University of Kentucky

UKnowledge

2020

COMMUNICATION TECHNOLOGY INTENTION TO USE AND USE BY COGNITIVELY INTACT LONG-TERM NURSING HOME RESIDENTS

Amy M. Schuster
University of Kentucky, amy.schuster@uky.edu
Author ORCID Identifier:
https://orcid.org/0000-0002-4472-0283
Digital Object Identifier: https://doi.org/10.13023/etd.2020.294

Right click to open a feedback form in a new tab to let us know how this document benefits you.

STUDENT AGREEMENT:

I represent that my thesis or dissertation and abstract are my original work. Proper attribution has been given to all outside sources. I understand that I am solely responsible for obtaining any needed copyright permissions. I have obtained needed written permission statement(s) from the owner(s) of each third-party copyrighted matter to be included in my work, allowing electronic distribution (if such use is not permitted by the fair use doctrine) which will be submitted to UKnowledge as Additional File.

I hereby grant to The University of Kentucky and its agents the irrevocable, non-exclusive, and royalty-free license to archive and make accessible my work in whole or in part in all forms of media, now or hereafter known. I agree that the document mentioned above may be made available immediately for worldwide access unless an embargo applies.

I retain all other ownership rights to the copyright of my work. I also retain the right to use in future works (such as articles or books) all or part of my work. I understand that I am free to register the copyright to my work.

REVIEW, APPROVAL AND ACCEPTANCE

The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Director of Graduate Studies (DGS), on behalf of the program; we verify that this is the final, approved version of the student's thesis including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

<div align="right">

Amy M. Schuster, Student

Dr. Graham D. Rowles, Major Professor

Dr. John Waktins, Director of Graduate Studies

</div>

COMMUNICATION TECHNOLOGY INTENTION TO USE AND USE BY
COGNITIVELY INTACT LONG-TERM NURSING HOME RESIDENTS

_____

DISSERTATION
_____

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Public Health
at the University of Kentucky

By
Amy M. Schuster
Lexington, Kentucky
Director: Dr. Graham D. Rowles, Professor of Gerontology
Lexington, Kentucky
2020

ABSTRACT OF DISSERTATION

COMMUNICATION TECHNOLOGY INTENTION TO USE AND USE BY
COGNITIVELY INTACT LONG-TERM NURSING HOME RESIDENTS

The goal of this dissertation was to gain an in depth understanding of intention to use and use of communication technology (CT) by long-term cognitively intact nursing home residents. This study also explored the value of the unified theory of acceptance and use of technology (UTAUT) as a framework for investigating the CT use of long-term cognitively intact nursing home residents. A convergent mixed methods design was used to gather data through semi-structured interviews, a nursing home resident communication technology checklist, a modified UTAUT questionnaire, the UCLA loneliness scale 10 item version, and the self-rated health scale. Participants ($n = 40$) were recruited from six nursing homes in Kentucky. The majority of the participants (65%) used some type of communication technology more advanced than a landline telephone, twenty percent (20%) of the participants used only a landline telephone, and fifteen percent (15%) did not use any form of communication technology. Findings emphasize the value that communication technology holds with long-term cognitively intact nursing home residents through connection, feeling of security, support, and continued learning. The findings reveal the increased need for research to understand how CT affects the lives of long-term cognitively intact nursing home residents. To add to this research a revised UTAUT model tailored to the cognitively intact long-term nursing home resident is proposed which includes the constructs performance expectancy, effort expectancy, and facilitating conditions moderated by age, functional health, personal communication preferences, and experience.

KEYWORDS: Nursing home residents, UTAUT, Loneliness, Communication
            technology

Amy M. Schuster

06/18/2020
Date

COMMUNICATION TECHNOLOGY INTENTION TO USE AND USE BY
COGNITIVELY INTACT LONG-TERM NURSING HOME RESIDENTS

By
Amy M. Schuster

Graham D. Rowles

Director of Dissertation

John Watkins

Director of Graduate Studies

06/18/2020

Date

DEDICATION

"A mustard seeds worth of faith"

-GMOC

ACKNOWLEDGMENTS

From the bottom of my heart I would like to say big thank you to Dr. Graham Rowles, Dr. Beth Hunter, Dr. Jarod Giger, and Dr. Nancy Harrington for their energy, understanding, and help throughout my dissertation. To my family and friends who have supported me throughout this journey, you are now famously pseudonyms in my dissertation.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1. PROLOGUE

A little over four years ago, Joseph (69 years old) moved into Locust Hills nursing home as a result of increasing medical issues that affected his capability to function independently in his home. As he explained, "I can't pick up things I used to pick up. I can't walk as far. I have a knee replacement, replacement elbow, three back surgeries, four broken skulls, just broken jaw, on and on and on." When he moved to Locust Hills nursing home, he used cellphones and smartphones handed down to him by family members but grew tired of trying to learn to use these devices that had other family members data saved in them. As a result, he decided to get a smart phone so that he could "…communicate with the least amount of items, but the most amount of feedback for my connection" with his family members. Joseph prides himself on maintaining strong relationships with his family. As he explains, "They keep you positive as possible and … help you with trying to function through the day." He noted, "My son lives nearby. He comes down and gets me and takes me out. But I have my grandchildren [six] and all that other stuff. Which is wonderful you know."

Joseph described how important the relationship with his granddaughter, 17 years old, is to him: "Her and I are so close it's ridiculous." From the time she was born, he has been an active caregiver in her life. "I actually raised her when I couldn't find any more work….She had just been born and I said well instead of putting her in a day care, let me watch her." Since then, their bond continues to remain strong, and whenever something important occurs in her life, she reaches out to Joseph. He described a time in the past week when she purchased her first car. He said, "Yeah it was a big deal to her…. She just called me up the other day and said Pa-Pa, I just bought my first car." I was like, "All

right!" She goes, "Paid cash for it." I go, "Alright!" She also text messages him pictures of her special events, like the time she became secretary of the STEM program at her high school: "And we always have pictures and everything else. That's the other thing they can send."

In addition to phone calls and receiving pictures on his smartphone, Joseph described how he uses video chatting [FaceTime] to communicate with other family members including his sister and grandson. His sister lives many states away, but they usually talk each afternoon. "We do face-to-face. That's another one….wow that's really cool!" As he explained, "You're lookin' right at them. I just had a…I usually end up in a long discussion with my sister cause they're very nice. They're a lot of fun. I mean it's so easy." One of the aspects of video chatting that he enjoys is "…they get to see ya and you get to see them." Joseph is currently growing out his hair to donate to a cancer support program. His sister noticed this recently when they were video chatting and said, "Wow your hair is so long. What are you gonna do?" I say, "Well, I'm growin' it to the length that I can, cutting it, and donating it to the people that are unfortunate that battle cancer and don't have any hair."

Joseph's experience using communication technology to keep in touch with the people he wants to remain in contact with is not a singular experience. There are many other nursing home residents who have and use communication technology regularly to enhance their communication opportunities.

CHAPTER 2. INTRODUCTION

2.1   Statement of the Problem

The composition of the United States (U.S.) population is changing, with a steady

increase in the older adult population (65 years and older). Older adults currently make

up approximately 17% of the U.S. population and will increase to 21% by 2050 (He,

Goodkind, & Kowal, 2016). As the older adult population increases, preserving social

connections has garnered interest because continuing relationships and maintaining social

connections are vital to older adults' health and quality of life. In the U.S., approximately

17% of older adults experience social isolation (Ortiz, 2011) and 20 to 35% experience

loneliness (Anderson & Thayer, 2018; Holt-Lunstad, Smith, & Layton, 2013).

Social isolation refers to minimal social support and a decrease in social ties

(Cornwell & Waite, 2009) and is linked with cognitive decline, a reduction in quality of

life and life satisfaction, and poorer overall health (Aylaz, Aktürk, Erci, Öztürk, &

Aslan, 2012). Loneliness, also known as perceived isolation, represents feelings of

missing companionship and neglect (Perissinotto, Stijacic Cenzer, & Covinsky, 2012). It

is associated with a decline in cognitive abilities and poorer overall health (Cacioppo &

Cacioppo, 2014). One segment within the older adult population, nursing home residents,

is especially vulnerable to social isolation and loneliness (Prieto-Flores, Forjaz,

Fernandez-Mayoralas, Rojo-Perez, & Martinez-Martin, 2011; Victor, Scambler, & Bond,

2009).

Nursing home residents reside in a health care facility providing 24-hour skilled

nursing care and other rehabilitative services (Sanford et al., 2015). Nursing homes have

historically been cut off from society by both the facility walls and a societal preference

to remain separated. Nursing home residents often feel isolated from society due to increased medical needs, limited opportunities to venture outside of the nursing home, and limited opportunities to interact with the general population (Anderson & Dabelko-Schoeny, 2010; Goffman, 1961). One way to bridge the gap between nursing home residents and people who reside outside the nursing home is through different channels of communication. Historically, communication options in the nursing home were limited to postal mail or in-person visits, either on site at the nursing home or outside of the nursing home with an occasional trip. With the passing of the Omnibus Budget Reconciliation Act of 1987, a new communication channel that had previously received limited use became federally mandated, the telephone, so that nursing home residents could remain socially engaged with individuals outside of the facility. Telephone use was an opportunity that community-dwelling older adults (i.e., older adults who do not reside in a prison, nursing home, assisted living facility, or other facility) had access to for many years before nursing homes were federally required to provide this option for residents.

As technology has advanced, Information and Communication Technology (ICT) has created additional ways to increase communication channel options. ICT is a broad term that includes all computer, software, networking, telecommunications, Internet, programming, and information systems technologies. One aspect of ICT is communication technology (CT), the focus of this dissertation. CT allows constant exchanges globally through venues such as video-conferencing, social networking platforms, the Internet, wireless networks, cell phones, and other communication media. Community-dwelling older adults have the option to accept and use CT, an opportunity that may be significantly reduced or even lost if they transition to a nursing home ("State

operations manual," 2017). CT options have increased since 1987 and yet, there have been no federal or state regulation changes to accommodate new types of CT available for nursing home residents. Just as there was a need for nursing home residents to have access to telephones, there is now a growing need for nursing home residents to have access to CT options, aside from a telephone, to communicate with those outside of the nursing home. Nursing home residents, when compared to other older adult groups, have received limited attention in studying the intention to use and use of CT (Abramson, Stone, & Bollinger, 2001; Freedman, Calkins, & Haitsma, 2005; Tak, Beck, & McMahon, 2007). This is especially important as those in the Baby Boomer Generation, who have been using CT, start to reside in nursing homes but may not have the technology available to them in the facility.

Intention to use technology and technology use can be explored within the framework of the unified theory of acceptance and use of technology (UTAUT; Venkatesh, Morris, Davis, & Davis, 2003). The UTAUT model consists of four factors that are proposed as determinants of intention to use technology and technology use (performance expectancy, effort expectancy, social influence, and facilitating conditions) and four moderators that facilitate intention to use technology and technology use (age, gender, experience, and voluntariness). In order to understand how CT fits in supporting resident communication, the intent of this study was to explore the value of UTAUT as a framework for usefully investigating the communication technology use of long-term cognitively intact nursing home residents.

2.2 Statement of Purpose

This mixed methods study was designed to gain insight on CT intention to use and use by long-term cognitively intact nursing home residents. The term nursing home refers to a residential health care facility providing 24-hour skilled nursing care and other rehabilitative services (Sanford et al., 2015). Cognitively intact refers to residents who have a score of > 3 on the Mini-Cognitive screening instrument (Borson, Scanlan, Brush, Vitaliano, & Dokmak, 2000). Finally, nursing homes may house a variety of residents (e.g., long- or short-term, cognitively intact or not, undergoing rehabilitation, receiving respite care, receiving hospice care). The term long-term resident, in this study, refers to those who are permanently residing at the nursing home (with the anticipation of completing their life at this residence) and not residents who are there for short-term rehabilitation. For this study, I focused on long-term cognitively intact residents, so anytime I refer to this population, even when referred to as "residents," I mean this specific type of resident.

A convergent mixed methods design was employed, where qualitative and quantitative data are collected, analyzed separately, and then analyzed together. Priority was placed on the qualitative data, with the quantitative data being used to support the qualitative information. This study was framed within the constructs of the UTAUT (Venkatesh et al., 2003). Semi-structured interviews were used to explore factors that affect CT intention to use and use by nursing home residents. In addition, a modified UTAUT questionnaire, the UCLA loneliness scale 10 item version, and the self-rated health scale were used to provide insight into influences that shape CT intention to use and use noted in the semi-structure interview. The reason for collecting both qualitative

6

and quantitative data was to corroborate results found from the two forms of data to bring greater insight into the problem that would not be obtained by either type of data separately.

2.3 Specific Aims

This study addresses the research question, "How do nursing home residents intend to use and use CT?" through the following specific aims:

1. To describe the current use of CT with this population;

2. To identify, document, and develop an understanding of the supports and barriers to CT intention to use and use with this population; and

3. To explore the use of the UTAUT model as a framework for understanding CT intention to use and use with this population.

