	8953	22.2
Eastern U.S.	15100	37.5
Western U.S.	9282	23.0
Southern U.S.	6955	17.3

Source: 2015 Current Population Survey
N= 40,290

TABLE 1.8: Frequencies of Biological Sex

	Frequency	Percent
Female	21103	52.4
Male	19187	47.6

Source: 2015 Current Population Survey
N= 40,290

TABLE 1.9: Frequencies of Race/Ethnicity

	Frequency	Percent
White	27699	68.7
Black	4649	11.5
Native American/Eskimo	243	0.6
Asian/Hawaiian/Pacific Islander	2161	5.4
Hispanic/Latino	5002	12.4
Mixed Race	537	1.3

Source: 2015 Current Population Survey
N= 40,290

TABLE 1.10: Frequencies of Marital Status

	Frequency	Percent
Married	20044	49.7
Separated/Divorced/Widowed	9095	22.6
Never Married/Single	11151	27.7

Source: 2015 Current Population Survey
N= 40,290

TABLE 1.11.1: Frequencies of Children in Household

	Frequency	Percent
No Children	25658	63.7
1 Child	6506	16.1
2 Children	5313	13.2
3 Children	2014	5.0
4 or more Children	799	2.0

Source: 2015 Current Population Survey
N= 40,290

TABLE 1.11.2: Binary Frequencies of Children in Household

	Frequency	Percent
No Children	25658	63.7
Children in Household	14632	36.3

Source: 2015 Current Population Survey
N= 40,290

TABLE 1.12.1: Frequencies of Disability

		Frequency	Percent
Vision	Does not Have Disability	39747	98.7
	Has Disability	543	1.3
Hearing	Does not Have Disability	39145	97.2
	Has Disability	1145	2.8
Physical	Does not Have Disability	37980	94.3
	Has Disability	2310	5.7
Mental	Does not Have Disability	39188	97.3
	Has Disability	1102	2.7

Source: 2015 Current Population Survey
N=
40,290

TABLE 1.12.2: Binary Frequencies of Disability

	Frequency	Percent
No Disability	36365	90.3
At least 1 Disability	3925	9.7

Source: 2015 Current Population Survey
N= 40,290

Bivariate Tables

TABLE 2.1: One-Way Analysis of Variance for Age Cohort by Technology Use & Number of Children in the Household

	Age Cohort							
	Generation Y		Generation X		Generation LF/BB			
Variable	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	F	*df*
Use of Computer and Internet Technology	5.1515	1.95981	4.6807	1.87941	3.5465	1.70135	2820.570***	40288
Number of children in household	.5465	.94463	1.1952	1.19533	.3000	.66280	3514.207***	40288

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

Source: Current Population Survey
N= 40,290

TABLE 2.2: Zero Order Correlation Among Age, Number of Children in the Household, & Technology Use

	Age as of 2015	Educational Attainment	Number of children in household
Age as of 2015	---		
Educational Attainment	0.037***	---	
Number of children in household	-0.206***	-0.038***	---
Use of Computer and Internet Technology	-0.385***	0.296***	0.061***

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

Source: Current Population Survey
N= 40,290

TABLE 2.3: One-Way Analysis of Technology Use by Educational Attainment

	Use of Technology			
	Mean	Std. Deviation	F	*df*
Less than High School Diploma/GED	3.1896	1.68925	1328.518***	40288
High School Diploma/GED	3.5753	1.74439		
Associates Degree/Some College	4.4224	1.91113		
Bachelors/Graduate/Professional Degree	4.8961	1.91754		

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

Source: Current Population Survey
N= 40,290

TABLE 2.4.1: One-Way Analysis of Technology Use by Employment Status

	Use of Technology			
	Mean	Std. Deviation	F	*df*
Unemployed	4.5639	1.85072	1758.163***	40288
Employed	4.7107	1.91468		
Not In Labor Force	3.9148	1.86626		
Retired	2.9237	1.40682		

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

Source: Current Population Survey
N= 40,290

TABLE 2.4.2: Comparison of Mean Technology Use by Employment Status

		N	Mean	Std. Deviation	T-Test	Cohen's d
Use of Computer and Internet Technology	Not Employed	13236	3.4944	1.75691	-63.344***	0.64
	Employed	27054	4.7107	1.91468		

