2017-07-01

Current Patterns of Ownership and Usage of Mobile Technology in Older Adults

Karen E. Cottle
Brigham Young University

Current Patterns of Ownership and Usage of Mobile Technology in Older Adults

Karen E. Cottle

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of

Master of Science

Peter J. Rich, Chair
Randall Davies
Charles R. Graham

Department of Instructional Psychology and Technology

Brigham Young University

ABSTRACT

Current Patterns of Ownership and Usage of Mobile Technology in Older Adults

Karen E. Cottle
Department of Instructional Psychology and Technology, BYU
Master of Science

The older generation is growing at a rate surpassed only by the speed at which mobile technology is advancing. Technology has become so ubiquitous in daily life, that most older people have done their best to adopt it. The purpose of this study was to explore the older adult (>50 yrs.) learner's everyday approach to and regard for mobile technology. Paper surveys were distributed by hand to four geographically diverse audiences. Each audience was composed of a minimum of 20 adult learners of each gender across three age groups, accounting for 160 individual older adults in all. Returned survey data (N = 107) were examined using either an ANOVA or Kruskal-Wallis H test for statistical significance, and appropriate post hoc analyses—Tukey's or pairwise comparisons—were applied to determine which age differed significantly. A targeted thematic analysis of open-ended survey answers uncovered supporting or refuting empirical information to elaborate on the quantitative findings. Results reveal that mobile device ownership declined with age. However, usage tasks were found to significantly differ across age groups. The most revealing result is one of non-significance: no learning strategies were found to be significant for any age. Qualitative elements illuminated the desire for ideal, personalized learning situations across all age groups. Implications are discussed in regard to designing ideal learning environments for older adults in learning newer technology.

Keywords: adult learner, older learner, technology, senior, adoption, devices and technologies

ACKNOWLEDGMENTS

With deepest appreciation for years of patience and support on this long and winding road, I hereby extend my sincerest gratitude to the following:

Dr. Peter Rich, for seeing me through the toughest academic time of my life and for suggesting the idea of IP&T in the first place; my committee members, for their never-ending encouragement, smiling faces, and gracious natures; Dr. Lynn Richards, for his inexhaustible devotion to my sanity and believing in this possibility more than anyone at times; my parents and family, for unwavering emotional and spiritual support and humorous diversions; above all, utmost indebtedness to my Father in Heaven for His divine intervention in this academic endeavor.

TABLE OF CONTENTS

LIST OF TABLES

DESCRIPTION OF THESIS CONTENT AND STRUCTURE

The world's population is getting older every year. As the population ages, old individuals see technological advances happening at an alarming rate. Today, technology has become so ubiquitous in daily life, that most older people have done their best to adopt it. Unfortunately, the perspective of the older user has not been foremost in the design of devices, thereby leaving the older users to fend for themselves.

Research Need

Current national data shows that older adults are buying devices and connecting to the mobile world more than ever before. They own mobile devices, sometimes multiple devices, and use them as competently as their limited knowledge allows. They are aware of the affordances of such technologies, but the prevailing view of this population is that they are slow, stubborn, and disadvantaged technologically. Recent studies have disputed such claims, finding that adult learners are aware of their lagging in fluency and can perform to a similar level as their younger peers. Most studies gather a group of older adults, provide a training on some technology, and then follow up with questions regarding their sentiment.

Research Agenda

Conversely, the purpose of this study was to investigate the older adult (>50 yrs.) learner's everyday approach to and regard for mobile technology. On the whole, technology holds the potential for connectedness, education, and personal enlightenment, but how do these people feel about it? How do they see mobile technology? Is it worth it to them to learn to use new devices? Do they understand the possible benefits for their lives as a whole?

Thesis Structure

This thesis follows a journal-ready format. The study reported herein was conceived,

designed, conducted and analyzed using a paper-based survey handed out to older adults (N = 115) in four different locations (uptown (urban), downtown (urban), suburban, and rural). Data were analyzed using ANOVA and Kruskal-Wallis H tests with subsequent post-hoc methods, with targeted qualitative analyses used to provide greater insight into observed differences. Results are discussed regarding current research on the use of technology by older adults. This article will be submitted to *Educational Gerontology*.

Current Patterns of Ownership and Usage of Mobile Technology in Older Adults

Senior citizens represent the fastest growing demographic worldwide (Seals, Clanton, Agarwal, Doswell, & Thomas, 2008). In the United States alone, the 2010 census confirms this observation by reporting that, "between 2000 and 2010, the population 65 and older grew 15.1 percent, while the total US population grew 9.7 percent" (U.S. Census Bureau, 2010, para. 3). With the older population growing at such a distinctly higher rate, the adoption and usage of mobile technologies by this demographic present an increasingly intriguing intersection in the kaleidoscope of learning.

Though seen as slow and stubborn in their approach, older adults can be observed buying and using mobile devices daily. Their typical usage may not constitute an incessant, borderline-addiction-like practice as can be seen in younger users today, but they have found ways to utilize mobile technologies in their lives. They seem cognizant of the overwhelmingly endless possibilities within their devices but may not employ such measures.

What is behind the difference in adoption and usage of technology by older adults? Most studies gather a group of older adults, provide a training regarding the basic usage of some technology, and then follow up with questions regarding their sentiment. While such experiments may reveal important ways in which older adults might learn to use new technologies, they do not provide an authentic view of actual device use among older adults or, equally importantly, reveal their feelings concerning mobile technology in their daily lives. The purpose of this study was to explore the older adult (>50 yrs.) learner's everyday approach to and regard for mobile technology. Specifically, in what ways do older adults utilize and perceive the usefulness of mobile technology for day-to-day interactions?

Review of Literature

Typical ageist views perceive this older population as "poor" and "resistant to change" (Cutler & Joyce, 2005, p. 67) or simply reluctant to accept information technology (Morris & Venkatesh, 2000; Niehaves & Plattfaut, 2014), thereby neglecting any pertinent information concerning their learning styles. Nevertheless, more recent studies are beginning to challenge that perspective. The most recent national data gathered by the Pew Research Center in Washington D.C. show that mobile phone ownership is growing in older adults. Rainie (2017), the director of Internet, Science and Technology research at the Pew Research center, revealed a national shift toward wireless connectivity across all ages, incomes, educational attainment, races and ethnicities, and community types. Specifically, 74% of 50 – 64 year olds own a smart phone as well as 42% of 65+ year olds. The trend of mobile ownership by the 65+ group has climbed from nearly zero back in 2001, yet this older group is still lagging behind the younger group (Rainie, 2017).

The impact of the trend in aging displayed within the 2010 census data, and the recent release of information from the Pew Research center, is immeasurable, and the extent of its global effect on society, economy, politics, and health care institutions has no precedent (Huber & Watson, 2014). Though the ageist view claims that ever-evolving advances in technology have already surpassed the aging population's capabilities, evidence to the contrary prevails. "As individuals move into retirement and older age, they run the risk of losing out on the myriad [of] benefits afforded by effective digital engagements," (Robinson et al., 2015, p. 572); however, the aptitude of older adults to remain physically, mentally, and socially interactive discussed by Purdie and Boulton-Lewis in 2003 is even more prevalent today.

The related body of work concerning seniors' overall connectivity and ICT (information and communication technology) adoption has begun to expand in the last decade. In 2005, Renold, Meronk, and Kelly established the importance of positive attitudes coupled with appropriate implementation of information technology and the accompanying potential for service agencies to provide higher-quality assistance to the aging population more efficiently while lowering costs. Gatto and Tak reported that internet use was deemed important in the lives of the 58 southern seniors they studied, even though they felt trepidation regarding privacy safety (2008). Hale, Cotten, Drentea, and Goldner's 2010 work highlights the importance of the availability of connectivity for seniors' use of the internet in rural areas to effectively afford them the possibilities of information technology. Huber and Watson (2014) found that older adults expressed excitement toward the usage of "practical" technologies, or technologies with perceived positive influence in their lives. Chaumon, Michel, Bernard, and Croisile (2014) agreed, stating that access to technology positively impacted the autonomy and learning capacities of older French adults in their research. "Providing more accessible and relevant technologies for today's older adults may make technology more universally accessible" (Huber & Watson, 2014, abstract).

The swelling ubiquity of mobile technologies may yield the answer. "The world's less-affluent populations cannot all afford personal computers, but mobile phones are much more within their financial reach" (Docksai, 2011, p. 12). For example, a profile of Taiwanese adults revealed a staggering 121.4% cell phone ownership statistic—due to multiple device ownership—accompanied by 85.8% access to a mobile internet connection (Hsu, Su, & Wang, 2012). While not technically a less-affluent country, an entire population encompasses the full socio-economic spectrum within that country. A similar trend toward mobile takeover within the

US and throughout its population has already been established, as evidenced by Rainie (2017) previously. Accordingly, Feist, Parker, Howard, and Hugo's (2010) claim of new technologies offering increased potential connectedness for older adults holds true today. While the attitudes and comfort levels exhibited in their work varied by age, it is important to note that positive attitudes emerged across *all* ages. Wang, Chen, and Chen (2017) suggest that a belief in the benefit and convenience of mobile technology increases the adult learner's ability for successful and quick adoption.

With the continued growth of the older population demonstrated by aging trends, the number of plausible mobile technology users within that population and the accompanying demand for suitable mobile technologies will increase in the coming years. Therefore, the profile of mobile technology usage by the aging population should be addressed, as Huber and Watson (2014) suggest. Feist et al. (2010) devoted a three-year study to attempting to find a definition of such a profile in aging Australians. Similarly, knowing that baby boomers already carry the technophobe stigma, McLeod (2009) approached her source population directly, to remove technology as a barrier to collecting information on technology attitudes from the aging population. Face-to-face interviews combined with a survey confirmed limited usage beyond calls and messaging, despite the tendency to embrace the technology quickly. She established a need for further investigation into design, marketing, and sales tailored toward this growing demographic. Furthermore, Pedlow, Kasnitz, and Shuttleworth (2010) found that cell phone usage and adoption in older adults with impairments or disabilities—conditions often dealt with in this population—are stymied by the cell phone industry as a whole, as much as any lack of technological understanding.