With each passing year, incoming nursing home residents have increased knowledge and/or use of CT as a result of more opportunities to use CT in their personal or professional lives prior to admission to the nursing home. This study explored CT intention to use and use by nursing home residents, in part to assess the value of a modified application of the UTAUT model as a framework for understanding the use of CT by nursing home residents. Whereas previous research in this area has focused on interventions (e.g., Demiris et al., 2008; Hensel, Parker-Oliver, & Demiris, 2007; Siniscarco, Love-Williams, & Burnett-Wolle, 2017; Tsai & Tsai, 2010, 2011, 2015), this research takes a step back to understand the current scope of the CT use and the factors that contribute to intention to use CT by long-term cognitively intact nursing home residents. In doing this, we will understand the issues surrounding CT use by nursing home residents and will be better able to provide effective interventions based on this

knowledge. This research contributes to how practices can influence innovation. This study explores the potentional of the UTAUT model for future CT interventions with long-term cognitively intact nursing home residents.

2.4   Outline of the Dissertation

In chapter one, I provided a personal account of CT use by one of the participants in this study. Chapter two explains why I chose to do this research. Chapter three provides a comprehensive literature review that incorporates the communication needs of nursing home residents, who are influenced by feelings of loneliness, social isolation, health changes, and the availability of CT. I discuss the design of this study in chapter four. Chapter five provides the findings. In chapter six I discuss the findings and their relationship to the UTAUT model. I conclude with chapter seven where I note the limitations of the study, and future directions for studying CT use by nursing home residents.

CHAPTER 3. LITERATURE REVIEW

3.1   Introduction

There is a paucity of research that examines the role that CT could play or does play in the lives of nursing home residents. This chapter will provide a background on the development of nursing homes, including communication opportunities for nursing home residents, by discussing social isolation, loneliness, and the role that CT can play for nursing home residents.

3.2   The Evolution of Nursing Homes

Older adults in the United States have resided in institutional settings dating back to the 18th century when English settlers brought the concept of almshouses to America, which provided institutional living for the indigent. Older adults who did not have children or family members could live in the almshouses, which were small, unregulated institutions funded by charities. Due to the subpar care provided to residents and social stigmatization, people used almshouses as a last resort (Vladeck, 1980). Later in the 18th century, as cities became overcrowded and more people were residing in the almshouses, funding transitioned to public support and older adults had to now reside in a publicly supported building (Rothman, 1971). These publicly funded buildings were intentionally inhospitable environments in an attempt to discourage people from wanting to reside in these institutions (Foucault, 1972; Rothman, 1971).

During the 20th century, the demand for public pensions arose after deplorable conditions in the almshouses were revealed to the public (Lidz, Fischer, & Arnold, 1992; Watson, 2009). As a result of the Social Security Act of 1935, unemployment insurance,

old-age assistance, and welfare programs became available to qualified individuals (SSA, 2005). A stipulation of the Social Security Act stated that public institutions could not receive federal funds (Watson, 2009). As a result, a transition occurred moving care for older adults from almshouses and public nursing homes to private nursing homes (Bohm, 2001). Residents' quality of care continued to be a concern in private nursing homes, just as it was in the almshouses and public nursing homes (Bohm, 2001). Significant changes to nursing home organization and care began in 1950. The 1950 Social Security Act amendments permitted compensation to institutions for providing care for those with disabilities and created a procedure for licensing these institutions ("Social Security Act: 1950 Amendments," 1950). Then the Hill-Burton Act, which initially provided funding for the development and construction of hospitals in 1946, was amended in 1954 to include the financing of nursing homes and other health facilities ("The medical facilities survey and construction act of 1954," 1954).

Nursing homes were now included within the hospital system because they were considered a more economical way of providing care and were thought of as the last stage of institutionalization prior to death (Vladeck, 1980). The Hill-Burton Act (1954) amendments set the standard for nursing home facility construction, design, and staffing patterns. Further growth of the nursing home industry occurred as a result of the approval of Medicare (Title 18) and Medicaid (Title 19), which brought public funding for long-term care to nursing homes ("Social Security Act Amendments of 1965," 1965). For those with limited income, Medicaid now provided funding for nursing home long-term care. Medicare funding became limited to a new group of extended care facilities and for rehabilitation stays of less than 100 days. The Social Security Act Amendments of 1965

also initiated federal oversight for nursing homes that elected to receive federal funds for resident care.

As the number of nursing homes rapidly increased, knowledge of how to appropriately treat residents did not follow the same pattern (Bishop, Bolton, & Jones, 1976). From 1939 to 1950 the number of nursing homes increased from 1,200 to 9,000. The number of people a nursing home could house (bed size) increased as well, increasing the total amount of people that could be housed in a nursing home from a total of 25,000 to 250,000 (Dunlop, 1979). The acute model of care that had previously been used was not a good fit for the contemporary nursing home dynamic. Policy makers and medical staff were not prepared to handle the rising number of nursing home facilities, the type of medical care needed, and the costs associated with the care. As a result, the care of the residents came into question numerous times leading Congress to order the Institute of Medicine to complete a study looking at the regulation of nursing homes (*Institute of Medicine Improving the Quality of Care in Nursing Homes*, 1986). Studies found flaws with respect to interactions between staff and residents and deficiencies regarding appropriate care and services to residents (Donabedian, 1988; Kane & Kane, 1988; Wyszewianski, 1988), care plan discrepancies (Hawes et al., 1995; Morris et al., 1990; Institute of Medicine, 1986), and poor care practices. The poor care practices included the use of physical restraints; inappropriate use of psychotropic medications; overuse of urinary catheters; deficient treatment of incontinence; inadequate prevention and resolution of pressure ulcers; inattention to nutritional problems; a lack of regard for hearing, vision, and dental problems; and inadequate psychosocial interventions, including behavior management programs (Evans & Strumpf, 1989; Gugel,

1989; Himmelstein, Jones, & Woolhandler, 1983; Howard, 1977; R. L. Kane, Williams, Williams, & Kane, 1993; Marron, Fillit, Peskowitz, & Silverstone, 1983; Ouslander & Fowler, 1983; Ouslander & Kane, 1984; Ouslander, Kane, & Abrass, 1982; Ray, Federspiel, & Schaffner, 1980; Schnelle, Sowell, & Traugher, 1988; Starer & Libow, 1985).

Due to extensive concerns about nursing homes' poor quality, abuse, and fraud, enhancing the quality of care in nursing homes became a priority for federal and state governments. The Omnibus Budget Reconciliation Act of 1987 (OBRA) regulated nursing homes with Medicare or Medicaid programs, imposing new standards of care and requiring improvements to the state survey and enforcement procedures. Survey teams from state agencies would survey each nursing home every nine to fifteen months. Nursing homes then had to comply with 189 federal regulations or they could be given deficiencies in categories such as quality of care, quality of life, mistreatment, nutrition and dietary, environment, and administration (Lee, Gajewski, & Thompson, 2006). The OBRA legislation signified a marked transition and expansion from a focus on "quality of care" to "quality of life."

According to OBRA, each resident had to be regularly assessed by the nursing home with the Resident Assessment Instrument in an attempt to gain a holistic understanding of a resident's capabilities and needs. The Resident Assessment Instrument was used to further the focus on residents' quality of care and expand concern to embrace quality of life. The instrument could also be used to track changes in a resident's condition, and the information gained about each resident was implemented into their care plans, planned interventions, and quarterly reviews (Hawes et al., 1997).

The Resident Assessment Instrument was composed of two main assessments: The Minimum Data Set and Resident Assessment Protocols. The Minimum Data Set provides a comprehensive overview of each nursing home resident by addressing physical functioning in the activities of daily living, cognition, continence, nutritional status, vision and communication, activities, and psychosocial wellbeing (Hawes et al., 1995; Morris et al., 1990). The Resident Assessment Protocols were used if the resident's Minimum Data Set noted a problem. The 18-question assessment was focused on treating any common condition or severe health risk. OBRA also increased the social workers' role within the nursing home to monitor residents' quality of life ("The Omnibus Budget Reconciliation Act of 1987," 1987). One area within quality of life is the ability for a nursing home resident to socially interact or communicate with those of their choosing (Kane & Kane, 2000; Schenk, Meyer, Behr, Kuhlmey, & Holzhausen, 2013; Stewart & King, 1994).

3.3   Nursing Home Communication Options

Nursing homes are currently federally and state mandated to provide a limited number of communication opportunities (i.e., telephone, postal mail, in-person visits, day trips) for residents to remain socially engaged with those outside of the facility. Kentucky nursing home regulations state, "The resident has the right to…communication with and access to persons and services inside and outside the facility. A facility must protect and promote the rights of each resident" ("State operations manual," 2017). Neither the federal nor the state regulations state that a nursing home has to actively promote or facilitate communication with those outside of the nursing home for

residents. Residents who are not able to take advantage of available communication options may feel lonely or socially isolated.

3.4   Social Isolation

Social isolation refers to minimal social contact and support and a decrease in social ties (Cornwell & Waite, 2009). Social isolation for older adults has been found to affect their physical and psychological health. Social isolation is linked with cognitive decline; a decrease in quality of life and life satisfaction; and poorer overall health (Aylaz et al., 2012; Dalgard & Lund Haheim, 1998; Ellis & Hickie, 2001; Fratiglioni, Wang, Ericsson, Maytan, & Winblad, 2000; Pinquart & Sorensen, 2001). Findlay (2003) found that older adults who experience social isolation are at risk for increased mortality and elevated blood pressure, as well as an increased chance of cardiovascular disease, dementia, depression, and suicide. Victor, Scambler, and Bond (2009) examined research on social isolation and noted links to negative health outcomes for older adults such as poor self-rated health, declining physical health, increased chance of mental illness, admission to a long-term care facility, restricted mobility, deficits in activities of daily living, and low morale.

Nursing home residents are at a high risk for social isolation despite being in close proximity to other people including residents and staff (Annear, Elliott, Tierney, Lea, & Robinson, 2017). Nursing home residents often have to depend on the assistance of others to participate in activities and engage in relationships because of cognitive and/or physical impairments. A feeling of geographical social isolation is frequently experienced by nursing home residents who have mobility issues and who lack opportunities to get out in the nursing home community and society (Victor et al., 2009).

Social support for nursing home residents has been found to positively influence their health. For example, social support may deter physical declines by alleviating symptoms of depression (Blixen & Kippes, 1999; Revicki & Mitchell, 1990). Social support also enhances subjective well-being and life satisfaction and reduces psychological distress and loneliness (Chou & Chi, 2003; Greenglass, Fiksenbaum, & Eaton, 2006; Pinquart & Sorensen, 2001; Yeung, Kwok, & Chung, 2013).

3.5   Loneliness

Loneliness, also known as perceived isolation, represents feelings of missing companionship and neglect (Perissinotto et al., 2012), along with a sense of emptiness, worthlessness, and loss of control (Cacioppo & Patrick, 2008). Loneliness has been documented across the lifespan but is commonly noted within the older adult population (Theeke, 2010). Risk for feelings of loneliness increases with widowhood (McInnis & White, 2001; van Baarsen, 2002; Van Baarsen, Smit, Snijders, & Knipscheer, 1999) and residing alone (Greenberg et al., 2003), as well as not having children, declining health, and major negative life experiences (Dugan & Kivett, 1994). Increased age is another risk factor for feelings of loneliness (Dugan & Kivett, 1994; Howden & Meyer, 2011; Shankar, McMunn, Banks, & Steptoe, 2011).

3.6   Consequences of Loneliness

Unlike social isolation, loneliness is a subjective experience (Drageset, Espehaug, & Kirkevold, 2012), but it can affect an individual physically, psychologically, and/or socially (Cacioppo & Cacioppo, 2014; Heinrich & Gullone, 2006; Luo, Hawkley, Waite, & Cacioppo, 2012).

3.6.1 Physical problems

Loneliness is associated with poor quality of sleep (Cacioppo et al., 2002; Friedman et al., 2005; Jacobs, Cohen, Hammerman-Rozenberg, & Stessman, 2006) and a decline in immune system functioning (Dixon et al., 2001; Glaser, Kiecolt-Glaser, Speicher, & Holliday, 1985; Kiecolt-Glaser et al., 1984). The effects of loneliness have also been found to increase cardiovascular health risk, such as systolic blood pressure (Hawkley, Masi, Berry, & Cacioppo, 2006), coronary heart disease (Thurston & Kubzansky, 2009), and cardiovascular mortality (Olsen, Olsen, Gunner-Svensson, & Waldstrøm, 1991). Heinrich and Gullone (2006) found that loneliness was associated with nausea, headaches, eating disturbances, fatigue, and serious illness. Continuous feelings of loneliness are related to increased mortality in older adults (Luo et al., 2012).

3.6.2 Psychological problems

Loneliness has been linked to a decline in cognitive capabilities for older adults (Cacioppo & Cacioppo, 2014; Wilson et al., 2007) and has been associated with anxiety and depression (Heinrich & Gullone, 2006). Loneliness is thought to be a symptom of depression. However, loneliness and depression are separate problems even though there are similarities between them (Merkel, 2001).