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

Source: Current Population Survey
N= 40,290

TABLE 2.5: One-Way Analysis of Technology Use by Worker Class

	Use of Technology			
	Mean	Std. Deviation	F	*df*
Not Working	3.3652	1.6972	1467.753***	40288
Self-Employed	4.4788	1.86272		
Private	4.7006	1.93009		
Government Work	4.8574	1.84776		

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

Source: Current Population Survey
N= 40,290

TABLE 2.6: Comparison of Mean Technology Use by Union Status

		N	Mean	Std. Deviation	T-Test	Cohen's d
Use of Computer and Internet Technology	No Union Coverage	39504	4.3065	1.95200	-3.586***	0.12
	Involved/Covered by Union	786	4.5427	1.82542		

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

Source: Current Population Survey
N= 40,290

TABLE 2.7: One-Way Analysis of Technology Use by Region

	Use of Technology			
	Mean	Std. Deviation	F	*df*
Central U.S.	4.3211	1.96640	25.614***	40288
Eastern U.S.	4.2899	1.94042		
Western U.S.	4.4392	1.96533		
Southern U.S.	4.1736	1.91763		

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

Source: Current Population Survey
N= 40,290

TABLE 2.8: Comparison of Mean Technology Use by Sex

		N	Mean	Std. Deviation	T-Test	Cohen's d
Use of Computer and Internet Technology	Female	21103	4.2306	1.92015	-8.687***	0.08
	Male	19187	4.3997	1.97830		

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

Source: Current Population Survey
N= 40,290

TABLE 2.9: One-Way Analysis of Technology Use by Race/Ethnicity

	Use of Technology			
	Mean	Std. Deviation	F	*df*
White	4.2794	1.93878	30.752***	40288
Black	4.3157	1.92347		
Native American/Eskimo	3.9366	1.82813		
Asian/Hawaiian/Pacific Islander	4.7130	1.98355		
Hispanic/Latino	4.2683	1.98666		
Mixed Race	4.8610	2.04622		

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

Source: Current Population Survey
N= 40,290

TABLE 2.10: One-Way Analysis of Technology Use by Marital Status

	Use of Technology			
	Mean	Std. Deviation	F	*df*
Married	4.1985	1.91000	740.230***	40288
Separated/Divorced/Widowed	3.8766	1.84202		
Never Married/Single	4.8680	1.98136		

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

Source: Current Population Survey
N= 40,290

TABLE 2.11: Comparison of Mean Technology Use by Children in the Household

		N	Mean	Std. Deviation	T-Test	Cohen's d
Use of Computer and Internet Technology	No Children	25658	4.2194	1.97636	-12.676***	0.13
	Children in Household	14632	4.4720	1.89188		

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

Source: Current Population Survey
N= 40,290

TABLE 2.12: Comparison of Mean Technology Use by Disability

Use of Computer and Internet Technology		N	Mean	Std. Deviation	T-Test	Cohen's d
Vision Disability	Does not Have Disability	39747	4.3209	1.94866	8.608***	0.37
	Has Disability	543	3.5965	1.90673		
Hearing Disability	Does not Have Disability	39145	4.3392	1.94787	18.598***	0.51
	Has Disability	1145	3.3511	1.76678		
Physical Disability	Does not Have Disability	37980	4.3798	1.94749	34.183***	0.61
	Has Disability	2310	3.1824	1.61360		
Mental Disability	Does not Have Disability	39188	4.3295	1.95001	11.953***	0.34
	Has Disability	1102	3.6601	1.83014		