An increasing number of studies are shedding light on the mounting need for such technology in the lives of older adults. For example, while they may not be familiar with Facebook or Twitter, Martinez-Pecino, Lera, and Martinez-Pecino's survey of 165 seniors revealed that cell phones do indeed play a social support role in older adults' lives, because it allows them to stay connected with family and friends more easily. Moreover, participants reported important empowering feelings such as security, freedom, and independence (2012). Demiris and colleagues found that seniors believed they could benefit from smart technologies back in 2004, but even then, they were more concerned about device user-friendliness, lack of tailored training, and paucity of human-to-human response for troubleshooting purposes when seeking help through official channels. Rosenberg, Kottorp, Winblad, and Nygård's (2009) analogous research also showed that seniors with no known cognitive deficits perceived the benefit of "everyday technologies," such as remote controls and the Internet, in simplifying their lives (p. 216). Jones, Ashurst, Atkey, and Duffy's work in 2015 introduced learners of age 65 years and older to the Internet. Those learners were highly impacted with changes such as increased social contact, reduced loneliness, and improved mental well-being.

In 2010, Broady, Chan, and Caputi's review of attitudes toward computers in older and younger adults revealed that older people could be taught to use technology to an equal degree and capacity as younger learners. Additionally, when compared to younger users, the older users in Ziefle and Bay's (2005) study performed comparably to their younger counterparts on low complexity cell phones. Though, as the complexity increased, the older learners' performance decreased. Unfortunately, disregard for the necessity of conscientiousness surrounding the learners' apprehension and perception of the "new" may result in negative sentiments such as

anxiety and inadequacy on the part of the learner. Thus, the underlying aberration may not be a question of desire or aptitude, but rather one of adequate instruction.

Andragogy

If mobile technologies are to become the catalyst for the empowerment of older adults, the focus must shift to their learning techniques, concerns, and trends. Andragogical theory—which proposes specific principles for adult learning—may provide insight into how to address adult learners' specific needs. Andragogy, made popular by Malcolm Knowles in 1967, is the science of teaching adults. Knowles focused on five principles that distinguish the adult learner from regular pedagogical demands: self-concept, experience, readiness, orientation, and motivation. Adult learners are self-directed, self-evaluative, and responsible for their own learning. Naturally, they bring a lifetime of individual experience to any new task. Their readiness to learn is usually rooted in subjects that have immediate relevance to their own lives, or the need to know in order to perform more effectively. Adults possess the ability to assess possible gaps in their knowledge level and the desired level. Learning is organized around life situations, applicable problem solving, and a perceived gateway to satisfaction. Adult learners are more motivated by internal forces such as self-esteem, self-confidence, and self-actualization. (Knowles, 1967; Merriam, 2001).

Recent studies regarding andragogical learning aspects have begun to emerge. Delahaye and Ehrich's 2008 research indicated that adult learners in Australia use both intrinsic and extrinsic motivators, active as well as passive knowledge-seeking, and a combination of dependent and independent learning. Similarly, in 2007, Carpenter and Buday interviewed residents in a naturally occurring residential community and found intrinsic motivation to be at the core of adults' attitudes toward technology. They suggest a developmental focus on the

adults' own capabilities, desires, and misgivings. Mori and Harada's work (2010) focused on ways older adults learn to use mobile phones. After three weeks, participants with no prior experience with a cell phone reported learning mainly from others within their household. Results were even more pronounced when younger generations were also in the household—a trend easily observed in daily life. Referring back to Broady, Chan, and Caputi (2010),

> At least two additional considerations are necessary in designing computer and technology education for older learners. First, consideration must be given to allow ample time for older people to master new skills. Second, care must be taken to treat any person learning to use technology in a positive manner that makes them feel like they are valued and that success is the expected outcome. (p. 483)

The most important factors for successful learning expressed by the older participants in Hernández-Encuentra, Pousada, and Gómez-Zúñiga's 2009 work were: a prior understanding of the function/usefulness of the technology, ongoing support, and the guarantee of future autonomy and independence. "Attitudes, experience of use, and perceived benefits are . . . key aspects that must be taken into account" (Hernández-Encuentra et al., 2009, abstract). Condensing it even further, Sayago, Forbes, and Blat (2013) reported three necessary learning strategies for thriving older learners: a link to real life, collaborative and informal environments, and appropriate memory aids. In 2016, Quan-Haase, Martin, and Schreurs called for a change in theoretical perspective—a new focus to highlight seniors' abilities over inabilities, on prosperous integration of technologies into their lives instead of failures. In doing so, they discovered that seniors had developed new practices and routines using technology. Some had even explored the benefit of meshing both their new technological skills with their "old" way of accomplishing a

task. Others had progressed so far as to replace their traditional practices with new digital means through technology. This is exactly the change proposed in this study.

In short, building upon these works, a more defined picture of mobile technology directly from the adult learners' perspective will allow for a more cohesive view of this learning landscape. Mobile technology presents a pervading medium attainable for a mounting percentage of members of this older population. Using andragogy as a lens, a portrait of the adult learner unfolds. Adults have a desire to understand why they should invest in learning to use the technology. As a group, adult learners' prior experience with technology could span the entire spectrum from novice to expert. Each individual learner approaches technology with a distinct vision of the possible real-life application, which affects readiness to learn. Effective learning must be task-oriented and authentic. It is up to the learner to find sufficient internal motivation. Studies regarding current practices and perceptions of adult learners may provide a baseline upon which to improve.

While Lim's (2010) postulation that technologies such as mobile phones may contain the potential to augment the quality of life for older adults through enhancement of communication networks and recreation may be true, what is the older people's perception of such potential? How do they approach mobile technologies on an average day, rather than after participating in structured studies intended for publication? Do they care about all that awaits them within their device? The true impact of this indispensable population may only begin to be discovered through further examination of the older population's own perspective of learning with mobile technology. The purpose of this study is to provide a picture of mobile technology through the lens of the adult learner. Specifically, are there differences in the way mobile technology is employed based on age or gender for users 50+ years old?

Measuring Older Adult Learners' Technology Use

The first step to understanding how older adults use technology is to understand current measures that have been developed for this purpose. A keyword-based thesaurus search was performed on the Academic Search Premier database, employing permutations using combinations the following terms: adult learner, iPad, tablet, computer training, and, e-book or electronic book. Results yielding the three largest lists were then cross-compared to find the articles appearing in multiple search combinations. These results were deemed more germane due to compounding relevancy evidenced by multiple search topic appearances. Limiting the germane results to the most recent decade, I read through titles and abstracts, keeping only those focused on a similar population (50+ years) and approach (understanding learner perspectives) to my study for consideration. This honed the list to 20 articles. I reviewed the topics covered in the findings of each paper for common themes found regarding older adults' technology use.

The research literature on measures of older adults' technology use revealed 10 commonly discussed topics (see Table 1). To better understand the relevance of each topic, a definition and findings regarding each of these is briefly elaborated on in the following discussion.

Table 1

Ten Most Commonly Occurring Topics and Corresponding Citation(s)

Topic	Citation(s)
Tasks performed	Hernández-Encuentra et al., (2009); Martinez-Pecino et al., (2012); Mori & Harada (2010); Ziefle & Bay (2005)
Frequency of tasks	Martinez-Pecino et al., (2012); Mori & Harada (2010); Purdie & Boulton-Lewis (2003)
Number and type of devices	Martinez-Pecino et al., (2012)
Details about ownership	Huber & Watson (2014)
Makes me feel about myself	Martinez-Pecino et al., (2012)
Feel effective using it	Feist et al., (2010); Martinez-Pecino et al., (2012)
Learning strategies used	Delahaye & Ehrich (2008); Hernández-Encuentra et al., (2009); Huber & Watson (2014)
Wish you could learn by	Hernández-Encuentra et al., (2009)
Like or not like about tech	Feist et al., (2010)
Prior familiarity with tech	Martinez-Pecino et al., (2012); Renold et al., (2005)

Tasks performed. A fundamental aspect of technology adoption is usage. Mobile technologies afford a myriad of functions to any user. The extent to which older adults are indulging in this abundance of possibility on their device must be considered. Older users own mobile devices, but what are they accomplishing with them?

Hernández-Encuentra et al.'s (2009) thematic analysis of discussion groups revealed the most common usages of internet connections were classes, email, reading newspapers, banking, making reservations, shopping, and instant messaging. Other less common uses included listening to music, watching videos, participating in chats, and posting content on the web. Martinez-Pecino et al. (2012) reported that seniors rarely use their mobile phones for tasks such as creating videos, taking pictures, or searching the Internet. Usual practices involved phone

calls, checking the time, and texting. Mori and Harada (2010) found that more exploratory tasks (other than making phone calls) such as texting, storing contact entries, and storing photos increased for seniors living with younger family members. Akin to those findings, Ziefle and Bay (2005) reported that as complexity increases in mobile phones, difficulty in usage of even basic tasks, like storing contacts, increases.

Frequency of tasks. Closely related, the regularity of task performance advances the defining of older users' mobile technology adoption. Frequent utilization of a task indicates familiarity. As familiarity with a device deepens, associated feelings of success can lead to greater adoption. How often do older learners employ the tasks they are familiar with?

Martinez-Pecino et al. (2012) asked their respondents to rate how often they employed each task. Purdie and Boulton-Lewis (2003) and Mori and Harada (2010) engaged their participants in direct interview questions regarding frequency, but the latter also verified qualitative accounts using phone logs. All three studies reported higher frequency of usage for basic tasks and decreased usage as task complexity rose.