3.6.3 Social problems

Interpersonal communication can be affected by feelings of loneliness. Individuals who are lonely are prone to be cynical and less tolerant of others, view others as less trustworthy, and anticipate negative judgments by others (Heinrich & Gullone, 2006). As a result, individuals who are lonely face peer rejection, less depth in

friendships, and low self-esteem (Heinrich & Gullone, 2006). Growing older is another aspect of loneliness. As one ages, life events such as relocation, retirement, and death of those important to them, shape social interactions with friends and family (Ashida & Heaney, 2008). Feelings of loneliness for older adults have been found to increase when the quality of social support networks weakens (Green, Richardson, Lago, & Schatten-Jones, 2001; Pinquart & Sorensen, 2001) or there is a lack of satisfaction with social contacts (Holmén & Furukawa, 2002).

3.6.4 Loneliness among nursing home residents

Loneliness is a widespread issue for nursing home residents (Hicks, 1999). Nursing home residents are at risk of experiencing physical, psychological, and social problems related to loneliness. However, they encounter additional circumstances that may increase their feelings of loneliness compared to community-dwelling older adults. Nursing home residents have to cope with transitioning to a nursing home, which includes a new home environment, people, and schedule (Theeke, 2010). Additionally, geographic distance may play into feelings of loneliness if the nursing home resident is not in close proximity to where they previously resided or if their family members are not able to see them as frequently due to the distance (Moyle, Kellett, Ballantyne, & Gracia, 2011). Nursing home residents have increased health issues and functional limitations that shape with whom and how they interact (Hawkley et al., 2008; Savikko, Routasalo, Tilvis, Strandberg, & Pitkälä, 2005). For nursing home residents, loneliness may lead to depressive symptoms, especially when combined with age related losses or challenges (Adams, Sanders, & Auth, 2004). Taking into account the physical, psychological, and social consequence of loneliness, it is vital for nursing home

residents' health to have different communication options available to connect with the people with whom they want to remain in contact.

3.7   Age Changes in Communication

Communicating with significant others is a basic human psychological need (Maslow, 1968). This basic psychological human need does not change throughout one's life, but the way in which the need manifests itself evolves as one ages as a result of physical and/or psychological changes.

3.7.1   Physical changes

Older adults may encounter physical changes that affect their ability to communicate. These changes may occur with their hearing, voice, speech, and linguistic processing as they age (Worrall & Hickson, 2003) and with changes in their psychomotor abilites (Vercruyssen, 1997). Hearing may be impaired in a number of ways, including decreased sensitivity to higher frequencies. Hearing impairment is the most common form of communication impairment nationally and for older adults is the third most frequent chronic ailment after arthritis and hypertension (Adams, Hendershot, & Marano, 1999; Wallhagen, Strawbridge, Shema, Kurata, & Kaplan, 2001). The frequency of hearing impairment grows with increasing age, ranging from 45% of those in their sixties to 89% of those age 80 or older (Lin, Niparko, & Ferrucci, 2011). Speech may be impaired due to a decrease in respiratory support, inability to clearly articulate, and/or a slower rate of speech. The voice may change, resulting in changes in pitch (i.e., higher for men, lower for women) and poorer vocal quality. Linguistic processing changes may include a decrease in speed, accuracy of word-retrieval, and increased difficulty with understanding linguistically complex or technical communication (Caruso, Mueller, &

Shadden, 1995). Psychomotor changes for older adults include a decreased response time (Vercruyssen, 1997) and the ability to control and modify applied forces decreases with age (Siedler & Stelmach, 1996). Older adults may also experience a decrease in level of sensitivity to touch as a result of high frequency vibration in their hands (Skre, 1972; Verrillo, 1980).

3.7.2 Psychological changes

During childhood and through adulthood, time and effort are invested in communication with a wide range of people. As an older adult, there is less of a desire to engage with people who do not provide an emotionally close relationship (Carstensen, 1995; Carstensen & Charles, 1998). Older adults may have a smaller social network, but the people within their network may be substantially important to them (Carstensen, 1995; Carstensen & Charles, 1998).

3.8 Evolution of Communication Channels

Over the past century, the way we communicate has evolved with the invention of new types of communication channels (Dickinson & Hill, 2007). Initially, communication channels were limited to face-to-face interaction or written letters. Through the creation of the telegraph and then the telephone, people gained the opportunity to connect with those at a distance in an instant. As technology has advanced, ICT has provided additional communication options. ICT is a broad term that includes all computer, software, networking, telecommunications, Internet, programming and information systems technologies. One aspect of ICT is communication technology (CT). CT allows constant exchanges globally through venues such as video-conferencing,

social networking platforms, the Internet, wireless networks, cell phones, and other communication channels.

3.9   Communication Technology Use by Older Adults

The adoption rate of CT for older adults has increased with each generation (Rainie & Perrin, 2016). Many older adults who did not have access to CT options currently available are increasingly embracing the use of cell phones, smartphones, tablets, and the Internet (Smith, 2014). Older adults enjoy using email and video communication to connect with family and friends and using the Internet for activities such as shopping, personal banking, blogging, and gaming (Hilt & Lipschultz, 2004; Keenen, 2009; Rosenthal, 2008). Internet usage for older adults has been shown to predict a sense of well-being and community (Sum, Matthews, & Hughes, 2009), to increase self-efficacy (Erickson & Johnson, 2011; Karavidas, Lim, & Katsikas, 2005), and to provide a sense of connectedness and satisfaction (Gatto & Tak, 2008). The social benefits of CT use by older adults are important to note due to the increased risk for isolation with age (Hawkley & Cacioppo, 2007).

An older adult's quality of life can be affected by their ability or inability to communicate with others. Older adults want to communicate with others and find it extremely important (49%) or very important (44%) to their quality of life (Lugo, Cooperman, Funk, & O'Connell, 2013). In a study of communication patterns and preferences of community-dwelling older adults, a majority of the participants preferred in-person communication; however, if in-person communication was not an option, communication channel preferences varied based on the ability to experience non-verbal cues (e.g., gestures, facial expressions, and body language). For example, many of the

participants would choose a telephone as the next best option to in-person communication because they could hear voices and vocal cues (Yuan, Hussain, Hales, & Cotten, 2016).

3.10 Communication Technology in Nursing Homes

Nursing home CT adoption has occurred at a slow rate. It was not until Rubin and Shuttlesworth (1983) researched family and staff views on what nursing homes should provide that it was suggested that nursing home residents should even have access to telephones. As part of the OBRA (1987), telephone access became mandated for nursing home residents, along with privacy during phone calls. The act required that residents have convenient access to make and receive telephone calls. More recent federal nursing home regulations state, "The resident has the right to have reasonable access to the use of a telephone, including TTY [Teletypewriter] and TDD [Telecommunication devices for the deaf] services, and a place in the facility where calls can be made without being overheard (p.33)." Since 1987, CT options have increased and yet, there have been no federal or state regulation changes to accommodate new types of CT available for nursing home residents. Studies have found that desktop computers, the Internet, and video conferencing are used in nursing homes (Abramson et al., 2001; Freedman et al., 2005; Gueldner, Clayton, Schroeder, Butler, & Ray, 1992; Kane et al., 1997; Tak et al., 2007), but these technologies have yet to be mandated at the federal level in order to meet contemporary nursing home residents' communication needs.

3.11   Communication Technology Research with Nursing Home Residents

3.11.1   Desktop computer and internet

Cognitively competent nursing home residents are capable of learning to use computers (Günter, Schäfer, Holzner, & Kemmler, 2003; Namazi & McClintic, 2003; Purnell & Sullivan-Schroyer, 1997; Weisman, 1983) and the Internet (Günter et al., 2003; Namazi & McClintic, 2003; Purnell & Sullivan-Schroyer, 1997). Cognitively competent nursing home residents are also interested in learning to use computers (Furlong & Kearsley, 1986; Günter et al., 2003; Kautzmann, 1990; Sherer, 1996). Over time, desktop computers and Internet access have started to be incorporated into nursing homes for use by residents to some extent but not comprehensively. Abramson, Stone, and Bollinger (2001) surveyed 118 nursing home administrators and found that the majority of their facilities had no Internet access. None of the facilities had access to the Internet for their residents. Freedman, Calkins, and Van Hairsma (2005) interviewed 16 experts in long-term care and found that technology had not been incorporated due to barriers such as lack of information, perceived lack of financial resources, regulations that prevent innovation, and a lack of experience in how to implement technological change. Tak, Beck, and McMahon (2007) found in their national survey of 64 nursing home administrators that only 11% of facilities had Internet access and only 14% had at least one computer, located in a common area, for use by residents. Of the nursing homes that had computers available for residents, approximately five residents per facility used the computers. Although many facilities in this study did not have computers or Internet available for use by residents, administrators noted that family contact was one of the main benefits of having computers and Internet for residents (Tak et al., 2007).

22

3.11.2 Video conferencing

Video conferencing provides the opportunity for verbal and non-verbal communication with a visual component (e.g. facial expressions, body language), which may enhance interactions between people (Hensel et al., 2007; Short & Christie, 1976). Interventions designed to assess the effect of video conferencing with residents and their families found that they enjoyed the opportunity to be able to see each other while talking (Demiris et al., 2008; Hensel et al., 2007; Mickus & Luz, 2002; Siniscarco et al., 2017; Tsai & Tsai, 2010, 2011, 2015; Tsai, Tsai, Wang, Chang, & Chu, 2010). Video conferencing provides the possibility for the nursing home residents to see other aspects of their family members' life (e.g., house, pets). It also makes it possible for family members to visually monitor the health of the resident. Residents and family members felt a greater connection with the individual with whom they were communicating as a result of increased visibility (Hensel et al., 2007; Mickus & Luz, 2002; Tsai & Tsai, 2010).

Three video conferencing intervention studies have examined social support, depression status, and/or loneliness (Siniscarco et al., 2017; Tsai & Tsai, 2011; Tsai et al., 2010), two of which (Tsai & Tsai, 2011; Tsai et al., 2010) found statistically significant results. Tsai et al. (2010) interviewed 57 nursing home residents and found that participants' emotional social support (e.g., providing care, empathy, love, and trust) and appraisal social support (e.g., exchange of information with a focus on self-reflection), depressive status, and feelings of loneliness improved during their three-month study. Tsai and Tsai (2011) conducted interviews with 90 nursing home residents on social support, depression status, and loneliness for over a year using the Social

Support Behaviors Scale, University of California Los Angeles Loneliness Scale, and Geriatric Depression Scale, and found that video communication had a long-term effect of easing depressive symptoms and feelings of loneliness, as well as improving long-term emotional social support and short-term appraisal support for the resident.

Overall, there is evidence that the use of video conferencing has positively affected nursing home residents' ability to communicate. It is also important to note that ease of use, technical issues, or availability of family were found to be important issues within each of the video conferencing interventions. Some residents found it difficult to use the video conferencing due to their visual or hearing impairments (Mickus & Luz, 2002; Tsai & Tsai, 2010). Residents who were not accustomed to using the video conferencing technology reported feeling intimidated by the equipment even though technology support was available (Mickus & Luz, 2002; Siniscarco et al., 2017; Tsai & Tsai, 2010). Technical issues noted included poor image or voice quality (Demiris et al., 2008; Hensel et al., 2007; Mickus & Luz, 2002; Siniscarco et al., 2017; Tsai & Tsai, 2010) and inconsistent Wi-Fi coverage within the nursing home facility (Siniscarco et al., 2017). Mickus and Luz (2002) studied ten pairs of nursing home residents and a family member and found that continued participation in the intervention was based on how participants tolerated the technical issues. Residents reported that having a specific person to help with technology issues was helpful (Siniscarco et al., 2017). Video conferencing opportunities were affected by the availability of family members to participate due to busy schedules or living in different time zones. Additionally, video conference opportunities were affected if the resident thought the family member did not

have time to talk (Demiris et al., 2008; Mickus & Luz, 2002; Siniscarco et al., 2017; Tsai et al., 2010).

As new CT has been introduced, limited research exists on what CT options are currently accepted and used by nursing home residents. Previous research on CT intention to use and use by nursing home residents has focused on interventions (Demiris et al., 2008; Hensel et al., 2007; Mickus & Luz, 2002; Siniscarco et al., 2017; Tsai & Tsai, 2010, 2011, 2015; Tsai et al., 2010) but has not addressed who is currently using CT prior to the intervention, to what extent they are using the CT, and why they are using CT. Only one of these studies (Hensel et al., 2007) was guided by theory. One theory that incorporates different aspects of technology intention to use and use is the UTAUT (Venkatesh et al., 2003). In order to understand how CT fits in supporting resident communication, this study explored the value of UTAUT (Venkatesh et al., 2003) as a framework for usefully investigating the CT use of cognitively intact long-term nursing home residents.