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

Source: Current Population Survey
N= 40,290

Multivariate Tables

TABLE 3.1: Ordinarily Least Squares Regression Results for Technology Use

	Full Model			Generation Y Model			Generation X Model			Generation LF/BB Model		
	B	Std. Error	Beta	B	Std. Error	Beta	B	Std. Error	Beta	B	Std. Error	Beta
Generation X	-.532	.025	-.128***	---	---	---	---	---	---	---	---	---
Generation LF/BB	-1.369	.026	-.347***	---	---	---	---	---	---	---	---	---
High School Diploma	.367	.039	.082***	.378	.082	.086***	.437	.069	.098***	.256	.058	.066***
Associates Degree	1.149	.039	.274***	1.293	.081	.316***	1.333	.068	.322***	.878	.057	.239***
Bachelor's or Above	1.595	.039	.395***	1.552	.085	.365***	1.914	.067	.502***	1.332	.057	.379***
Employed	.117	.045	.028**	-.198	.082	-.043*	.168	.080	.035*	.352	.074	.103***
Self Employed	.717	.056	.096***	.537	.135	.049***	.416	.102	.062***	.713	.084	.119***
Private Work	.696	.047	.178***	.547	.090	.129***	.470	.089	.121***	.694	.075	.196***
Government Work	.808	.053	.127***	.822	.111	.116***	.482	.097	.088***	.754	.081	.128***
Union Status	-.198	.062	-.014***	-.388	.148	-.025**	-.144	.098	-.012	-.142	.093	-.011
East Residence	-.022	.023	-.006	-.059	.051	-.014	-.010	.041	-.003	-.018	.031	-.005
West Residence	.103	.026	.022***	.047	.057	.010	.167	.046	.038***	.090	.035	.022*
South Residence	-.132	.027	-.026***	-0.172	.058	.035**	-.063	.049	-.013	-.165	.039	-.033***
Female	-.026	.017	-.070	-.056	.039	-.014	-.048	.031	-.013	-.009	.024	-.003
Black	-.085	.028	-.014**	-.154	.057	-.028**	-.116	.047	-.021*	-.008	.043	-.001
Native	-.307	.109	-.012**	-.407	.229	-.017	-.405	.182	-.018*	-.144	.165	-.006
Asian	.038	.038	.004	.139	.082	.017	-.030	.062	-.004	-.127	.061	-.015*
Latin	-.121	.028	-.021***	-.160	.052	-.032**	-.140	.046	-.027**	-.012	.049	-.002
Mixed	.273	.074	.016***	.284	.130	.021*	.340	.132	.021**	.118	.124	.007
Was Married	.033	.022	.007	-.161	.086	-.019	.115	.041	.024**	.031	.026	.009
Never Married	.168	.024	.039***	.129	.048	.031**	.151	.042	.034**	.042	.042	.007
Children in the Household	.003	.020	.001	-.357	.047	.084***	.063	.034	.016	.132	.030	.032***
Disabilities	-.067	.021	-.015***	.061	.075	.008	-.025	.047	-.004	-.065	.023	-.021**
R^2		.255			.120			.159			.195	
F		601.706***			64.655***			120.038***			198.604***	
N		40289			9830			13248			17209	

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

Source: 2015 Current Population Survey

TABLE 3.2: Partitioning Unique Variance: Regression on Technology Use

Predictors	B	Beta	Sig.	Zero-order	Partial	Part	Sq. Part	Per Model Segment	Percent of Total
Generation X	-.532	-.128	.000	.133	-.107	-.092	0.009		
Generation LF/BB	-1.369	-.347	.000	-.339	-.251	-.224	0.050	0.059	47.98%
High School Diploma	.367	.082	.000	-.220	.047	.040	0.002		
Associates Degree	1.149	.274	.000	.039	.147	.128	0.016		
Bachelor's or Above	1.595	.395	.000	.231	.201	.177	0.031		
Employed	.117	.028	.010	.293	.013	.011	0.000		
Self Employed	.717	.096	.000	.024	.064	.055	0.003		
Private Work	.696	.178	.000	.212	.073	.063	0.004		
Government Work	.808	.127	.000	.096	.076	.065	0.004		
Union Status	-.198	-.014	.001	.017	-.016	-.014	0.000		
East Residence	-.022	-.006	.327	-.008	-.005	-.004	0.000		
West Residence	.103	.022	.000	.036	.020	.017	0.000		
South Residence	-.132	-.026	.000	-.032	-.024	-.021	0.000	0.061	50.30%
Female	-.026	-.007	.128	-.043	-.008	-.007	0.000		
Black	-.085	-.014	.002	.001	-.015	-.013	0.000		
Native	-.307	-.012	.005	-.015	-.014	-.012	0.000		
Asian	.038	.004	.317	.049	.005	.004	0.000		
Latin	-.121	-.021	.000	-.008	-.022	-.019	0.000		
Mixed	.273	.016	.000	.033	.018	.016	0.000		
Was Married	.033	.007	.141	-.120	.007	.006	0.000		
Never Married	.168	.039	.000	.177	.034	.030	0.001		
Children in the Household	.003	.001	.895	.062	.001	.001	0.000		
Disability	-.067	-.015	.001	-.143	-.016	-.014	0.000	0.002	1.73%
				Total Unique Variance			0.122		
				Total Shared Variance			0.133		
				Total Variance (R^2)			0.255		

Source: 2015 Current Population Survey

N= 40,290