Number and type of devices. Interestingly, those in the older demographic are becoming increasingly wireless, reporting higher rates of smart phone ownership than ever before (Rainie, 2017). Often, older adults can be observed owning more than one mobile device. Details regarding the reasoning for multiple device ownership are considered in the next section.

Martinez-Pecino et al. (2012) employed an ad hoc survey that resulted in 165 participants. They implied device familiarity using the number of devices owned and the length of ownership. An overwhelming 95.8% of participants reported owning a mobile device for an average of 9.9 years. While many older adults have multiple devices, length of ownership

correlating with familiarity seems to be a stretch. This study simply elicited concrete numbers of types of devices owned.

Details about ownership. Technology has obviously become more prevalent in the lives of older adults today. Studies mentioned earlier show that more older adults than ever before own mobile devices, but some factors must affect their ownership. This study sought to uncover possible intrinsic motivations and extrinsic influences behind the purchases, asking what made them decide on the device(s) they currently own.

For Huber and Watson (2007), 77 participants completed Likert-type scaled questions. Their reports centered around age, gender, education level, and prior experience with technology. Not surprisingly, older learners were less likely to research devices on the internet before purchasing them. In general, these learners were more willing to contact a store consultant when considering a purchase, with one interesting caveat; more highly educated learners were less likely to be intimidated by shopping, but also felt less comfortable consulting the store associate, regardless of age. This points to the desire for this group of learners to not be seen as unintelligent.

Makes me feel about myself. With mobile technologies becoming pervasive in the lives of older adults, levels of associated familiarity could influence self-perceptions with regard to technology. Remarkably, only one of these studies reported results considering the influence of technology on personal feelings. Martinez-Pecino et al. (2012) reported no feelings of positivity when around others due to owning high quality mobile technology. Most participants believed they could live without mobile technology—as they had done so before now, and the greatest benefit of owning mobile technology reported were feelings of security in case of emergencies and feeling like they had more independence.

This study takes a more substantial view of the possible influence of technology on adult learners' perceptions. Beyond reflected feelings of self-value when interacting with other adults, the impact of the existence of mobile technology in the lives of older learners may affect self-perceptions of capability, adaptability, and aging. How have their self-views modified since the onslaught of mobile technology?

Feel effective using it. While seniors own these devices and use them daily, these adult learners are aware of the space between their usage and the perceived usage of younger users. Some experience effectiveness in their regular usage, but the lack of complete knowledge of their device could prevent overall feelings of efficacy. What are the sentiments of these learners regarding their success in using their mobile devices?

Feist et al. (2010) reported a bevy of negative feelings regarding new technology. The 858 seniors in their study recounted feelings most akin to statements about the overwhelming speed of changes, complexity, and preventative costs. The one exception to the dominant pessimism was the acknowledgement of the ease provided for increased ability to stay in touch with people.

Learning strategies used. The older adults' awareness that their skills lag behind younger users highlights the possibility of a need to learn new tasks on the device. The number of ways to approach the unknown are as varied as the types of learners in this demographic, but as adults, they are aware of their previous learning successes and can easily discern how they attained that success. Researchers have asked, armed with this meta-knowledge, what ways do older learners select to carry out the act of solving new tasks on their devices?

Delahaye and Ehrich (2008) supplied their respondents with 24 different learning strategies to report on, including, but not limited to, "watch an expert," "go home and try," "ask

specific questions," "quietly watch," "talk to a friend," "try my own way," and "swapping ideas". A thematic analysis by Hernández-Encuentra et al. (2009) resulted in a much shorter, subset-like list of learning strategies. The most common being "teach oneself," "learn from family members," or "attend courses." Huber and Watson (2007) did not provide the extensive list used in their study, but mention "ask a friend," "call a help line," and "contact tech support."

Wish you could learn by. Although numerous ways to learn about their devices are available to these learners, the "perfect" method may not exist. A lifetime of experiential knowledge generates detailed aspects of the most successful learning scenario. Adult learners engage in the best possible practice even though it may cause them to fall short of authentic understanding. Nonetheless, if it were plausible, how would they prefer to learn to use their mobile technology?

Although the details provided by Hernández-Encuentra et al. (2009) are few, they provide ample insight into the older learner's learning desires. Participants requested an easy and efficient way to learn to use their technology. Specific attributes of the desired way include classes with a friend or specialist, clear written instructions, and integrated, diverse tasks covered during such classes.

Like or not like about tech. The youngest participants in this study were born in 1967. Technological advances simply did not occur at the same rate during most of these learners' lives as they do now. Consequently, many of them lived most their lives without mobile technology and have established prior opinions of it. Having the majority of their experience with mobile technology as adults, how do they see the universality of it?

As mentioned before, the respondents in the study conducted by Feist et al. in 2010 displayed a relatively bleak view of technology. While they conceded its usefulness in staying

connected, the majority reflected rigid mindsets and discredited possible positive stances citing new technologies as too complex, too expensive, and too rapidly changing. One-third of all respondents felt they were too old to learn.

Prior familiarity with tech. Similarly, since the recent technology expansion occurred during adulthood for these learners, the younger adults may have undergone a technological invasion in the workplace while the oldest may have escaped it entirely. Furthermore, some inhabit areas with access to the internet daily while others choose to live in quaint places without regular encounters with technology. Still, some may have resided in areas differing from their current situation. Does previous involvement with technology shape the older learners' current views?

The associated studies, while claiming concern with this measure, fail to provide applicable findings for comparison. As a reminder, Martinez-Pecino et al. (2012) insinuated familiarity with technology from length of device ownership. Renold, Meronk, and Kelly (2005) discuss the reluctance to embrace technology in community-based organizations, but fail to provide the direct view of adult learners within those communities.

Prior studies have given us a basic picture of the adult learner's perspective, but many details have been left undiscovered. From this research, we know that older learners own mobile devices at a relatively high rate and can perform various tasks, but their perceptions of the devices, the tasks, and themselves as day-to-day technology users remain underexplored. Factors regarding ownership, learning strategy, and experience with technology have been discussed, but primarily with the limitation of pre-provided statements or lists rather than instinctive, non-primed considerations. Particular attention to and investigation of the learners' perception of mobile technology will strengthen the existing body of work. The purpose of this

study was to explore older adult (>50 yrs.) learners' everyday approach to and regard for mobile technology. Specifically, I asked, in what ways do older adults utilize and perceive the usefulness of mobile technology for day-to-day interactions?

Methods

I first sought to create survey questions from existing instruments. Of the 20 articles in the previous review, only 11 included descriptive statistical analysis of the responses to the questions used in their studies. Most were presented in tabular form, displaying simple keyword topics or phrases and percentages in simple matrices. Unfortunately, no exact surveys were included in the appendices or made available for use. The only exception to this generality was the ETUQ—Everyday Technology Use Questionnaire—developed by Rosenberg et al. (2009). I reached out to Nygård and Rosenberg directly with a formal request for permission to use the ETUQ, as stated on their site. While expressing their excitement for related research, Rosenberg thoughtfully invited me to the next required one-day workshop at the Karolinska Institutet in Stockholm, Sweden. Regrettably, that trip has been deemed outside of the scope of this project.

Materials

Since no surveys from completed studies were readily available for use, I began generating the questions for this study by combing each of the 11 descriptive synopses from the reviewed articles for recurring topics. The 10 most commonly occurring topics were identified from the descriptive synopses (see Table 1) and then applied as the topic framework for the questions developed for this study (see Table 2). For example, seven of the articles included questions regarding specific usage scenarios and learning strategies, while five inquired about self-perception of capability. Due to the nature of this research, additional information (e.g., demographics) was required, adding six supplementary questions. Two such questions regarding

connectivity and work experience with technology were purposefully placed at the end of the survey to limit any negative reflections upon the respondents' self-perceptions. For example, if a respondent had no prior work experience with technology and were reminded of that fact at the beginning of the survey, it was plausible that their answers could then reflect any negative associations that person felt due to the lack of such experience.

Table 2

Ten Most Commonly Occurring Topics and Corresponding Survey Questions

Topic	Survey Question
Tasks performed	What do you use your mobile device(s) for and how often? Make and receive phone calls, send and receive email, text, search internet, online banking, online shopping, search quotes for services, take and store pictures, online courses, download and listen to music, research health conditions or concerns, watch movies or TV, arrange travel, connect with loved ones, keep mind active, personal study or learning needs
Frequency of tasks	What do you use your mobile device(s) for and how often? Daily, weekly, monthly, rarely, never
Number and type of devices	Which mobile technology device(s) do you own and use? Smart watch, smart phone, regular cell phone, tablet computer, portable music player, Bluetooth, laptop
Details about ownership	What factors influenced you to purchase the mobile device(s) you own? If you do not own any of these mobile technologies/devices, please indicate any reasoning behind that decision.
Makes me feel about myself	How do they make you feel about yourself? (e.g., I feel empowered by them; too old to learn quickly enough; keeps my mind active; upset when I feel inadequate; very useful,

	etc.)
Feel effective using it	How would you describe your general familiarity with mobile devices and technologies? How would you describe your ability to use your mobile device(s) to accomplish desired tasks successfully
Learning strategies used	How did/do you learn to use your mobile device? Watch expert at store, try it out myself and learn from mistakes, use online forums, look over people' shoulders, call the support hotline, attend a basic workshop if available, teach myself using provided instructions, spouse/partner, family members, trusted friends, anyone in the near vicinity
Wish you could learn by	How do you wish you could learn to use your mobile device(s)?
Like or not like about tech	What are the benefits you receive or frustrations you encounter when using your mobile device(s), if any? How do you feel about new technologies?
Prior familiarity with tech	What field(s) do you have work experience in (at least 3 years)? Agriculture, mining, construction—building, construction—transportation, home and family management, manufacturing—machinery, manufacturing—food, textiles; retail; transportation, information—news, radio; finance, real estate, legal services, professional and business services, education, health care, arts and entertainment

In order to create a survey that could unearth the personal views from this particular audience concerning technology use, a paper and pencil method of distribution was adopted in an effort to eliminate inherent biases in or against technology as much as possible and respect any

"forms of digital inequality which can affect participation," (Robinson et al., 2015, p. 577). Moreover, though it could be argued that paper and pencil are a form of technology, this particular medium was chosen due to its overwhelming abundance during the target population's formative years. Additionally, related precautionary measures were adopted in hopes of diminishing any other potentially preexisting biases. Boechler, Foth, and Watchorn's (2007) suggestions of larger serif font size and spacing were implemented to adjust for readability issues experienced by many aging adults (as cited in Martinez-Pecino et al., 2012, p. 877). Black font on white paper also provided the highest contrast, which may have been helpful for any vision-impaired individuals in my demographic.