3.12 Unified Theory of Acceptance and Use of Technology (UTAUT)

As technology options increase, organizations have been relying on information systems (IS) to assist with operational processes and creating technology implementation strategies. Intention to use and use of IS are vital to an organization because without intention to use and use, the technology is just an unproductive piece of equipment. Numerous theoretical models have described technology intention to use and technology use (e.g., Rogers, 1995; Taylor & Todd, 1995; Thompson & Higgins, 1991), but there was not a single model that brought together these different constructs of technology

intention to use and use, such as subjective norm, perceived behavioral control, perceived usefulness, or social factors.

In an attempt to move toward a "unified view of user acceptance," Venkatesh, Morris, Davis, and Davis (2003) developed the UTAUT using constructs from eight models: the theory of reasoned action (Davis, Bagozzi, & Warshaw, 1989; Fishbein & Ajzen, 1975); the technology acceptance model (Davis, 1989; Venkatesh & Davis, 2000); the motivational model (Davis, Bagozzi, & Warshaw, 1992; Vallerand, 1997); the theory of planned behavior (Ajzen, 1991; Harrison & Stewart, 1997; Mathieson, 1991; Taylor & Todd, 1995) combined technology acceptance model and theory of planned behavior (Taylor & Todd, 1995); model of PC utilization (Thompson & Higgins, 1991; Triandis, 1977); diffusion of innovations theory (Moore & Benbasat, 1991; Rogers, 1995); and social cognitive theory (Bandura, 1986; Compeau & Higgins, 1995). Each of the models applies technology use as the dependent variable and behavioral intention as a direct determinant of technology use. Behavioral intention is a sign of an individual's readiness to carry out a given behavior and is a direct precursor of behavior (Ajzen, 1991). See Appendix 1 for a description of the eight models.

Venkatesh et al. (2003) compared the eight models using 48 tests of validity to determine the convergent and discriminant validity of constructs from each of the models. The analyses showed that individual intention to use was explained in all the models, constructs related to social influence were not significant in voluntary settings, and over time determinants of intention differed. Once baseline testing of the models was complete, moderating influences (experience, voluntariness, age, and gender) were examined. Venkatesh et al. (2003) found that the eight models explained 17% to 53% of

the variance in intentions to use technology and that seven constructs had a significant direct effect on intention to use or use behavior. The UTAUT model was developed with four factors that are determinants of intention to use technology and technology use (performance expectancy, effort expectancy, social influence, and facilitating conditions) and four moderators that facilitate intention to use technology and technology use (age, gender, experience, and voluntariness). See Figure 3.1. To keep in line with the original the interpretation while acknowledging the contemporary changes to the meaning of words (Unger, 1979), for the rest of this dissertation, I will refer to the original UTAUT moderator "gender" as "sex."

The UTAUT model has demonstrated an improvement over the other acceptance models and explains up to 70% of the variance in behavioral intention to use technology (Venkatesh et al., 2003). Behavioral intention is the criteria needed (performance expectancy, effort expectancy, and social influences moderated by age, gender, experience, and voluntariness of use) for an individual to decide to use a technology for a certain purpose. An individual's decision to use a technology for a certain purpose is use behavior. Use behavior is influenced by all of the criteria that determines behavioral intention to use and the facilitating conditions moderated by age and experience.

In the following paragraphs, I elaborate on each of the components of the model and show how these relate to the content of my dissertation and my research aims.

Figure 3.1: Original UTAUT model
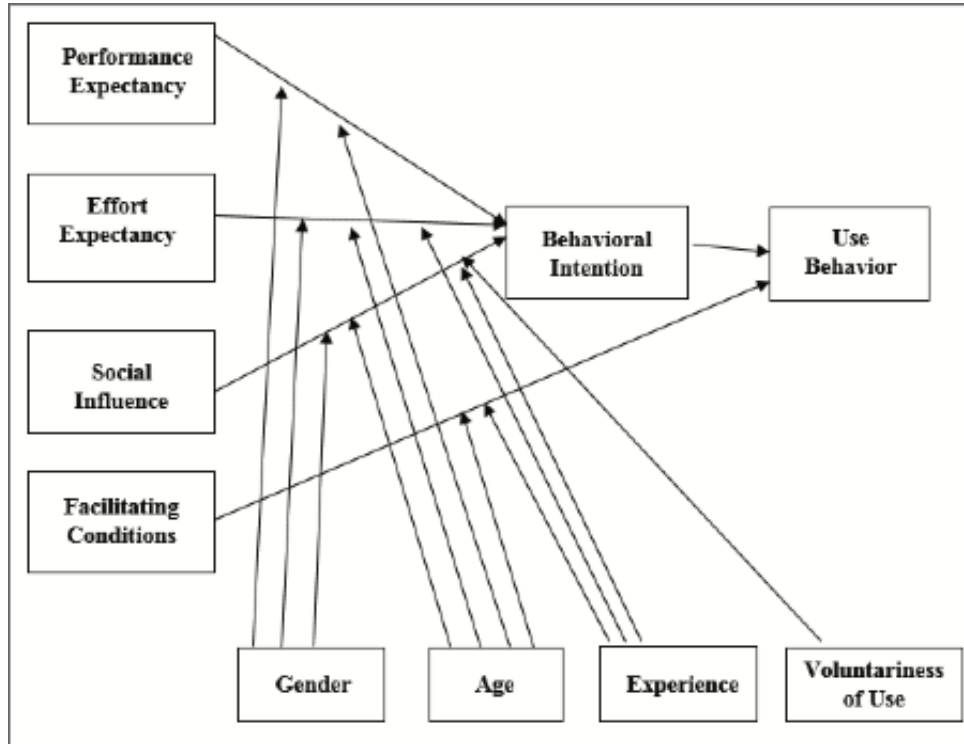
(Venkatest et al., 2003)

3.13 UTAUT Model and Application for This Study

This study evaluates the four constructs (performance expectancy, effort expectancy, social influence, facilitating conditions) of the UTAUT model. It also incorporates consideration of the four moderators of the model (gender, age, experience, voluntariness of use), along with a new moderator, health related factors.

3.13.1 Performance expectancy

Performance expectancy is the "degree to which an individual believes that using the system will help him or her to attain gains in the job performance" (Venkatesh et al., 2003, p. 447). Performance expectancy includes the following constructs: perceived usefulness (i.e., TAM, TAM2, C-TAM-TPB), extrinsic motivation (i.e., MM), job-fit

28

(i.e., MPCU), relative advantage (i.e., DOI), and outcome expectations (i.e., SCT). Each model explained that performance expectancy is the main predictor of behavioral intention and continues to be significant at all points of measurement regardless of setting (Venkatesh et al, 2003; Agarwal & Prasad, 1998; Compeau & Higgins, 1995; Davis et al, 1992; Taylor & Todd, 1995; Thompson et al., 1991; Venkatesh & Davis, 2000).

Cognitively intact older adults residing in nursing homes are not focused on how technology will help them "attain gains in the job performance." However, older adults do consider the constructs within performance expectancy when choosing to use technology. Older adults may choose not to use the Internet due to a lack of interest (Carpenter & Buday, 2007; Morris, Goodman, & Brading, 2007; Peacock & Kunemund, 2007; Selwyn, Gorard, Furlong, & Madden, 2003), lack of knowledge (Ng, 2008; Peacock & Kunemund, 2007), or perceived lack of benefit (Melenhorst, Rogers, & Bouwhuis, 2006).

3.13.2 Effort expectancy

Effort expectancy is the "degree of ease associated with the use of the system" (Venkatesh et al., 2003, p. 450). Effort expectancy includes the following constructs: perceived ease of use (i.e., TAM/TAM2), complexity (i.e., MPCU), and ease of use (i.e., DOI). Effort expectancy is more prominent in the initial phases of a new behavior (Agarwal & Prasad, 1997, 1998; Davis et al., 1989; Thompson & Higgins, 1991; Thompson, Higgins, & Howell, 1994) but becomes less relevant over periods of prolonged use as process or instrument concerns become more significant (Davis et al., 1989; Szajna, 1996; Venkatesh, 1999).

Experience with technology is an aspect of technology use that older adults

encounter when determining whether or not to use technology. Older adults who do

adopt technology may need training to learn how to use the technology (Rogers, Stronge,

& Fisk, 2005). Training may require repeated lessons, and progress can be slow

(Hawthorn, 2000). The availability of technological assistance in the event of an issue

can be a perceived barrier by older adults (Lee, Chen, & Hewitt, 2011).

3.13.3 Social influence

Social influence is the "degree to which an individual perceives that important

others believe he or she should use the new system" (Venkatesh et al., 2003, p. 451).

Social influence includes the following constructs: subjective norms (i.e., TRA, TAM2,

TPB, C-TAM-TPB), social factors (i.e., MPCU), and image (i.e., DOI). Use behavior is

influenced by the way an individual perceives others' opinions of them as a result of

using the technology.

Maintaining social connections with family and friends plays a vital role in the

quality of life of cognitively intact nursing home residents (Giger et al., 2015;

Guadagnoli & Mor, 1991). The desire to maintain connections may influence technology

use. As mentioned earlier, three studies (Hensel et al., 2007; Mickus & Luz, 2002; Tsai

& Tsai, 2010) found that video conferencing provided the ability for nursing home

residents to see other parts of their family members' life (e.g., house, pets) and the family

members' ability to visually monitor the health of the resident. Both residents and family

members felt greater connection with the individual they were in contact with as a result

of increased visibility. One study found family members' video conference use could be

predicted by frequency of in-person visits, trying to maintain the residents' emotional

status, and whether or not there was a caregiver (Tsai & Tsai, 2015). For example, family members that regularly visited were not as accepting of video conferencing as a replacement for in-person visits. Family members who were trying to maintain the residents' emotional status or had hired a caregiver for the resident were more accepting of video conferencing.

For nursing home residents, factors that may affect social connection include relationship with family prior to admission (Bowers, 1988; Gaugler, Anderson, & Leach, 2004; Gaugler & Ewen, 2005; Port et al., 2001; Yamamoto-Mitani, Aneshensel, & Levy-Storms, 2002), family geographical proximity to the nursing home (Bitzan & Kruzich, 1990; Gaugler et al., 2004; Greene & Monahan, 1982; Hook & Oak, 1982; Montgomery, 1982; Port et al., 2001; Yamamoto-Mitani et al., 2002), and payer source (e.g., private pay, Medicaid) for nursing home services (Geib, 1980).

3.13.4 Facilitating conditions

Facilitating conditions are the "degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system" (Venkatesh et al., 2003, p.453). Facilitating conditions include perceived behavioral control (i.e., TPB, C-TAM-TPB), facilitating conditions (i.e., MPCU), and compatibility (i.e., DOI). Facilitating conditions do not have an effect on predicting behavioral intention to use, but they do have a direct influence on technology use.

Structural barriers for older adults' use of technology include no Internet connection, lack of finances, and lack of time (Dutton & Gerber, 2009). Internet use by older adults has been found to be associated with income (Zickuhr & Madden, 2012),

education levels (Carpenter & Buday, 2007; Czaja et al., 2006; Werner, Carlson, Jordan-Marsh, & Clark, 2011), and ethnicity (Geib, 1980).

3.13.5 Moderators

In this study, age, sex, experience, and a new component, health related factors, will be considered as moderators of performance expectancy, effort expectancy, social influences, and facilitating conditions for CT behavioral intention to use and actual use by nursing home residents. The moderator voluntariness of use was not evaluated in this study as the choice to use CT for each nursing home residents is a voluntary choice versus a mandatory requirement in a work environment.

Age moderates performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). It is the only moderator in this model that affects all of the constructs in relation to use. Age is a factor that has been found to influence the adoption of CT by older adults (Boulton-Lewis, Buys, Lovie-Kitchin, Barnett, & David, 2007; Carpenter & Buday, 2007; Heart & Kalderon, 2013). Age will play a role because older adults (born before 1946) did not grow up with the technology options currently available. They had to intentionally make the decision to adopt and use new technology as it was not introduced to them in the workplace. Those born in the Baby Boomer Generation (1946-1964) had to adapt to using technology in the workplace and possibly their personal life. In this study I will assess age and assess by generation.

Sex, referred to as gender in the original UTAUT model, moderates performance expectancy, effort expectancy, and social influences (Venkatesh et al., 2003). Sex is another factor that has been found to influence the adoption of CT by older adults (Boulton-Lewis et al., 2007; Carpenter & Buday, 2007; Heart & Kalderon, 2013). Older

men have been found to have more experience using the computer and Internet than older women (Czaja et al., 2006; Karavidas et al., 2005; Kim, Lee, Christensen, & Merighi, 2017). This may be due to different life experiences, with men typically having had increased opportunities in higher education and paid employment, while women were expected to serve as family caregivers (Settersten & Lovegreen, 1998). Over time, the sex gap has decreased for each younger generation using CT (Rainie & Perrin, 2016).

Experience moderates effort expectancy, social influences, and facilitating conditions (Venkatesh et al., 2003). Many older adults have the same experience when they use computers as the younger population but lack confidence in their knowledge (Mitzner et al., 2010). Rosenthal (2008) and Lee, Chen, and Hewitt (2011) found that older adults with limited technology literacy had more challenges (i.e., anxiety, stress, low self-confidence) when confronted with new technology. High fear and anxiety (Marquié, Jourdan-Boddaert, & Huet, 2002), negative attitudes stemming from the fear and anxiety (B. Lee et al., 2011; Marquié et al., 2002), and self-imposed barriers from high anxiety and low self-efficacy (Marquié et al., 2002; Turner & Van DeWaller, 2007) are other challenges faced by older adults for technology adoption. Confidence levels can increase with training along with changes in attitudes toward technology and increasing older adults' success with technology (Laganà, 2008; Laganà, Oliver, Ainsworth, & Edwards, 2011).

In addition to the original UTAUT model moderators age, sex, and experience, I also considered health related factors as a moderator for CT intention to use and use. Health related factors have been found to influence CT intention to use and use by older adults (Gell, Rosenberg, Demiris, LaCroiz, & Patel, 2013). Hawthorn (2000) noted that

declines in vision, hearing, and psychomotor coordination are some of the physical changes that may affect older adults' use of computers. For example, to adapt with aging changes in visual acuity, a simpler computer screen format that does not have overlapping windows or a complex background may be needed. Normal aging cognitive declines, such as decreased attention span and memory capabilities, have been found to change the process of learning how to use technology and technology use. To accommodate these changes, a simpler interface is needed with fewer distractions and more cues to assist with recall (Hawthorn, 2000). Age related declines have been noted in other research investigating level of technology use by older adults (Carpenter & Buday, 2007; Rogers et al., 2005). Gell et al. (2013) found that increased physical impairment influenced the use of technology.

3.14 UTAUT Applied in Studies with Older Adults

The UTAUT was originally developed to explain intention to use and use of information technology from an organizational standpoint, but has since been applied to studies of technology intention to use and use by older adults for the Internet (Gell et al., 2013; Niehaves & Plattfaut, 2014), computer (Nägle & Schmidt, 2012), tablet (Barnard, Bradley, Hodgson, & Lloyd, 2013; Magsamen-Conrad, Upadhyaya, Joa, & Dowd, 2015), smartphones (Gao, Yang, & Krogstie, 2015; Lai, 2018; Ma, Chan, & Chen, 2016; Pheeraphuttharangkoon, Choudrie, Zamani, & Giaglis, 2014; Wang, Chen, & Chen, 2017; Zhou, Rau, & Salvendy, 2014), e-health apps (Boontarig, Chutimaskul, Chongsuphajaisiddhi, & Papasratorn, 2012; de Veer et al., 2015; Hoque & Sorwar, 2017; Or et al., 2011), wireless sensor networks (Steele, Lo, Secombe, & Wong, 2009), telehealth (Cimperman, Makovec Brenčič, & Trkman, 2016; Diño & de Guzman, 2015),

assistive robots (Chu et al., 2019; Heerink, Kröse, Evers, & Wielinga, 2010), and video games (Money et al., 2019).

All of the UTAUT studies with older adults, except for one (Diño & de Guzman, 2015), concentrated on community dwelling older adults. In an effort to determine the variables that influence technology intention to use and use by older adults, each of these studies evaluated different constructs of the UTAUT model alone or in combination with other elements to extend the model. Performance expectancy was found to predict intention to use technology in 86% (12 of 14 studies that assessed performance expectancy) of the studies. Effort expectancy was found to predict intention to use technology in 80% (12 of 15 studies that assessed effort expectancy) of the studies. Barnard et al. (2013) found that participants who used computers had previously learned at work or in a computer course.

Social influence was found to predict intention to use technology in 53% of the studies (9 of 17 studies that assessed social influence). In the nine studies where social influence predicted intention to use technology, participants decision to use technology was based on if they thought those important to them (their social influences) were already using the technology or would support their technology use. As part of the original UTAUT model and a direct determinant of intention to use, social influence was found to be nonsignificant without the inclusion of all four moderators: age, gender, experience, and voluntariness (Venkatesh et al., 2003). However, in the studies with older adults, the moderator "voluntariness of use" was not assessed. This could be due to many of the participants already using technology or due to technology intention to use or use not being mandatory for the older adults in the studies. There is not a clear

explanation of why some of the studies found that social influence predicted intention to use technology when all four moderators were not tested. More research is needed on social influence to understand what elements affect social influence for older adults.

Ten of the studies evaluated facilitating conditions as a predictor of technology use and also extended the model to assess facilitating conditions as a predictor of intention to use. Of these studies, 40% (4/10) found that facilitating conditions predicted intention to use and 40% (4/10) found that facilitating conditions predicted use. Steele et al. (2009) noted that cost was an important facilitating condition in predicting technology use. Nägle and Schmidt (2012) found that facilitating conditions included sufficient resources, assistance, and information on how to use the computers. Barnard et al. (2013) explained that participants relied on family or a paid computer expert when they had technology issues. Many of the studies focused on predictors of intention to use, but not on intention to use as a predictor of use. Of the studies that assessed behavioral intention to use 60% (6/10) found intention to use predicted technology use. In order to understand technology use, more studies need to assess intention to use as a predictor of use.

Age was collected in 18 of the studies, but only seven of the studies analyzed age as a moderator or as a predictor of intention to use. Of these studies, two found age as a moderator for performance expectancy. One study found age as a moderator for effort expectancy, social influence, and facilitating conditions. Age was otherwise not found to moderate or predict intention to use or was not analyzed as part of the UTAUT model. It is important to note that although age was gathered as part of data collection, only two of these studies tested for age group differences (Magsamen-Conrad et al., 2015; Pheeraphuttharangkoon et al., 2014). Pheeraphuttharangkoon et al. (2014) analyzed

participants by two age groups: those over 50 and those below 50. For both age groups, social influence and facilitating conditions were predictors of behavioral intention, and behavioral intention predicted use. For those over 50, effort expectancy was a significant predictor for behavioral intention. For those under 50, performance expectancy was significant predictor of behavior intention.

Magsamen-Conrad, Upadhyaya, Joa, and Dowd (2015) analyzed generational differences (i.e., Silent Generation, Baby Boomers, GenX, Millennials) in predicting intention to use a tablet. Comparing each generation within each construct, the authors found that GenX had the highest level for performance expectancy, facilitating conditions, and behavioral intention and Millennials had the highest level for effort expectancy and social influence. Within each construct, significant differences were also found among the generations. The Silent Generation was significantly different from the other generations in performance expectancy, social influence, and behavioral intention. For effort expectancy, there were significant differences between all but one of the generations groups. There was not a significant difference found among GenX and Millennials. The Baby Boomers were only different from the Silent Generation for social influence. For facilitating conditions, the Millennials were significantly different from the Baby Boomers and Silent Generation. The results of this study show a negative relationship between age and intention to use technology. The intention to use technology decreases as a person's age increases.

Sex was assessed in 15 of the studies. Two studies found sex was a moderator for effort expectancy. However, the majority of the studies (8/10) did not find sex to be a

moderator in the model. Eight of the studies collected data on experience but did not report experience as significant or nonsignificant in the model.

Each of these studies highlighted factors within the UTAUT model that facilitate or act as a barrier for older adults' technology intention to use and use. An additional factor, health, was found to moderate technology intention to use and use for older adults (Gell et al., 2013). Gell et al. (2013) analyzed data from the 2011 National Health and Aging Trends Study ($N = 7,609$) to describe prevalence of technology use, with an emphasis placed on disability status, among adults ages 65 and older. They noted individuals' technology use was modified by health issues. Specifically, from the UTAUT model, effort expectancy and facilitating conditions predicted technology use for those with increased disabilities. For example, older adults with increased physical, vision, and memory impairments decreased their technology use. In contrast, older adults with pain or breathing issues were found to have an increased likelihood of technology use. Wang et al. (2017) also assessed health as part of the UTAUT model. Although health was not found to be a significant predictor of intention to use, the authors did emphasize the importance of including health as a variable to be assessed in future studies.

3.15 Summary

Nursing home residents have limited communication opportunities provided by the nursing home such as postal mail or in-person visits, and telephone access. Residents who are not able to take advantage of available communication options may feel lonely or socially isolated. Loneliness is associated with declines physically, psychologically, and/or socially. Social isolation is linked with cognitive decline, a reduction in quality of

life and life satisfaction, and poorer overall health. Nursing home residents are especially vulnerable to social isolation and loneliness as nursing homes have historically been cut off from society by both the facility walls and a societal preference to remain separated. Residents often feel isolated from society due to increased medical needs, limited opportunities to venture outside of the nursing home, and limited opportunities to interact with the general population.

CT offers a way to bridge the gap between nursing home residents and people who reside outside the nursing home. CT allows constant exchanges globally through venues such as video-conferencing, social networking platforms, the Internet, wireless networks, cell phones, and other communication media. Attempts have been made to increase communication opportunities for nursing home residents using CT. Studies have found that desktop computers, the Internet, and video conferencing are used in nursing homes. Nursing home residents are capable of learning to use computers and the Internet. Nursing home residents are also interested in learning to use computers. Interventions designed to assess the effect of video conferencing with residents and their families found that both parties enjoyed the opportunity to be able to see each other while talking. Video conferencing provides the possibility for the nursing home residents to see other aspects of their family members' life (e.g., house, pets). It also makes it possible for family members to visually monitor the health of the resident. Residents and family members felt a greater connection with the individual with whom they were communicating as a result of increased visibility.

Nursing home residents, when compared to other older adult groups, have received limited attention in studying the intention to use and use of CT This is

especially important as those in the baby boomer generation, who have been using CT, start to reside in nursing homes but may not have the technology available to them in the facility.

This dissertation study is unique in that it evaluated the potential to use a modified version of the UTAUT model as a framework for understanding nursing home residents and their intention to use and use of CT. This study can potentially provide important insight into understanding nursing home residents' use of CT and the barriers and opportunities that either limit or facilitate the use of the technology. The UTAUT constructs studied included the four factors that are determinants of intention to use technology and technology use (performance expectancy, effort expectancy, social influence, and facilitating conditions) and three moderators that facilitate intention to use technology and technology use (age, gender, and experience). This study also examined health as potential moderator for CT intention to use and use by nursing home residents.

CHAPTER 4. METHODS

In this chapter, I share the methodology of the study. I describe the study process, study sites, and data collection methods. I conclude with a discussion of the data analysis. Findings are discussed in the next chapter.

4.1   Research Design

This study used a mixed-methods convergent design (QUAL + quan) to explore long-term cognitively intact nursing home residents' CT intention to use and use (Groger & Straker, 2001; Morse, 1991). A classification developed by Morse (1991) describes the notations to describe mixed-methods research designs. An all capitalized QUAL signifies that the qualitative data is prioritized. The lowercase quan signifies that the quantitative data has lesser priority in the design. The "+" signifies that both the qualitative and quantitative methods occur at the same time. This mixed methods design was composed of qualitative data providing the main explanatory framework and quantitative data as support regarding long-term nursing home residents' CT intention to use and use, feelings of loneliness, and health status. A semi-structured interview was used to gain in-depth information on CT intention to use and use. The quantitative instruments used were the nursing home resident communication technology checklist, UTAUT questionnaire, UCLA loneliness scale 10 item version, and the self-rated health scale. Past research on CT intention to use and use by nursing home residents has presented a limited view by using almost exclusively qualitative or quantitative approaches. There is a need for a more thorough understanding that can only be achieved by comparing both qualitative and quantitative data.

Mixed methods designs are able to answer a more comprehensive range of research questions because the researcher is not limited to a particular method or approach (Creswell, 1998; Tashakkori & Teddlie, 1998). By gathering both qualitative and quantitative data, there is possibility of additional insights and understanding that would have otherwise been missed if only a single method was used. For example, it may appear that participants do not think that their friends have thoughts on their CT use or provide CT assistance from their response of "neither disagree nor agree" for the questions "My friends think I should use___" and "My friends have been helpful with the use of___" on the UTAUT questionnaire. However, in the qualitative interview, participants explained they do not have friends due to friends dying or frequent moves throughout their life.

CT intention to use and use by nursing home residents is an understudied area, and there is a need for a deeper understanding. The most effective way to address the proposed research question and aims of this study is by using a mixed methods design. The aim of the convergent design is "…to obtain different but complementary data on the same topic" (Morse, 1991, p. 122) in order to have a comprehensive understanding of the topic. A convergent design links qualitative methods (e.g., smaller sample, non-generalizable) and quantitative methods (e.g., larger sample, generalizable) so the strengths and weaknesses of one method compensate for strengths and weaknesses of the other (Patton, 1990). In a convergent design, the researcher gathers qualitative and quantitative data on the research topic concurrently, but separately. Each data set is analyzed independently based on the appropriate analytic procedure for the data. After each data set is analyzed independently, they are then be merged with the objective of

comparing the findings and results. Data are interpreted based on how the findings and results agree or differ from each other (Creswell & Plano Clark, 2018).