Procedure

Upon obtaining Institutional Review Board approval, paper versions of the survey and its instructions (see Appendix A)—along with self-addressed, stamped envelopes—were distributed by hand to audiences consisting of adults living at home in four geographically diverse areas in the state of Utah, attempting to span socio-economic status and internet connectivity spectra.

Participants

Each audience was composed of a minimum of 20 male and 20 female adult learners encompassing ages 50+ years, accounting for 160 individual older adults in all (see Table 3).

Table 3

Description of Areas Covered by the Survey

Area	Socioeconomic Status	Geography	Connectivity
Area 1	Low – middle	Rural/agricultural	Limited
Area 2	Middle – upper	Suburban	Limited – regular
Area 3	Low – upper	Urban—downtown	Regular – constant
Area 4	Middle – upper	Urban—benches	Constant

Digital dissemination of surveys could easily have alienated a large portion of my target population, thereby biasing my results toward technologically-oriented adults. The self-address on the distributed envelopes was purposefully varied in design for each area. The 115 responses received included envelopes returned from each of the four areas.

Analysis

Upon receipt of completed surveys, I examined the data across the following age groups, adapted from Feist et al. (2010): 50 – 64 years old, 65 – 79 years old and 80+ years old. A one-way ANOVA provided a picture of any statistical significance across the age and gender attributes concerning usage facts, details of ownership, and preferred learning strategy. The ANOVA also helped to detect if the statistically significant differences observed were simply due to chance and lowered the likelihood of a type 1 error—falsely attributing any differences to the effect of age or gender—much more than multiple t-tests.

An ANOVA requires that the factors being measured are distributed normally across each age group and that those groups are even in spread. Demographic data were mined from the returned surveys, and these assumptions were verified on a case by case basis. If they were not met, a Kruskal-Wallis H test was applied to those cases to account for skew of normality as well as non-homogeneity. The assumption of independence of cases could not be fully accounted for in this study. While each returned survey contained its own data, I could not be certain that the survey was completed in isolation. Two copies of the survey were distributed to a number of married couples with the intent to obtain separate points of view, but I did not sit with any respondents during execution to ensure the absence of influence from the spouse. Each survey was merely delivered and left with the respondents to complete; however, explicit instructions concerning autonomous completion were included with each survey. Fundamentally, I could not

understand the nature of people's marital relationships nor ensure that the answers from one spouse have no effect on the other, regardless of location during the completion. Therefore, no guarantee could be made.

Should the data provide no statistical significance, the null hypothesis of no relation between age or gender and any of the factors must be assumed as acceptable. However, statistical significance, if any, suggests that there are at least two groups whose means are different enough to warrant deeper analysis, or more plainly: two groups whose age or gender have a measurable effect on one or more factors. Any such differences were followed up by a post hoc Tukey's HSD test (for homogeneic variances) or Kruskal-Wallis H pairwise comparisons (with the Bonferroni correction applied) to sift out which group combinations resulted in the statistical significance(s).

Along with the primary focus of this study in the quantitative analyses, a targeted thematic analysis of the qualitative data followed. Based upon the results regarding significance from the ANOVA and Kruskal-Wallis H, as well as appropriate post hoc tests, the open-ended data from the survey were examined for supporting or refuting empirical information to elaborate on the findings. Qualitative responses were studied for prominent themes within each age group or gender. For example, mentions of reasons behind ownership, feelings surrounding usage tasks, and details of preferred learning strategies were monitored. Discovered patterns and excerpts that provided context relating to any germane result are considered in the discussion section of this paper. In addition, survey answers included usage frequency reports for each task with the following options: daily (4), weekly (3), monthly (2), rarely (1), and never (0). Reponses were then equated with the corresponding numerical representation and summed within each age group or gender.

Results

Of the 115 respondents, 59.1% were female while 36.5% were male, comprising a 72% (115/160) response rate. Unfortunately, 4.3% did not mark either male or female. Each of the age groups were represented as well with 47% between 50 and 64 years old, 40.9% between 65 and 70 years old, and only 9.6% in the 80+ years old age group. Again, 2.6% failed to mark their age. When the incomplete respondent data (i.e., no age or no gender marked) were removed (N = 107), both genders were still represented within each age group as seen below (see Table 4). Simple descriptive statistics also show that 63.5% own at least one smart phone, 70.5% own at least one tablet, and 53.9% own at least one laptop. This alone suggested multiple types of technology being owned by the majority of respondents, and therefore seems to challenge the ageist assumptions of resistance to change and technophobia mentioned earlier. All results presented below are grouped first by age and then by gender. Pertinent findings are discussed in more detail later.

Table 4

Distribution of Gender Across Age Groups with Incomplete Data Omitted

Age Group	Female	Male	Total
50 – 64 years (%)	34 (65.4)	18 (34.6)	52 (100)
65 – 79 years (%)	22 (50)	22 (50)	44 (100)
80+ years (%)	9 (81.8)	2 (18.2)	11 (100)
Total (%)	65 (60.7)	42 (39.3)	107 (100)

Age

Types of devices. One of the assumptions for using an ANOVA is that the data must exhibit equality of variance between groups. Levene's test for Equality of Variances revealed that the data only met the required ANOVA criteria for three devices: smart watch, tablet

computer, and laptop. At the $\alpha = .05$ threshold, the one-way ANOVA yielded no statistical significance ($F(3,107) = 2.14$, $p = .887$; 1.002, $p = .395$; 2.622, $p = .054$). Age did not seem to influence the ownership of these three devices. Data regarding all other devices violated the assumptions and were subsequently analyzed using the Kruskal-Wallis H test comparing device ownership with different age groups: smart phone, regular cell phone or "dumb" phone, portable music player ($H(3) = 4.411$, $p = .220$), and Bluetooth ($H(3) = 4.021$, $p = .259$). The former two devices resulted in statistical significance according to the Kruskal-Wallis H test. Therefore, the null hypothesis of age not affecting the ownership of smart phones ($H(3) = 29.876$, $p < .001$) and "dumb" phones ($H(3) = 19.844$, $p < .001$) was rejected.

Subsequently, pairwise comparisons were performed on the smart phone and "dumb" phone data to uncover which age groups displayed the statistically significant differences. Adjusted *p*-values are presented. The ownership differences for smart phones between the 50 – 64 age group and the 65 – 79 age group ($p = .002$) and between the 50 – 64 age group and the 80+ age group ($p < .001$) were significant, but barely missed between the 65 – 79 age group and the 80+ age group ($p = .053$). This suggests the only significant difference was evident when the youngest group ownership was compared with either older group in smart phones. For "dumb" phone ownership, the only statistically significant difference was revealed between the 50 – 64 year olds and the 80+ year olds ($p < .001$). The difference between the 65 – 79 year olds and the 80+ year olds was very close to statistical significance at $p = .051$ while the other two groups were not at $p = .130$. Both show that the oldest group ownership of "dumb" phones was considerably different than the younger groups. Alternatively, the devices which did not yield statistical significance across age groups exhibited no significant relation between the device ownership and age.

Types of tasks. The same process was repeated for the data regarding the types of tasks, that is: Levene's test followed by the ANOVA or Kruskal-Wallis H and then necessary post hoc analyses. Interestingly, exactly half of the tasks' data met the ANOVA assumptions, while the other 50% violated them. Of the total 16 tasks, seven resulted in statistical significance at the $\alpha = .05$ threshold and rejection of the null hypothesis, meaning age could not be discredited as a factor affecting the bolded tasks below (see Table 5). A follow-up Tukey's HSD test was performed on the data for "take and store pictures" and "personal study or learning needs," and pairwise comparisons completed for the remaining statistically significant tasks.

Tukey's post hoc analyses on the significant ANOVAs indicated that the youngest group was different from each of the older groups for "take and store pictures" ($p < .001$) but only differs from the 80+ year olds for "personal study or learning needs" ($p = .003$). For "take and store pictures," the older two groups did not register evidence of a significant difference at $p = .205$. Neither did the 50 – 64 and 65 – 79 year olds at $p = .280$ nor the 65 – 79 and 80+ year olds at $p = .075$ for "personal study or learning needs." This suggests that the youngest group used the "take and store pictures" function on their devices more than and the two older groups.

Similarly, the youngest group's level of employment of their device for "personal study or learning needs" was higher than the oldest group.