4.2   Recruitment

4.2.1   Permission to conduct research

Recruitment of nursing home facilities occurred prior to and throughout the study. In order to have access to interview nursing home residents, approval from nursing home administrators had to be obtained. Beginning in December 2018, a list of 15 nursing homes in Lexington, Kentucky was obtained from the Kentucky Department of Health and Family Services Division of Health Care website that houses the long-term care directory for Kentucky. A phone call, email, and/or in-person visit to the facility was made to each nursing home administrator to explain the study and request permission to conduct research at their facility. Given several attempts to recruit administrators in Lexington with no success, it was clear that I would need to widen the scope to nursing home administrators outside of Lexington.

Beginning in February 2019, a list of 28 nursing homes was obtained from the Kentucky Department of Health and Family Services Division of Health Care website that included all nursing homes in counties that surrounded Lexington. A phone call or email was sent to these facilities nursing home administrators to explain the study and request permission to conduct research at their facility. In addition to individual facility phone calls and emails, I placed a recruitment letter in the March 2019 monthly newsletter for the Kentucky Association of Health Care Facilities. I also reached out to LeadingAge Kentucky for nursing home recruitment support. Neither the Kentucky

Association of Health Care Facilities nor LeadingAge Kentucky was helpful for facility recruitment.

For administrators interested, I offered to meet with them in-person, via email, or over the phone to discuss the study. The majority of the administrators (75%) preferred email contact to discuss the study and the possibility of their nursing home being a research site. Once they agreed for their nursing home to be a research site, it was determined through email correspondence how recruitment and interviews would proceed at their facility. In-person meetings occurred with two of the administers as an introduction to discuss the study, but the rest of the communication to work out the recruitment and interview process was through email. Eight nursing home administrators agreed to allow this study at their facility.

Facility considerations discussed with each administrator and their facility social worker included interview location and an introduction to eligible participants. Participant interviews were either conducted in the participant's room or another private room in the nursing home. Interviews were completed in the participant's room if they had a private room. A "do not disturb" sign was placed on the outside of their room door for privacy during the interview. Interviews with participants who did not have a private room were conducted in a predetermined private location designated by the administrator, such as a private conference room. The social worker, who regularly (at a minimum of every three months) conducts cognitive assessments on residents as part of standard nursing home care, determined eligible participants based on inclusion criteria. Either the administrator or the social worker provided an in-person introduction to the eligible participants. Prior to my in-person introduction, the administrator or social worker

notified eligible participants of the study. This study was approved by the University of Kentucky Institutional Review Board (IRB #50799).

4.2.2   Participants

Participants were purposefully selected for this study based on cognitive status, sex, and age (Miles & Huberman, 1994). Purposeful sampling aims "to select information rich cases whose study will illuminate the questions under study" (Patton, 1990, p. 169). The sampling frame was composed of a list of eligible nursing home residents for this study given to me by the social worker or administrator at each participating facility. In total, 225 nursing home residents from six nursing homes met the inclusion criteria. To be eligible to participate in this study, nursing home residents had to have an intact cognitive status. Cognitively intact nursing home residents range from 38% to 50% of a nursing home resident population (Nichols, 2017). A cognitively intact status was determined by a score of > 3 on the Mini-Cog screening instrument. The Mini-Cog combines a simple memory test with a clock drawing test (Borson et al., 2000; Scanlan & Borson, 2001). The Mini-Cog has a 99% sensitivity and 93% specificity as a screen for cognitive impairment. It can be administered in approximately 3 minutes (Borson et al., 2000). There has been little bias found by this instrument for education level, language, or culture. The Mini-Cog has been shown to be a better cognitive screening instrument than the Mini-Mental Status Exam (Folstein, Folstein, & McHugh, 1975; Tombaugh & McIntyre, 1992).

To achieve an inclusive sample of nursing home residents, sex and age was also taken into consideration when selecting participants. The nursing home population in the United States is comprised predominately of residents who are 65 years of age or older

and female (Harris-Kojetin et al., 2019). Since I wanted to look at the differences between generations, the study was open to ages 55 to 94 years. This included those born in the Silent Generation (1925-1945) and the Baby Boomer Generation (1946-1964). Older adults in the Silent Generation (born before 1946) did not grow up with the technology options available to more recent generations. They had to intentionally make the decision to adopt and use new technology because the advancement of technology into their environment occurred post-retirement. Those born in the Baby Boomer Generation (1946-1964) did not grow up with the technology options, but they had to adapt to using technology as it was integrated in the workplace and possibly their personal life. Since females make up the majority of the nursing home population, I tried to oversample male participants. I recruited for maximum variation, but variation was difficult when taking into account each nursing homes' different resident population, residents who were eligible for the study, and residents who wanted to participate in the study. I interviewed older adults with different levels of familiarity with CT in order to get a broader picture of the challenges they face and gain insight into different ways of coping with technology.

The social worker, who regularly (at a minimum of every three months) conducts cognitive assessments on residents as part of standard nursing home care, determined eligible participants based on inclusion criteria. The administrator or the social worker at the nursing home introduced me to residents who met the eligibility criteria. I introduced myself to the resident and explained (a) the purpose of the study, (b) the process for collecting data, and (c) the estimated time commitment for those who chose to participate

in the study. Interviews were arranged with residents who elected to participate in the study at their convenience (either that day or another day).

4.3 Data Collection

4.3.1 Sample size

Data was collected through semi-structured interviews of 40 nursing home residents (Creswell, 1998). All of the eligible participants (225 nursing home residents) were invited to participate and only 40 agreed to participate. This sample size allowed for a detailed exploration of the characteristics that addressed the research question and discerned relevant conceptual categories (Charmaz, 2006; Morse, 1994, 1995). Due to the heterogeneity of the participants and complexity of the topics that were studied, the larger sample size was able to explain relationships within the conceptual categories and address any negative cases (Charmaz, 2006; Morse, 1994, 1995).

4.3.2 Interviews

Interviews were audio recorded unless the participant requested that they not be. Two participants requested their interview not be audio recorded, so I wrote down detailed participant responses throughout the interview. Each audio recorded interview consisted of seven parts: (1) informed consent, (2) participant history, (3) nursing home resident communication technology checklist, (4) a semi-structured interview, (5) UTAUT questionnaire, (6) UCLA loneliness scale 10 item version, and (7) self-rated health scale.

4.3.2.1 Informed consent

At the beginning of each interview, I reviewed consent for participation. In addition to age, inclusion criteria included being cognitively intact and having long-term status as a resident at the nursing home. Long-term status was defined as permanently residing at the nursing home with the anticipation of finishing their life at this residence. Exclusion criteria were not being cognitively intact, residing at the facility short-term, receiving respite care, or receiving hospice care. Participants were informed about the reason for the study, potential risks of participation, and that they might decline participating in the interview or stop participating at any time. Once participants consented to the study, the interview began.

4.3.2.2   Participant history

The first two open-ended questions asked were about the participants' past and how they became a resident at the nursing home in an effort to decrease feelings of anxiety of being interviewed and to establish a social context for each participant (Appendix 2). Developing rapport involves creating a safe and relaxed atmosphere for participants to share their experiences and views. Rapport also includes maintaining respect for the participant and the information they share. I also gathered basic demographic information about sex, birthdate, nursing home payer source, and highest level of education.

4.3.2.3   Nursing home resident communication technology checklist

A nursing home resident communication technology checklist (Appendix 3) was created after a pilot study on communication changes for nursing home residents highlighted the various ways that nursing home residents use CT (Schuster, Giger, & Hunter, 2016). The nursing home resident communication technology checklist was

administered to provide baseline data on CT usage by nursing home residents. The checklist gathered which type of CT was used, how the CT was used, and which CT was the primary device. The primary CT selected by the participant was incorporated into the semi-structured interview questions in order to expand upon the checklist responses.

4.3.2.4 Semi-structured interview protocol

A semi-structured interview protocol (Appendix 4) was employed. During a semi-structured interview, the researcher uses an interview protocol with open-ended questions to guide the discussion, while also permitting opportunities for unplanned discussion by the participant (Morse & Niehaus, 2009). This flexible structure allows the researcher to probe beneath "surface level" answers so that each participant's meanings can fully be explored (Merriam, 2009). The semi-structured interview guide, with questions developed from constructs of the UTAUT model (i.e., performance expectancy, effort expectancy, social influence, behavioral intention to use CT), was used to gather information about CT intention to use and use by the participant. Open ended questions included the following: "How does using _____ affect your ability to communicate with other people?" (Effort expectancy), "Tell me about the resources or individuals that you think are available to you for guidance or specialized instruction on using ___" (Facilitating conditions), "What are some of the ways you believe that using _____ to communicate with those outside the nursing home affects your life?" (Performance expectancy), and "Tell me about how you use the CT" (Behavioral intention to use).

4.3.2.5 UTAUT questionnaire

CT intention to use and use was assessed using the UTAUT questionnaire (Appendix 5). Data was collected using the complete UTAUT questionnaire because I

wanted my data to be consistent with previous research. I could not be certain that each question would be needed, but I knew *a priori* that some of these questions were not as useful. The UTAUT questionnaire is composed of 17 items answered on a 5-point scale of "strongly disagree," "disagree," "neither disagree nor agree," "agree," and "strongly agree." The items were previously developed and validated (Venkatesh et al., 2003) but were slightly modified to fit the nursing home population and aims of this study. For example, under performance expectancy in the original UTAUT questionnaire, the first question is "I would find the system useful in my job" (Venkatesh et al., 2003). For this study, the same question was modified to be, "Using [insert CT primarily used] is helpful to me." Social influence questions were modified to incorporate family and friends. For example, in the original UTAUT questionnaire, the question read, "people who influence my behavior think that I should use the system" (Venkatesh et al., 2003). For this study, the same question was adapted to read, "My family thinks that I should use [insert CT primarily used]." Facilitating condition questions were modified to include the nursing home. For example, in the original UTAUT questionnaire, the question read, "A specific person (or group) is available for assistance with system difficulties" (Venkatesh et al., 2003). For this study the same question was adapted to read, "When I have problems using [insert CT primarily used] someone at the nursing home can help me solve them."

4.3.2.6   UCLA loneliness scale

The UCLA loneliness scale 10 item version (Appendix 6) was employed to evaluate loneliness experienced by participants. I chose to measure loneliness because, as mentioned in the literature review, nursing home residents are particularly vulnerable to this emotion. The UCLA loneliness 4-point scale was originally created to measure

feelings of loneliness among college students. The internal consistency of the scale (coefficient alpha ranging from 0.89 to 0.94) and the test-retest reliability ($r = 0.73$) demonstrate that this scale is highly reliable (Russell, 1996). The UCLA loneliness scale was selected for this study because it has previously been used with nursing home residents and is found to be a reliable and valid measure with this population (e.g. Cheng, Lee, & Chow, 2010; Schwindenhammer, 2014; Tsai & Tsai, 2011; Tsai et al., 2010).

4.3.2.7   Self-rated health scale

Self-rated health (Appendix 7) was assessed with a single question asking participants to rate their health in general, with five response options: (1) poor, (2) fair, (3) good, (4) very good, and (5) excellent (Idler & Benyamini, 1997). I added a health question because I knew at the outset that this was going to be a variable that applied to a nursing home population. This single-item measurement has been found to be a sufficient alternative for multi-item measures and has reliable psychometric efficacy to assess general health (McDowell, 2006).

4.3.3   Data security

All information from the interviews was entered in a secure database. The secure server was password protected and used 128 bit encryption. All information collected and participant identity was kept confidential. All data was stored in a locked file cabinet or on a secure server on a locked computer in the Graduate Center for Gerontology and was accessible only to the researcher.

4.4   Analysis

Analysis of qualitative (i.e., semi-structured interviews) and quantitative data (i.e., nursing home communication technology checklist, UTAUT questionnaire, UCLA loneliness scale, and self-rated health scale) using a mixed methods convergent design occurred in two phases. Each data set was analyzed separately and independently in the first phase using the appropriate analytic procedure per the type of data, as explained below. Once each data set was analyzed independently, findings from each data set were merged in the second phase. The merged findings were compared to determine in which ways they supported, contradicted, or expanded upon each other in order to create combined results and explanations that increase understanding, present inclusive results, and/or validate findings (Creswell & Plano Clark, 2018).

4.4.1   Semi-structured interviews

Audio recorded interviews were transcribed verbatim. A content analysis deductive approach was used to analyze the semi-structured interviews. Content analysis is a systematic and objective method of explaining a phenomenon (Downe-Wamboldt, 1992; Krippendorff, 1980; Sandelowski, 1995). Through content analysis, the researcher is able to increase their understanding of the data directed by a theoretical lens, in this case through the UTAUT model. The goal of content analysis is to achieve a concentrated and comprehensive description of the phenomenon with the outcome of the analysis being concepts explaining the phenomenon (Miles & Huberman, 1994). There are two approaches to content analysis: inductive and deductive. An inductive approach is used when there is limited prior knowledge about the phenomenon. A deductive approach is used when the organization of the analysis is functioning on the basis of a

theory and previous knowledge (Berg, 2001; Polit & Beck, 2006) and so data move from broad to specific (Burns & Grove, 2005). This study used a deductive approach to content analysis guided by an *a priori* list of codes based on the constructs of the UTAUT model and research on CT intention to use and use by older adults (Miles & Huberman, 1994). The *a priori* list of codes included performance expectancy, effort expectancy, social influence, facilitating conditions, and health (Appendix 8). I also remained acutely aware of possible new codes that could emerge during data analysis.

During the first step in content analysis, the transcribed interviews were read multiple times to get a feel for the data and make sense of what was occurring (Morse & Field, 1995). I then created a categorization matrix and coded the data in line with the matrix (Polit & Beck, 2004). In initial coding, incidents or events were labeled and assembled together through constant comparison to form categories and properties (Berg, 2001). Initial coding focuses on concept development, which is made up of "identifying a chunk or unit of data (a passage of text of any length) as belonging to, representing, or being an example of some more general phenomenon" (Spiggle, 1994, p. 493). I then reread the interview transcripts alongside the insights noted in the text to check that all facets had been included in relation to the specific aims of the study (Burnard, 1991). At this point, unmarked text that did not provide support to the research question was excluded (Burnard, 1991, 1995). Coded material was then separated into categories based on different areas of the study (Patton, 2002). Words or phrases that appeared multiple times within each category were then coded into a theme. For example, in the performance expectancy category, the word "connection" appeared in a majority of the

transcripts so it was then coded as a theme. The final step was the analysis and starting the writing up process.

During qualitative data collection and analysis, establishing reliability and validity of the data must be taken into consideration. Reliability in qualitative research involves a consistent study approach by the researcher (Gibbs, 2007). To address reliability concerns, I shared a sample of interviews with an independent researcher to code independently. We then met to compare coding interpretation to reduce researcher bias (Barbour, 2001; Campbell, Quincy, Osserman, & Pedersen, 2013; Kurasaki, 2000).

Validity in qualitative research means that the findings are accurate (Creswell & Miller, 2000). To address validity concerns, I used triangulation of the data. Triangulation of the data is a validity procedure that involves using different methods and sources to corroborate findings (Denzin, 1970; Miles & Huberman, 1994; Patton, 1990). Triangulation decreases the possibility of accidental associations, as well as of systematic biases existing as a result of a specific method being used, so there is greater confidence in any interpretations (Maxwell, 1992). A computer assisted qualitative data analysis software (CAQDAS) program, specifically NVivo 12, was used to assist me in recording, storing, indexing, sorting, and coding data (Creswell & Creswell, 2017).

4.4.2   Nursing home resident communication technology checklist

Data from the nursing home resident communication technology checklist was analyzed descriptively. Frequency tables were created showing the percent of residents using which device, how they are using the device, and age, sex, highest education level attained, and payer source.

4.4.3   UTAUT questionnaire

Data from the UTAUT questionnaire was analyzed descriptively. Spearman's Rho was then used to measure the strength of association between two variables. This approach was used to measure the strength of association between the constructs (performance expectancy, effort expectancy, social influence, and facilitating conditions). Spearman's Rho is a non-parametric test and is used with ordinal data. The sign of the Spearman's Rho correlation signifies the direction of association between X (the independent variable) and Y (the dependent variable). A positive Spearman's Rho correlation coefficient indicates that Y tends to increase when X increases. A negative Spearman's Rho correlation coefficient indicates that Y tends to decrease when X increases. A correlation of zero means that there is no tendency for Y to either increase or decrease when X increases. When the Spearman correlation coefficient becomes 1, the X and Y are perfectly monotonically related. Data was analyzed using SPSS 25.

4.4.4   UCLA loneliness scale

Data from the UCLA loneliness scale was analyzed based on the instrument scoring protocol (Russell, 1996). Scale scoring was calculated individually and overall for the study population. A t-test was used to test the difference between male (0) and female (1) responses on the scale and between the age group responses on the scale. Age was coded by generation groups: (0) Silent Generation (1925-1945) and (1) Baby Boomer Generation (1946-1964).

Likert-type scales, in this case the UCLA loneliness scale, produce ordinal scale responses because the distance between response options are not necessarily equal.

However, ordinal data can be converted to numbers and considered interval data when taking into account parametric test results versus non-parametric test results. Parametric tests assume that the population from which the data has been attained is normally distributed, unlike non-parametric tests. Non-parametric tests are less powerful than parametric tests, and they typically need a larger sample size to find a difference between groups when a difference exists in order to have the same power as parametric tests. Parametric tests can be used with ordinal data and have been found to be more robust than non-parametric tests when analyzing Likert-style scales even when there is not a normal distribution of data (Norman, 2010). It is also best practice to use Cronbach's alpha to provide evidence that the components of the scale are adequately intercorrelated and the grouped items measure the main variable (Rickards, Magee, & Artino, 2012). The data was found to be normally distributed. Data was analyzed using SPSS 25.

4.4.5 Self-rated health scale

Data from the self-rated health scale was 1) analyzed descriptively and 2) analyzed based on sex and age. A frequency table was created showing the percent of residents who rated their health with the five response options: poor, fair, good, very good, excellent. Data was then tested for normality with a histogram and the Shapiro-Wilk's W test of normality. The Shapiro-Wilk's W test of normality was used as it is more sensitive to a smaller sample. The histogram showed a fairly symmetrical normal distribution and the Shapiro-Wilk's W test suggested the data was normally distributed (p <.001). A t-test was used to test the difference between male (0) and female (1) responses on the scale. A t-test was used to test the difference between the age group responses on

the scale. Age was coded by generation groups: (0) Silent Generation (1925-1945) and

(1) Baby Boomer Generation (1946-1964). Data was analyzed using SPSS 25.

CHAPTER 5. FINDINGS

Research findings are presented in this chapter. These findings include nursing home characteristics, participant demographic characteristics, participant CT characteristics, themes that emerged from the qualitative interviews (connection, feeling of security, support, and continued learning) and an assessment of the appropriateness of the UTAUT model as a framework for assessing CT intention to use and use.

Data collected during a full interview included (1) a participant history; (2) completion of a nursing home resident communication technology checklist; (3) a semi-structured interview; (4) administration of the modified UTAUT questionnaire; (5) the UCLA loneliness scale 10 item version; and (6) administration of the self-rated health scale. All participant names and nursing home names are pseudonyms. The full interviews lasted on average 51 minutes. Interviews ranged from 30 minutes to 106 minutes depending on the CT used by the participant and their willingness to share. During the interviews, there were no unanticipated problems or adverse events (physical or psychological harm).

5.1 Nursing Home Characteristics

Eight nursing homes were originally research sites for this study. Two of the nursing homes did not have residents who met the inclusion criteria for participation in the study. No interviews were conducted at these two nursing homes and so they were dropped from the study. Information is presented on the six nursing homes where interviews were conducted. Four (66.7%) of these nursing homes were for profit. Four (66.7%) were large (100 or more beds). Four (66.7%) of the nursing homes did not provide a landline telephone for each resident; however, in these cases there was a

landline phone access port in the wall in each resident's room. Residents had to either ask the nursing home to have the phone line hooked up or had to contact a phone provider to have their phone line activated. With both options, the resident had to provide their own phone and pay a monthly phone fee. This finding is consistent with Kentucky nursing home regulations which only provide the guidelines that, "Residents shall have access to a telephone at a convenient location within the facility for making and receiving telephone calls ("State operations manual," 2017)." The nursing home does not have to provide a telephone or individual phone lines for each resident.

In the nursing homes that provided a landline telephone for each resident, long distance calls were not included. Long distance phone calls could be made at the nurses station. Four (66.7%) of the nursing homes had at least one desktop computer available for residents' use. All six nursing home provided Wi-Fi for residents. A full description of nursing home characteristics is found in Table 5.1.

Table 5.1:Nursing Home Characteristics

Nursing Home	Bed Size	Type	Landline Phone Provided	Facility Desktop Computer
Locust Hills	285	Gov't/State*	No	Yes
Beauclerc Wood	112	For Profit	Yes	Yes
Osprey Nest	95	For Profit	Yes	Yes
Midland Tower	94	For Profit	No	Yes
River Villas	108	For Profit	No	No
Summer Court	130	Non-Profit	No	No

*Gov't/State refers to Veterans Administration support.

5.2 Participant Characteristics

Forty (n = 40) individuals participated in this research; 16 were male and 24 were female. The mean age of the participants was 77.4 years (range 57-94; SD = 9.9). The average age of the female participants (78.8 years; range 57-94; SD = 10.1) was slightly higher than the average age of male participants (75.2 years; range 59-94; SD = 9.6). Twenty-six (65%) of the participants were from the Silent Generation (born between 1925-1945) and 14 (35%) were from the Baby Boomer Generation (1946-1964). A large majority, thirty-eight (95%) of the participants were White. Thirty-one (77.5%) of the participants had completed high school. Of those completing high school, 14 (45%) graduated college and five (16%) took part in graduate school education. Eighteen (45%) of the participants were widowed. Payment for nursing home residence was from one of three sources: Medicaid (65%), Veteran's Benefit (25%), or private pay (10%). A full description of participants' demographic characteristics is provided in Table 5.2 (See also Appendix 9).

The majority of the participants (26; 65%) rated their health as good or higher (see Table 5.3). There was no statistically significant effect for age, t (38) = 0.496, p = .624, despite the Silent Generation (M = 3, SD = 0.96) having higher scores than the Baby Boomer Generation (M = 2.85, SD = 0.90). There was no statistically significant effect for sex, t (38) = 1.7436, p = .092, despite men (M = 3.25, SD = 0.86) having higher scores than women (M = 2.75, SD = 0.944).

Table 5.2: Participant Demographics

Characteristic	Number (%)
Sex	
Female	24 (60%)
Male	16 (40%)
Age	
90-94	5 (12.5%)
80-89	13 (32.5%)
70-79	12 (30%)
60-69	8 (20%)
57-59	2 (5%)
Generation	
Silent Generation	26 (65%)
Baby Boomer Generation	14 (35%)
Race	
White	38 (95%)
African American	2 (5%)
Relationship Status	
Never Married	5 (12.5%)
Married	7 (17.5%)
Divorced	10 (25%)
Widowed	18 (45%)
Payer Source	
Medicaid	26 (65%)
VA	10 (25%)
Private Pay	4 (10%)
Education	
8th Grade or Below	5 (12.5%)
Some High School	3 (7.5%)
High School Graduate	13 (32.5%)
Some College	7 (17.5%)
College Graduate	6 (15%)
Graduate School	5 (12.5%)

Table 5.3: Self-Rated Health

Rating	Number (%)
Poor	1 (3%)
Fair	13 (33%)
Good	15 (38%)
Very Good	9 (23%)
Excellent	2 (5%)

5.3   Participant Communication Technology Use

Participant CT use varied, with twenty-six (65%) of the participants using some type of CT more advanced than a landline telephone (e.g., cellphone, smartphone, desktop computer, laptop, tablet). Eight (20%) of the participants used only a landline telephone, and six (15%) were not using any form of CT. Twenty (59%) of the participants who used CT used more than one type of CT. There was minimal difference between males (70%) and females (75%) in CT use. Of the participants who used some form of CT more advanced than a landline telephone, 16 (62%) were from the Silent Generation and 10 (39%) were from the Baby Boomer Generation. So proportionally, more Baby Boomers (71%) used CT more advanced than a landline telephone than those from the Silent Generation (62%).

A full description of participants' CT use is found in Table 5.4. For participants who used CT more advanced than a landline telephone, there was more variation in the types of CT (e.g., landline telephone, cellphone, smartphone, desktop computer, laptop, tablet) used by participants in the Silent Generation (51%) than those in the Baby Boomer Generation (34%). For example, Connor (Silent Generation) used a cellphone and laptop, whereas Alyssa (Baby Boomer Generation) used a cellphone.

Table 5.4: Participant CT Use

	Used CT More Advanced Than a Landline Telephone Number (%)	Only Used a Personal Landline Telephone Number (%)	No CT Use Number (%)
Baby Boomer Generation			
Female	5 (12.5%)	2 (5%)	1 (2.5%)
Male	5 (12.5%)	1 (2.5%)	0
Silent Generation			
Female	9 (22.5%)	3 (7.5%)	4 (10%)
Male	7 (17.5%)	2 (5%)	1 (2.5%)

Sixteen (40%) participants used a personal landline telephone. Thirteen (32.5%) participants used a cellphone. Ten (25%) participants used a smartphone. Five (12.5%) of the participants used a desktop computer. Five (12.5%) participants used a laptop. Three (7.5%) participants used a tablet. Twenty-three (57.5%) participants used a cellphone or smartphone. Cellphones were mainly used for calls (13; 32.5%). Smartphones were mainly used for calls (10; 25%) and text messages (8; 20%). Desktop computers were used for email (1; 2.5%) and videoconferencing (1; 2.5%). Laptops were used for emails (2; 5%). Tablets were used for text messaging (1; 2.5%) and videoconferencing (1; 2.5%). Eight (20%) participants used a smartphone, desktop computer, or tablet to get on Facebook. There was no difference noted between making (32.5%) and receiving (32.5%) phone calls for cellphones. There was minimal variation found in the difference between making and receiving calls for landline telephones (30%, 35%) and smartphones (22.5%, 25%). A full description of types of CT and how participants use CT is found in

Table 5.5. CT use varied by participant from daily (22; 55%), weekly (6; 15%), monthly (3; 7.5%), to rarely (9; 22.5%).