Table 5

ANOVA or Kruskal-Wallis H Results for Usage Tasks—Statistical Significance Marked by Asterisk

Test	Task	Significance
ANOVA	***Take and store pictures	$F(3,98) = 10.191$, $p < .001$
	**Personal study or learning needs	$F(3,97) = 4.828$, $p = .004$
	Online banking	$F(3,98) = .545$, $p = .653$
	Online shopping	$F(3,98) = 1.651$, $p = .183$
	Search quotes for services	$F(3,99) = 1.469$, $p = .228$
	Watch movies or television	$F(3,99) = .553$, $p = .648$
	Connect with loved ones	$F(3,94) = 1.936$, $p = .129$
	Keep mind active	$F(3,100) = 1.807$, $p = .151$
Kruskal-Wallis H	**Send and receive email	$H(3) = 13.81$, $p = .003$
	***Texting	$H(3) = 32.117$, $p < .001$
	**Search the internet	$H(3) = 12.929$, $p = .005$
	*Download and listen to music	$H(3) = 10.115$, $p = .017$
	**Research health conditions or concerns	$H(3) = 11.819$, $p = .008$
	Make and receive phone calls	$H(3) = 5.064$, $p = .167$
	Participate in online courses	$H(3) = 3.345$, $p = .341$
	Arrange travel	$H(3) = 5.45$, $p = .142$

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

Pairwise comparisons for the "send and receive email," "texting," "search the internet," "download and listen to music," and "research health conditions or concerns" tasks were also conducted. Statistically significant differences between age groupings are below for each task. Adjusted *p*-values are presented in Table 6. Somewhat expectedly, the differences between the youngest and the oldest groups were statistically significant for all five tasks. This suggests that age was a factor in the differences seen in the usage of "send and receive email," "search the internet," "download and listen to music," and "research health conditions or concerns" between

the 50 – 64 age group and the 80+ age group. Also, the task of "texting" revealed statistical significances between all three age groups with the most significant being between the youngest and oldest groups ($p < .001$). These differences imply a statistical significance in texting usage as age increases.

Table 6

Pairwise Comparison Results (p-Value) for Usage Tasks Across the Age Attribute—Statistical Significance Marked by Asterisk

Task	50 – 64 years to 65 – 79 years	50 – 64 years to 80+ years	65 – 79 years to 80+ years
Send and receive email	.182	*.012	.456
Texting	**.002	***< .001	*.024
Search the internet	.080	**.010	.699
Download and listen to music	.388	*.017	.437
Research health conditions or concerns	.636	*.012	.249

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

Types of learning strategies. Repeating the process for the various learning strategies revealed some unexpected results. Levene's test concluded that only one strategy's data met the assumptions for an ANOVA, but the "trusted friends" learning strategy was not statistically significant across age groups ($F(3,106) = .138$, $p = .937$). The other learning strategies were subjected to the Kruskal-Wallis H test, but only one lead to statistical significance (see Table 7).

Although the "spouse/partner" learning strategy originally yielded significance from the Kruskal Wallis H test ($p = .037$), the pairwise comparison revealed no statistical significance across age groups ($p = .735$, $p = 5.87$, $p = 1.0$). Therefore, the null hypothesis could not be rejected for all cases, and age seems to have no effect on the choice of learning strategy across age groups. As a matter of interest, the next closest significant result was "try it out myself and learn from mistakes" ($p = .066$).

Table 7

Kruskal-Wallis H Results for Learning Strategies— Statistical Significance Marked by Asterisk

Test	Task	Significance
Kruskal-Wallis H	Watch expert at store when device was purchased	$H(3) = 4.447, p = .217$
	Try it out myself and learn from mistakes	$H(3) = 7.20, p = .066$
	Use online forums	$H(3) = 3.67, p = .299$
	Look over people's shoulders	$H(3) = 2.45, p = .484$
	Call the support hotline	$H(3) = 5.32, p = .150$
	Attend a basic workshop if available	$H(3) = 1.907, p = .592$
	Teach myself using provided instructions	$H(3) = 5.626, p = .131$
	*Spouse/partner	$H(3) = 8.475, p = .037$
	Family members	$H(3) = 3.089, p = .378$
	Anyone in the near vicinity	$H(3) = 4.761, p = .190$

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

Gender

Types of devices. The unforeseen results continued with the data on gender. Following the same process of Levene's test to determine the meeting of assumptions for the one-way ANOVA resulted in six ANOVAs and one Kruskal-Wallis H, none of which resulted in statistical significance for the ownership of device type (see Table 8). Therefore, the null hypothesis of gender having no effect on the ownership of devices could not be rejected.

Table 8

ANOVA or Kruskal-Wallis H Results for Device Ownership by Gender

Test	Task	Significance
ANOVA	Smart watch	$F(1,104) = .244$, $p = .622$
	Smart phone	$F(1,104) = .678$, $p = .412$
	Tablet computer	$F(1,104) = 2.40$, $p = .124$
	Portable music player	$F(1,104) = .050$, $p = .823$
	Bluetooth	$F(1,104) = .548$, $p = .461$
	Laptop	$F(1,104) = 2.836$, $p = .095$
Kruskal-Wallis H	"Dumb" Phone	$H(1) = .783$, $p = .376$

Types of tasks. For the 16 usage tasks, 14 ANOVAs resulted in no significance. In contrast, the two remaining tasks resulted in statistical significance when the Kruskal-Wallis H was performed (see Table 9). The tasks of "search the internet" ($p = .018$) and "download and listen to music" ($p = .016$) were both statistically significant across genders. It seems that gender did have an effect on the differences in usage for these two tasks. In general, women search the internet more, whereas men used the "download and listen to music" function more often.

Table 9

ANOVA or Kruskal-Wallis H Results for Usage Tasks by Gender— Statistical Significance Marked by Asterisk

Test	Task	Significance
ANOVA	Make and receive phone calls	$F(1,93) = 1.163$, $p = .284$
	Send and receive email	$F(1,93) = .021$, $p = .886$
	Texting	$F(1,95) = .378$, $p = .540$
	Online banking	$F(1,96) = .210$, $p = .648$
	Online shopping	$F(1,96) = .223$, $p = .638$
	Search quotes for services	$F(1,97) = 1.55$, $p = .216$
	Take and store pictures	$F(1,96) = .198$, $p = .657$
	Participate in online courses	$F(1,98) = .000$, $p = 1.0$
	Research health conditions or concerns	$F(1,95) = .119$, $p = .731$
	Watch movies or television	$F(1,97) = .004$, $p = .949$
	Arrange travel	$F(1,98) = .479$, $p = .490$
	Connect with loved ones	$F(1,92) = .007$, $p = .932$
	Keep mind active	$F(1,98) = .165$, $p = .686$
	Personal study or learning needs	$F(1,95) = .820$, $p = .367$
Kruskal-Wallis H	*Search the internet	$H(1) = 5.599$, $p = .018$
	*Download and listen to music	$H(1) = 5.753$, $p = .016$

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

Types of learning strategies. Only one of seven ANOVAs yielded a significant result for learning strategies while four Kruskal-Wallis H tests yielded none (see Table 10). "Teach myself using provided instructions" ($p = .031$) was the only statistically significant result across the gender attribute for learning strategies, suggesting an effect on the difference of its employ between men and women. As only the third instance in this study where gender disclosed an effect, further investigation revealed that males were more likely to teach themselves with the assistance of instructions than females.

Table 10

ANOVA or Kruskal-Wallis H Results for Learning Strategy by Gender— Statistical Significance Marked by Asterisk

Test	Task	Significance
ANOVA	Watch expert at store when device was purchased	$F(1,103) = .007, p = .933$
	Look over people's shoulders	$F(1,103) = .069, p = .793$
	Call the support hotline	$F(1,103) = .509, p = .477$
	Attend a basic workshop if available	$F(1,103) = 671, p = .415$
	*Teach myself using provided instructions	$F(1,103) = 4.777, p = .031$
	Spouse/Partner	$F(1,103) = .019, p = .890$
	Anyone in the near vicinity	$F(1,103) = .038, p = .846$
Kruskal-Wallis H	Try it out myself and learn from mistakes	$H(1) = 1.527, p = .217$
	Use online forums	$H(1) = 1.324, p = .250$
	Family members	$H(1) = 2.367, p = .124$
	Trusted friends	$H(1) = 1.616, p = .204$

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

Discussion

Devices

The variances in the data for the smart watch, tablet computer, and laptop allowed for the usage of the one-way ANOVA. However, that test yielded no significance for each of those devices as it pertains to ownership. The conclusion that age had seemingly no effect on ownership was reinforced when the raw data were considered, but for opposing reasons. Only four individuals owned a smart watch out of the entire group of respondents. Tablet computer and laptop ownership was much more prolific. Although the portable music player and

Bluetooth devices were scrutinized using a Kruskal-Wallis H test, the raw ownership data were similar to the smart watch across age groups: not very many older learners owned them.

Phones, on the other hand, did lend themselves to significances across age groups due to abundant ownership. The Kruskal-Wallis H test for both smart phones and regular cell phones or "dumb" phones resulted in statistical significance, so pairwise comparisons were performed to find out exactly where those significant differences lay in the data. For smart phone ownership, the youngest age group (50 – 64 years old) showed statistical significance from both of the older groups. Although recent national data showed a 41% increase in smart phone ownership by 65+ year olds, this study revealed that smart phone ownership began to decline with the 65 – 79 year olds. Descriptive statistics of respondents concerning significant results can be seen in Table 11 below. Qualitative data gathered from the survey were consistent with these findings. Overall, the younger group expressed themes of more familiarity for multiple years, usage for various responsibilities within their personal use, as well as ownership of multiple newer versions. While not required, nearly half of the younger group voluntarily reported an average of 4.5 years of experience with smart phones. The most noticeable trait from this age group was the positivity reflected in the majority of responses. For example, one respondent said, "I use my mobile devices daily. I've had my iPhone for 5 years. I feel comfortable." Another reported, "I am very familiar with all my devices (smart phone 3 years ago). I became familiar with them as I purchased them and enjoy them very much."

Table 11

Distribution Percentages of Respondents for Significant Results in Device Ownership

Significant Result	Respondent Data		
	% of Females / % of Males		
Variable	50 – 64 years	65 – 75 years	80+ years
Age			
Smart phone	82.3 / 94.4	54.5 / 45.4	11.1 / 0
"Dumb" phone	20.6 / 11.1	45.4 / 31.8	77.7 / 100

They also demonstrated respect for the ubiquity of application of a smart phone throughout their lives. Opinions such as, "While I am positive I do not use it near as much as possible, I believe I would be lost without it," and "[I got my] first smart phone several years ago . . . can't live without," characterized this understanding. In addition to the regular use of a smart phone, the younger age group reported employing their devices for work, entertaining grandchildren, therapy, volunteering, and disability assistance. Quips such as, "Early adopter, have had multiple versions," from the qualitative data also suggested that the younger group may not have been too flustered by the constant change in smart phone technology. Others reported, "Always like to have the latest technology," and "I research the technologies on the internet and try to stay up to date and informed." Importantly, every age groups' responses ran the gamut of positive to negative with regard to these technologies. However, the younger the age group, the more positivity was present.

Oppositely, the regular cell phone or "dumb" phone ownership significance was between the youngest and oldest (80+ years old) age groups while the difference between the middle (65 – 79 years old) and oldest group was very close to being significant. In fact, without the Bonferroni correction applied, the difference became significant ($p = .009$). This showed that the

oldest group was considerably different from both younger groups for "dumb" phones, and reinforced an expected positive correlation between age and "dumb" phone ownership. Qualitative responses from the oldest group were poignant and deliberate. For those who admitted that they were still learning, usage was described as minimal or basic. Most of the data reflected a theme of non-desire regarding technological devices. For example, "I have a cell phone I hardly ever use," "I am not familiar with any of it," and "I am as familiar as I want to be and do not wish to be more involved." Additionally, qualitative responses revealed that reported ownership of devices was usually due to the receipt of gifts from family members rather than personal interest in the device. This could justify the non-significant result with regard to gender and ownership since family members may likely give to both parents or grandparents. The youngest group did have a few members that owned a "dumb" phone instead of other possibilities. In each case, respondents claimed that it was their choice to do so.

Tasks

Some of the tasks included on the survey were expected to expose ubiquitous usage, such as "make and receive phone calls," "connect with loved ones," and "keep mind active"—even for the oldest learners. For example, being able to stay in contact with friends and family who are "out of state" or "far away" was mentioned in all three age groups. This is consistent with Gatto and Tak's 2008 results and Martinez-Pecino et al.'s findings from 2012. Both found that seniors appreciated the ease of connection with family and friends made possible by technology. Another recent study also found that the primary task completed by older users of mobile technology was contacting family members and friends with prevailing sub-tasks of communication, phonebook, and text messaging (Wang, Chen & Chen, 2017). Others like "participate in online courses," "search quotes for services," and "arrange travel" did not surprise

with such minimal overall usage, though Gatto and Tak related these as being enjoyed by their study participants. The seven tasks that yielded statistical significance across age groups did reveal interesting insights. Each of the post hoc analyses revealed differences between certain groups. Those differences were all supported by the familiarity levels discussed in the devices section above. Table 12 summarizes the descriptive statistics of respondents concerning significant results in usage tasks.

Table 12

Distribution Percentages of Respondents for Significant Results in Usage Tasks

Significant Result	Respondent Data		
	% of Females / % of Males		
Variable(s)	50 – 64 years	65 – 75 years	80+ years
Age			
Take and store pictures	85.3 / 77.8	68.2 / 45.4	22.2 / 0
Personal study or learning needs	79.4 / 83.3	59.1 / 54.5	22.2 / 100
Send and receive email	88.2 / 77.8	77.2 / 54.5	22.2 / 100
Texting	88.2 / 88.9	72.7 / 59.1	22.2 / 0
Research health conditions or concerns	67.6 / 61.1	50 / 40.1	11.1 / 50
Age and Gender			
Search the internet	85.3 / 88.9	72.7 / 54.5	11.1 / 100
Download and listen to music	50 / 55.6	13.6 / 36.4	0 / 0

The “take and store pictures” function was much more likely to be used by the younger learners than either older group. Frequency responses were calculated using the algorithm laid out in the methods section of this paper. The associated frequency data supported this likelihood, showing that the younger group performed this task twice as often as the 65 – 79 year olds (n = 90 respondents in both groups; 119 times vs 53 times) and much more often than the older group (n = 60 respondents in both groups; 119 times vs 5 times). However, the qualitative

responses altered the meaning of these conclusions somewhat. Although no prominent themes were evident, both of the younger groups mentioned active usage in taking and sharing pictures such as, “It is fun to share pictures,” while the only 80+ year old respondent who mentioned pictures spoke of a more passive use in receiving them from family and friends. This suggests that the youngest group employed the “take and store pictures” task more often, but the younger two groups used it differently than the oldest group.

The “personal study or learning needs” task also showed a difference between the youngest group and the oldest group. Frequency of use responses reflected this as well, showing that the younger group employed this task much more often than the oldest group (n = 60 respondents in both groups; 141 times vs 9 times). Qualitative data from the younger group focused on the ease and accessibility with statements such as, “The world is at my fingertips,” and “I can google anything;” as opposed to the oldest group reporting, “I don’t really use them, I don’t know how.”

“Send and receive email,” “search the internet,” “download and listen to music,” and “research health conditions or concerns” all showed significant differences and indicated that age is a factor between the youngest and oldest groups. Frequency responses also reflected this disparity between the groups for these tasks (n = 60 respondents) as seen in Table 13. Peacock and Künemund (2007)’s findings support the propensity of older adults’ performance of tasks on the internet to reduce with age.

Table 13

Frequency of Occurrence Calculations by Age Group for Significant Differences in Usage Tasks

	Send and receive email	Search the internet	Download and listen to music	Research health conditions or concerns
50 – 64 year olds	165	166	61	66
80+ year olds	14	12	0	2

Gender also played a role in clarifying the usage of "search the internet" and "download and listen to music" tasks. Females searched the internet more while males listened to music more often. The qualitative data exposed a difference behind the reasoning between genders' internet searching. Females referenced specific time-consuming tasks such as checking prices, easily obtaining information, and finding recipes. Male qualitative data focused much more on email, business, and research. Haight, Quan-Haase, and Corbett (2014) also found a difference in usage by gender in older Canadians, with men being online for more traditional tasks while women visited social networking sites more.

Texting across age groups showed a negative correlation with age, but occurred in every age group. Two very nimble-fingered 80+ year olds were still able to communicate via text. Texting was a prevalent theme in the qualitative familiarity responses of the younger two groups with multiple references to ability and convenience such as, "I can send texts at inconvenient times," and "I love being able to answer immediately with texts." Interestingly, not all mentions were positive, but each seemed to possess an understanding of the function and a comfort level with vernacular that connoted familiarity.

Learning Strategies

Possibly the most surprising finding was the non-significant result across ages with regard to every type of learning strategy included in the survey across age groups. Even the

"spouse/partner" learning strategy eventually resulted in no statistical significance in pairwise comparisons. It seemed that no one strategy aided in learning for any age group. The learning strategy that came the closest to statistical significance was "try it out myself and learn from mistakes" ($p = .066$), which could be employed as a last resort and most closely mimics the actions of younger users. The only significant result (descriptive statistics available in Table 14 below) for learning strategies across either variable occurred by age in the "teach myself using provided instructions" technique. According to findings, males reported a greater likelihood of using instructions while self-teaching than females.

Table 14

Distribution Percentages of Respondents for Significant Results in Learning Strategies

Significant Result	Respondent Data		
	% of Females / % of Males		
Variable	50 – 64 years	65 – 75 years	80+ years
Gender			
Teach myself using provided instructions	38.2 / 61.1	45.4 / 40.9	0 / 100

In the near absence of quantitative significance, I turned to the qualitative. In addition to typical qualitative data, the survey asked how they preferred to learn. Oddly, every age group mentioned multiple learning strategies in the free-response that are currently available to almost anyone and were visible on the survey. The 50 – 64 year olds mentioned seven of the 11 learning strategies specifically: "family members," "look over people's shoulders," "use online forums," "attend a basic workshop if available," "teach myself using provided instructions," "watch expert at store when device was purchased," and "try it out myself and learn from mistakes." Again, the 65 – 79 year olds also mentioned six of the same strategies as the youngest group and added "trusted friends" to the list. Finally, the 80+ year olds mentioned

"attend a basic workshop if available" and "family members." Additionally, there were several occurrences of the same learning strategy being reported as employed and desired by the same respondent. Perhaps factors outside of this study such as intrinsic or extrinsic factors, similar to Delahaye and Ehrich's findings (2008), complicate the employment of strategies. Reasons for not employing available learning strategies were not elicited during the survey.

All age groups provided specific interpretations and caveats in the qualitative responses. Most described the desired nature of an expert instructor as patient, slow, repetitive; some described the preferred setting as one-on-one, in person, at home, comfortable. It is possible that these specific details served as reasoning for not employing the learning strategies even if readily available. A common theme found within these descriptions was a desire for the concept of trust in or comfort with the person providing instruction: "Ask someone I trust, who will not make me feel stupid and with slow step by step instruction." "My ideal learning environment is advice from older, more patient tutors who don't talk down to me." "One on one tutoring from children or a close friend." "Take classes but I would like a class of people my age." "Access to a person of infinite patience who can slowly explain." "One on one with someone I trust teaching and re-teaching me." These findings were in standing with Pew's (2017) report that 63% of self-proclaimed "newcomers" to technology would need someone present to assist them and the overwhelming request for scaffolded instruction by seniors in Wood, Lanuza, Baciu, MacKenzie, and Nosko's (2010) work. Similarly, the concept of privacy emerged as a prominent theme. The term "one on one" was used by 13 individual respondents in their descriptions. An additional 19 referenced the idea through statements such as, "A private lesson with someone showing, explaining, and answering questions," and "A personal tutor would be optimal." This alludes to a perceived vulnerability on the part of the learner. According to andragogy, adult learners are

accustomed to approaching a learning task with related prior knowledge or experience. Vulnerable feelings could be present due to a lack of experience in the subject area.

Qualitative data concerning learning strategies provided other note-worthy insights as well. Disinterest in continuing to learn about and with devices did not appear until the 65 – 79 age group, but was definitely present in the oldest age group with blunt statements such as, "Not interested at all." The desire to not be seen as a burden surfaced in more than one age group. Phrases such as "learn from son . . . try not to bother him too much," ". . . always having to ask family members . . . I'd rather just fiddle with it," and " . . . so as to not annoy spouse, children, and grandchildren," displayed this frustration that may be felt by many others. Finally, in each age group, some conveyed messages of learned helplessness as they seemed convinced that any plausible learning strategy was either unattainable or insufficient: "My simple brain can't absorb too much." "Kids today just start punching buttons and figure things out as if it were instinctive." "Wish I could have been born with it." "It would be nice just to have a magic wand to wave when in trouble." "Some people like me will have to wait until the next life to learn what others can do now."

Conclusion

The older generation is growing at a rate surpassed only by the speed at which technology is advancing. However, responses from the participants in this study seem to challenge prevailing ageist stereotypes of unwillingness to adapt and reluctance toward technology (Cutler & Joyce, 2005; Morris & Venkatesh, 2000; Niehaves & Plattfaut, 2014). Older learners of today are faced with a world full of information technology and, for the most part, are facing it uprightly. Device ownership in these older adults mirrored Rainie's reported national upward trends (2017). Similarly, Robinson et al.'s (2015) warning to potential retirees

concerning losing out when disregarding technology has not gone unnoticed by this population. Qualitative comments showed that many in this study were aware of digital inequality and feel they are lagging. In response, mobile technology adoption has become increasingly pervasive in older adults and continues to be an important factor in the social aspect of older adult life by affording easy connections with family and friends.

While the findings from this study were in line with many previous results such as Gatto and Tak's (2008) report of older adults' acknowledgement of the importance of the internet in their lives, I focused on the complexity of the older learners' perspective by uncovering details regarding the daily interaction with mobile technology. Deeper analyses in this study also revealed variations by age group. Such details serve to explain the everyday interpretations of previous related findings. For example, Huber and Watson (2014) reported that older adults were excited about technology. The general statement held true in this study; however, the excitement level varied with each task considered. Many existing tasks on owned devices were not even employed, and the overall excitement level waned as age increased, as might be expected. Martinez-Pecino et al. (2012) described the importance of technology in the older adults' social interaction. Findings from this study genuinely support this concept, but shed a brighter light on their claim of empowerment and independence. The majority of learners in the younger group (50 – 64 years old) conveyed parallel responses of perceived connectedness and instant access to information. In contrast, older learners (80+ years old) focused on social interaction with friends and family, but included statements such as, "I just don't understand the way things work." Demiris et al.'s (2004) lack of tailored training and human interaction woes are magnified in these findings, with the most common request across all ages being one-on-one device instruction.

Most tellingly, the descriptions of ideal learning situations for the participants were laden with aspects of andragogical theory. These adult learners desired a slow-paced, individualized learning strategy with genuine application when learning to use a new device. This underscores many previous findings that highlighted andragogical elements such as the importance of prior understanding of the usefulness for the learner (Hernández-Encuentra et al., 2009) and linking to real-life situations (Sayago, Forbes, & Blat, 2013). They were aware of their lack of prior experience with mobile technologies and it made them uneasy, making Carpenter and Buday's (2007) call to account for the adults' own capabilities, desires, and misgivings even more fitting today.

The three age groups, adapted from Feist et al. (2010), provided a level of differentiation not generally discussed in the literature. Universal usage of tasks such as phone calls and staying connected were expected, but the details regarding other tasks were enlightening. While sweeping statements of usage held true, the definition provided by the ages within this study delineates dynamics in factors such as onslaught of indifference, regularity of use, and even strategies of employ. For example, all age groups reported using their devices for pictures and texting. At the same time, each age group's usage details were diverse for both tasks. Texting seemed ubiquitous for the two younger groups and the two 80+ year old texters in this study. However, not all members of the two younger groups were fans of mobile technology, although all acknowledged its omnipresence. Likewise, the usage of devices for pictures morphed with age. Younger users were more interactive with the camera in taking and sharing pictures while older users simply reported receiving them. New detailed insights could have far reaching effects in guiding future development in many areas.

Quan-Haase, Martin, and Schreurs's (2016) recommendation for a new positive focus was strongly heeded during this analysis and should continue to be so. Understanding the view from the perspective of adult learners provides opportunities for more effective tech support offered by software companies, more accessible training or owner manuals, and hopefully increased adoption of new technologies by generations of older adults in the future.

Allowances for accessibility needs of older learners should also be made. This study exhibited a need for the creation of readable instructions (i.e., larger print) for seniors, especially males. While their younger counterparts may disregard manuals, some older learners rely on them for self-instruction. Likewise, other aids in this field would also be beneficial. A glossary of technological terms covering even the simplest subjects would assist these learners and provide opportunity for a much-needed fundamental understanding of technology. Moreover, these findings should shape current and future programs designed around the older learner's routines, education, and lifestyle. Such programs need not focus on a particular learning strategy, as this study has proven that a singular, generalizable strategy for success in this demographic does not exist. Alternatively, they should allow for catered, personal learning conditions.

Follow up work in this area should enhance the breakdown of age groups even further in hopes of unveiling new levels of detail. Factors regarding prior exposure to technologies in the workplace could also clarify the portrait of the adult learner. Evidence of possible learned helplessness shows that this phenomenon should also be explored in the future. Additionally, related research regarding the timing of the onslaught of smart technologies in the lives of older adults could provide evidence of its effects on their attitudes toward technology. Finally, exploration of the application of an andragogical agent—a pedagogical agent adapted to enhance

older learner experience by employing aspects of andragogy—within the technologies themselves as well as accompanying manuals could unearth new directions for work in aiding older learners with new technology.

References

Broady, T., Chan, A., & Caputi, P. (2010). Comparison of older and younger adults' attitudes towards and abilities with computers: Implications for training and learning. *British Journal of Educational Technology*, *41*(3), 473-485. doi:10.1111/j.1467-8535.2008.00914.x

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

Chaumon, M. B., Michel, C., Bernard, F. T., & Croisile, B. (2014) Can ICT improve the quality of life of elderly adults living in residential home care units? From actual impacts to hidden artefacts. *Behaviour & Information Technology*, *33*(6), 574-590. doi:10.1080/0144929X.2013.832382

Cutler, S., & Joyce, R. (2005). Ageism and technology. *Generations*, *29*(3), 67-72.

Delahaye, B. L., & Ehrich, L. C. (2008). Complex learning preferences and strategies of older adults. *Educational Gerontology*, *34*(8), 649-662. doi:10.1080/03601270801900875

Demiris, G., Rantz, M. J., Aud, M. A., Marek, K. D., Tyrer, H. W., Skubic, M., & Hussam, A. A. (2004). Older adults' attitudes towards and perceptions of 'smart home' technologies: a pilot study. *Medical Informatics & the Internet in Medicine*, *29*(2), 87-94. doi:10.1080/14639230410001684387

Docksai, R. (2011, November – December). Connecting people to their governments. *Futurist*, *45*(6), 12-13.

Feist, H., Parker, K., Howard, N., & Hugo, G. (2010). New technologies: Their potential role in linking rural older people to community. *International Journal of Emerging Technologies and Society*, *8*(2), 68-84. Retrieved from http://www.swin.edu.au/ijets

Gatto, S. L., & Tak, S. H. (2008). Computer, Internet, and e-mail use among older adults: Benefits and barriers. *Educational Gerontology*, *34*(9), 800-811. doi:10.1080/03601270802243697

Haight, M., Quan-Haase, A., & Corbett, B. A. (2014). Revisiting the digital divide in Canada: The impact of demographic factors on access to the internet, level of online activity, and social networking site usage. *Information, Communication & Society*, *17*(4), 503-519. doi:10.1080/1369118X.2014.891633

Hale, T. M., Cotten, S. R., Drentea, P., & Goldner, M. (2010). Rural-urban differences in general and health-related Internet use. *American Behavioral Scientist*, *53*(9), 1304-1325. doi:10.1177/0002764210361685

Hernández-Encuentra, E., Pousada, M., & Gómez-Zúñiga, B. (2009). ICT and older people: Beyond usability. *Educational Gerontology*, *35*(3), 226-245. doi:10.1080/03601270802466934

Huber, L. & Watson, C. (2014). Technology: Education and training needs of older adults. *Educational Gerontology*, *40*(1), 16-25. doi:10.1080/03601277.2013.768064

Hsu, Y. L., Su, R. H., & Wang, Z. (2012). Profile of the aging boomers in Taiwan. *Gerontechnology*, *11*(2), 119-120. doi:10.4017/gt.2012.11.02.283.00

Jones, R. B., Ashurst, E. J., Atkey, J., & Duffy, B. (2015). Older people going online: Its value and before-after evaluation of volunteer support. *Journal of Medical Internet Research*, *17*(5), e122. doi:10.2196/jmir.3943

Knowles, M. S., & Associates. (1984). *Andragogy in action: Applying modern principles of adult education*. San Francisco, CA: Jossey-Bass.

Lim, C. (2010). Designing inclusive ICT products for older users: Taking into account the technology generation effect. *Journal of Engineering Design*, *21*(2-3), 189-206. doi:10.1080/09544820903317001

Martinez-Pecino, R., Lera, M. J., & Martinez-Pecino, M. (2012). Active seniors and mobile phone interaction. *Social Behavior & Personality*, *40*(5), 875-880. doi:10.2224/sbp.2012.40.5.875

McLeod, E. (2009). The use (and disuse) of mobile phones by baby boomers. *International Journal of Emerging Technologies and Society*, *7*(1), 28-38. Retrieved from http://www.swin.edu.au/ijets

Merriam, S. B. (2001). Andragogy and self-directed learning: Pillars of adult learning theory. *New directions for adult and continuing education*, *2001*(89), 3-14.

Mori, K., & Harada, E. T. (2010). Is learning a family matter?: Experimental study of the influence of social environment on learning by older adults in the use of mobile phones. *Japanese Psychological Research*, 52(3), 244-255. doi:10.1111/j.1468-5884.2010.00434.x

Morris, M. G., & Venkatesh, V. (2000). Age differences in technology adoption decisions: Implications for a changing work force. *Personnel psychology*, *53*(2), 375-403.

Niehaves, B., & Plattfaut, R. (2014). Internet adoption by the elderly: employing IS technology acceptance theories for understanding the age-related digital divide. *European Journal of Information Systems*, *23*(6), 708-726. doi:10.1057/ejis.2013.19

Peacock, S. E., & Künemund, H. (2007). Senior citizens and Internet technology. *European journal of ageing*, *4*(4), 191-200. doi:10.1007/s10433-007-0067-z

Pedlow, R., Kasnitz, D., & Shuttleworth, R. (2010). Barriers to the adoption of cell phones for older people with impairments in the USA: Results from an expert review and field study. *Technology & Disability*, 22(3), 147-158. doi:10.3233/TAD20100298

Purdie, N., & Boulton-Lewis, G. (2003). The learning needs of older adults. *Educational Gerontology*, 29(2), 129-149. doi:10.1080/713844281

Quan-Haase, A., Martin, K., & Schreurs, K. (2016). Interviews with digital seniors: ICT use in the context of everyday life. *Information, Communication & Society*, 19(5), 691-707. doi:10.1080/1369118X.2016.1140217

Rainie, L. (2017). Digital divide—Feeding America. *Retrieved from Pew Research Center at http://www.pewinternet.org/2017/02/09/digital-divides-feeding-america*.

Renold, C., Meronk, C., & Kelly, C. (2005). Technology in community-based organizations that serve older people: High tech meets high touch. *Educational Gerontology*, 31(3), 235-245. doi:10.1080/03601270590900972

Robinson, L., Cotten, S. R., Ono, H., Quan-Haase, A., Mesch, G., Chen, W., ... & Stern, M. J. (2015). Digital inequalities and why they matter. *Information, Communication & Society*, *18*(5), 569-582. doi:10.1080/1369118X.2015.1012532

Rosenberg, L., Kottorp, A., Winblad, B., & Nygård, L. (2009). Perceived difficulty in everyday technology use among older adults with or without cognitive deficits. *Scandinavian Journal of Occupational Therapy*, 16(4), 216-226. doi:10.3109/11038120802684299

Sayago, S., Forbes, P., & Blat, J. (2013). Older people becoming successful ICT learners over time: Challenges and strategies through an ethnographical lens. *Educational Gerontology*, 39(7), 527-544. doi:10.1080/03601277.2012.703583

Seals, C. D., Clanton, K., Agarwal R., Doswell F., & Thomas C. M. (2008) Lifelong learning: Becoming computer savvy at a later age. *Educational Gerontology*, 34(12), 1055-1069. doi:10.1080/03601270802290185

U.S. Census Bureau. (2011). *2010 Census Shows 65 and Older Population Growing Faster Than Total U.S. Population*. Retrieved from https://www.census.gov/newsroom/releases/archives/2010_census/cb11-cn192.html

Wang, K. H., Chen, G., & Chen, H. G. (2017). A model of technology adoption by older adults. *Social Behavior and Personality: an international journal*, *45*(4), 563-572. doi:10.2224/sbp.5778

Wood, E., Lanuza, C., Baciu, I., MacKenzie, M., & Nosko, A. (2010). Instructional styles, attitudes and experiences of seniors in computer workshops. *Educational Gerontology*, *36*(10-11), 834-857. doi:10.1080/03601271003723552

Ziefle, M., & Bay, S. (2005). How older adults meet complexity: Aging effects on the usability of different mobile phones. *Behaviour & Information Technology*, 24(5), 375-389. doi:10.1080/0144929042000320009

APPENDIX A: Survey

Thank you for participating in this work. NOTE: there are ***no*** *wrong answers*, so please be completely honest. This survey has 2 or 3 questions in each of the following sections: 1) Using Mobile Technology, 2) Describing Your Capability, 3) Learning to Use Your Technology, 4) General Perception of Technology, and 5) Other Info. Feel free to take as much space as you need to provide your perspective and use the back if needed. Lastly, please complete this survey on your own, or note if assistance was required.

YOUR PERSPECTIVE OF MOBILE TECHNOLOGY

1. Gender: Male / Female

2. In which age category do you belong?
   - ☐ 50 – 64 years old
   - ☐ 65 – 79 years old
   - ☐ 80+ years old

3. Which of the following best describes your marital status?
   - ☐ Single
   - ☐ Married
   - ☐ Divorced
   - ☐ Widow/Widower

4. Which mobile technology device(s) do you own and use? *Please write the number of each type you own if more than one.*
   - ☐ Smart watch (e.g., Apple Watch, Android Wear, Sony SmartWatch, etc.)
   - ☐ Smart phone (e.g., iPhone 6, Samsung Galaxy S5, Nexus 6, etc.)
   - ☐ Regular cell phone ("dumb phone")
   - ☐ Tablet computer (e.g., iPad, Surface, Tablet, etc.)
   - ☐ Portable music player (e.g., iPod, mp3 player, etc.)
   - ☐ Blue tooth (e.g., phone extension on an ear piece or in your car)
   - ☐ Laptop
   - ☐ Other: _____
   - ☐ I don't know; *please describe your device below.*

Using Mobile Technology:

5. How would you describe your general familiarity with mobile devices and technologies? *Please provide a brief history (timeline) of your experience with the device(s) marked above. (Extra space available on the back.)*

6. What do you use your mobile device(s) for and how often? *Please mark all that apply AND mark how frequently you use each on the grid below.*

	Never	Rarely	Monthly	Weekly	Daily
☐ Make and receive phone calls					
☐ Send and receive email					
☐ Texting					
☐ Search the internet					
☐ Online banking					
☐ Online shopping					
☐ Search quotes for services (e.g., handiwork, yard work, etc.)					
☐ Take and store pictures					
☐ Participate in online courses					
☐ Download and listen to music					
☐ Research health conditions or concerns					
☐ Watch movies or television					
☐ Arrange travel					
☐ Connect with loved ones					
☐ Keep mind active					
☐ Personal study or learning needs					
☐ Other:					
☐					

***Now**, please circle the items in the above question that you feel you would do if someone could provide sufficient instruction for you.*

Describing Your Capability:

7. How would you describe your ability to use your mobile device(s) to accomplish desired tasks successfully?

8. What are the benefits you receive or frustrations you encounter when using your mobile device(s), if any?

   Benefits:

   Frustrations:

Learning to Use Your Technology:

9. How did/do you learn to use your mobile device? *(Blank boxes allowed).*
   - ☐ Watch expert at store when device was purchased
   - ☐ Try it out myself and learn from mistakes
   - ☐ Use online forums
   - ☐ Look over people's shoulders
   - ☐ Call the support hotline
   - ☐ Attend a basic workshop if available
   - ☐ Teach myself using provided instructions
   - ☐ Spouse/Partner
   - ☐ Family members Ages:_____
   - ☐ Trusted friends Ages:_____
   - ☐ Anyone in the near vicinity
   - ☐ Other: _____

   ***Now**, please rank the items in descending order of how frequently you do each of the items that you have checked (1 = most often). Simply write the number next to the checked box.*

10. How do you wish you could learn to use your mobile device(s)? *Please describe your ideal learning environment for this situation.*

11. What factors influenced you to purchase the mobile device(s) you own?

General Perception of Technology:

12. How do you feel about new technologies? *(e.g., love learning about new ones; friends and family use them, so I do too; too expensive; connecting with people more easily; difficult to use; make life easier, etc.)*

13. How do they make you feel about yourself? (e.g., I feel empowered by them; too old to learn quickly enough; keeps my mind active; upset when I feel inadequate; very useful, etc.)

14. If you do not own any of these mobile technologies/devices, please indicate any reasoning behind that decision.

Other Background Info:

15. Which of the following best describes the availability of internet connectivity where you live?

- ☐ Limited internet access
  - Please describe: _____
- ☐ Regular internet access
  - Please describe: _____
- ☐ Constant internet access
  - Please describe: _____
- ☐ No internet access

16. What field(s) do you have work experience in (at least 3 years)?

- ☐ Agriculture, forestry, fishing, hunting
- ☐ Mining, quarrying, oil or gas extraction
- ☐ Construction—building
- ☐ Construction—transportation
- ☐ Home and family management
- ☐ Manufacturing—machinery, electronics, transportation
- ☐ Manufacturing—food, textiles, paper
- ☐ Retail or wholesale
- ☐ Transportation or Utilities
- ☐ Information—news, radio, library
- ☐ Finance or insurance
- ☐ Real estate
- ☐ Legal services
- ☐ Professional and business services
- ☐ Education
- ☐ Health care
- ☐ Arts and entertainment
- ☐ Other: _____