CT such as smartphones (5%), desktop computers (12.5%), laptops (10%), and tablets (5%) were also used for non-communication purposes (Table 5.6). Non-communication purposes included surfing the web, watching TV, checking the weather, playing games, listening to music, and shopping.

Table 5.5: Types of CT and How Participants Use CT

CT Type and Use	Total	Male	Female	Silent Generation	Baby Boomer
Personal Landline Phone	**16 (40%)**	**6 (15%)**	**10 (25%)**	**11 (27.5%)**	**5 (12.5%)**
Receives Calls	14 (35%)	5 (12.5%)	9 (22.5%)	9 (22.5%)	5 (12.5%)
Makes Calls	12 (30%)	4 (10%)	8 (20%)	8 (20%)	4 (10%)
Requires Assistance	1 (2.5%)	1 (2.5%)	0	0	1 (2.5%)
Cellphone	**13 (32.5%)**	**4 (10%)**	**9 (22.5%)**	**10 (25%)**	**3 (7.5%)**
Makes & Receives Calls	13 (32.5%)	4 (10%)	9 (22.5%)	10 (25%)	3 (7.5%)
Requires Assistance	2 (5%)	2 (5%)	0	2 (5%)	0
Receives Text Messages	3 (7.5%)	1 (2.5%)	3 (7.5%)	3 (7.5%)	1 (2.5%)
Sends Text Messages	2 (5%)	0	2 (5%)	1 (2.5%)	1 (2.5%)
Smartphone	**10 (25%)**	**6 (15%)**	**4 (10%)**	**5 (12.5%)**	**5 (12.5%)**
Receives Calls	10 (25%)	6 (15%)	4 (10%)	5 (12.5%)	5 (12.5%)
Makes Calls	9 (22.5%)	6 (15%)	3 (7.5%)	5 (12.5%)	4 (10%)
Receives Video Conferencing	4 (10%)	3 (7.5%)	1 (2.5%)	2 (5%)	2 (5%)
Calls with Video Conferencing	2 (5%)	2 (5%)	0	0	2 (5%)
Receives Text Messages	8 (20%)	4 (10%)	4 (10%)	4 (10%)	4 (10%)
Sends Text Messages	7 (17.5%)	4 (10%)	3 (7.5%)	3 (7.5%)	4 (10%)
Requires Assistance with Text Messaging	1 (2.5%)	0	1 (2.5%)	1 (2.5%)	0
Sends & Receives E-mails	4 (10%)	2 (5%)	2 (5%)	2 (5%)	2 (5%)

Table 5.5 (continued)

Uses Family Members Smartphone	3 (7.5%)	2 (5%)	1 (2.5%)	3 (7.5%)	0
Facebook	4 (10%)	1 (2.5%)	3 (7.5%)	2 (5%)	2 (5%)
Personal Desktop Computer	**2 (5%)**	**1 (2.5%)**	**1 (2.5%)**	**1 (2.5%)**	**1 (2.5%)**
Receives Videoconferencing	1 (2.5%)	0	1 (2.5%)	1 (2.5%)	0
Sends & Receives E-mails	1 (2.5%)	1 (2.5%)	0	0	1 (2.5%)
Facebook	1 (2.5%)	0	1 (2.5%)	1 (2.5%)	0
Facility Desktop Computer	**3 (7.5%)**	**3 (7.5%)**	**0**	**2 (5%)**	**1 (2.5%)**
Facebook	1 (2.5%)	1 (2.5%)	0	0	1 (2.5%)
Laptop	**5 (12.5%)**	**4 (10%)**	**2 (5%)**	**4 (10%)**	**1 (2.5%)**
Sends & Receives E-mails	2 (5%)	2 (5%)	0	2 (5%)	0
Tablet	**3 (7.5%)**	**1 (2.5%)**	**2 (5%)**	**1 (2.5%)**	**2 (5%)**
Calls & Receives Calls with Video Conferencing	1 (2.5%)	0	1 (2.5%)	0	1 (2.5%)
Sends & Receives Text Messages	1 (2.5%)	0	1 (2.5%)	0	1 (2.5%)
Facebook	2 (5%)	0	2 (5%)	1 (2.5%)	1 (2.5%)

Table 5.6: Technology Use for Non-Communication Purposes

Non-Communication Use of Technology	Total	Male	Female	Silent Generation	Baby Boomer
Tablet	2 (5%)	1 (2.5%)	1 (2.5%)	1 (2.5%)	1 (2.5%)
Laptop	4 (10%)	4 (10%)	0	4 (10%)	0
Facility Desktop Computer	3 (7.5%)	3 (7.5%)	0	2 (5%)	0
Personal Desktop Computer	2 (5%)	1 (2.5%)	1 (2.5%)	1 (2.5%)	1 (2.5%)
Smartphone	2 (5%)	2 (5%)	0	1 (2.5%)	1 (2.5%)

5.4   Themes

Throughout the interviews, four themes emerged from the conversations in relation to participants' CT use: connection, feeling of security, support, and continued learning. Each will be considered in more depth.

5.4.1   Connection

Connection to the outside world was an important theme in the interviews (24/34). Participants used CT to stay connected with family, friends, and their community. CT was also used to prevent social isolation and feelings of loneliness. Participants explained that having CT allowed them to feel less confined to the nursing home because they could contact whomever they wanted at their own discretion. Chris, 74 years old, uses his smartphone daily to communicate with his family, friends, and past students he worked with when he was a University Professor; he also uses it to get on Facebook and play games. He has a laptop that he uses for business purposes, such as writing emails. Chris explained that by using his smartphone, "I don't feel imprisoned. I think technology has given me a way to unlock the bars and go out wherever I want to."

The ability to regularly keep in contact with people was important since consistent in-person visits from more than one person were not always an option. Consistent in-person visits from people who lived outside the nursing home ranged from daily (7/40), more than once a week (9/40), once a week, (11/40), every other week (5/40), to once a month or less (8/40). These regular in-person visits were mainly by one person like a spouse, child, or other family member. Participants who did not see family members daily, but wanted to talk to them, used CT to connect with those family members. Larry,

71 years old, uses his smartphone daily to keep up to date with what is going on in his

family members lives. Larry shared, "I use it [smartphone] quite a bit to call outside

people, you know." He receives phone calls daily from his daughter, granddaughter, and

son.

> My daughter calls me… every morning when she gets up. And she calls me every afternoon before I go to supper. And then she'll call me after I get out of the shower. And my granddaughter does the same thing. She'll call me before she goes to work to tell me she's going to work, and she'll call me after she gets off. And then she'll call me before I go to bed.

> Larry's son calls "…every day when he gets off from work." He also uses his

smartphone to connect with other family members weekly. Larry explained, "….my

brother that lives in [another town]. I usually call him '…bout every couple days. Me and

him's the only two left out of nine children." In addition to communicating with family

members, CT provided an option for communicating with friends. Chris explained how

he is able to keep in touch with the people important to him when in-person visits are not

possible:

> When I first came in here two years ago I had a lot of visitors, but most of my friends are married with kids … and most, a lot of my former students live far away, and they don't have the time to come in and visit as much as they would like or as much as I would like. So we communicate through messages and through the phone….A lot of people want to come and visit but because they have children or jobs they're not…it's not always available to them. Whereas, if I'm thinking about someone I can just send them a quick message and they can just send one back to let me know they are thinking about me. It's like a social extension of my life.

> CT use by participants was predominantly for maintaining relationships and

socializing, but CT use was also for completing specific tasks. Myra, 79 years old, used

her smartphone daily to play Solitaire, search Facebook, listen to music, search online,

and text/email her husband since she moved to Beauclerc Wood nursing facility. Prior to

moving to this facility, Myra was in charge of the family finances and maintaining the home, which has now transitioned to her husband's responsibility. She uses her smartphone to communicate with him and help him with the transition. Myra shared that, "…after I got sick he had to take over bill paying. So I had to coach him on that through texting. He's finally got that down pat. So it gives us a way to communicate about the finances." As she elaborated about her smartphone, "I think I have to have it [smartphone]. I feel it's a have to cause I can't…don't keep up with my husband that much other than texting and emailing things." CT was also used for shopping or ordering food delivery. Karah, 76 years old, does not have any personal CT but uses the nurses' station for receiving and making phone calls. She also uses the nurses station landline telephone to order Domino's pizza once a week to supplement some meals because as she said, "Institution food sucks." As she described the delivery experience, she laughed and said, "They [Domino's pizza delivery person] just bring it up and … well, they know who I am now. I sit up by the front door, and they say, 'Here's your dinner, Karah.'"

While most of the participants (22/40) used CT daily, the overall consensus was that just having the option to use CT was important to feel connected to those outside of the nursing home, even if the option was used infrequently based on the participants communication preferences. John, 73 year old, used his smartphone predominantly for business prior to moving to Locust Hills nursing home two years ago, but he still relies on his smartphone for specific purposes like restocking his supply of his favorite drink. John is a devoted Sprite drinker, and when he runs out, he calls a friend to bring him more bottles. John explained,

Don't use the phone that much. I just don't have a need to. I'm not one of those that you get down there and starts punching buttons and you know… but it is nice thing to have. You're not totally cut off from the world that way.

Communication with family members and friends through CT use, was a way to remain part of the community where they had lived prior to moving into the nursing home. Akieya, 72 years old, uses her cellphone daily and explained that, "It's [cellphone] my connection to the outside world…to friends and one or two different organizations that I belong to."

Without the ability to use CT, participants explained there would be the potential for social isolation. This reason was emphasized when participants explained that it can be difficult to find other residents inside the nursing home to communicate with because either they are not able to leave their room due to worsening physical medical conditions or they are not able to easily communicate with other residents' who have limited cognitive capabilities. Participants who have physical impairments that limit their ability to move around independently shared that without the CT they would feel socially isolated. Marium, 66 years old, spends most of her day on her smartphone or on her laptop (playing online games, searching the web, and using Facebook). She has lived at Beauclerc Wood nursing home for over two years and explained that without CT she would not have people to talk to because she cannot walk and spends most of her day in bed. Marium says that a life without CT, "…it's a little bit impossible without one [smartphone]. How would you keep up with people because I don't know a whole lot of people around here."

Marium shared that her grandson is the only family member who lives in the same city and the majority of people she knows live in other states. She relies on daily phone

calls from her friend, Sarah, and her grandson to maintain the level of communication she

prefers. Marium said, "I'll tell you what, if she [Sarah] didn't call me, I would be lost."

Marium also talked about her strong bond with her grandson: "I'm the only grandparent

that he has and he's the only living relative that I have." She lights up when she talks

about her grandson: "We talk every day. Usually before he goes to bed at night we talk,

and he'll text me something. He'll tell me a joke or if he heard something funny or

whatever." Marium laughed as she described the birthday present her grandson gave her.

> So he [grandson] got me my plant for my birthday… and when he got it for me, it only had purple and yellow flowers on it because those are my colors and he knows I like those colors….And then I told him in a few weeks…"This plant is growing red flowers." He said, "Nana, it is not. That plant has purple and yellow flowers. I picked it out special for you." And I said, "Now it's growing red flowers." And he thought I was losing my mind, so I had to take him a picture of it and send it to him. He said, "Oh, my goodness. What happened?" I said, "I don't know."

Marium went on to explain, "He thought I was just trying to pull a trick on him.

We do that all the time." In addition to using her smartphone to keep in touch through

calls and texts, Marium also uses her smartphone to keep in touch with her grandson

through Facebook:

> He gets on Facebook and talks to me and sends stuff to me on there. And he'll send stuff that's got cactus because I like cactuses. They're my favorite things. He'll say, "Here is you a prickly pear cactus," and he'll send me a big picture. And he says that "Nanas are like cactus. They're prickly out on the outside, but on the inside, they're warm and mushy."

Participants also acknowledged that it could be difficult to find residents inside

the nursing home to communicate (connect) with because of the varying levels of

cognitive functioning among residents. Chris noted, "And a lot of these people…really, I

can't communicate with because they have some type of dementia." Participants

explained that on a daily basis, social niceties were exchanged with other residents, but

there was no depth to their exchanges. None of the participants expressed that they used CT to communicate with other nursing home residents. Participants depended on communication from those who lived outside of the nursing home, either through using CT or in-person visits so that they did not feel socially isolated.

5.4.1.1 Loneliness

Although loneliness has been noted as one of the three plagues of nursing home life, along with helplessness and boredom (Thomas, 1996), the majority of the participants (38/40) did not express feelings of loneliness in their interview. Two participants, Harriet and Karah, directly stated that they felt lonely. Harriet, 68 years old, does not use any personal CT. She has lived at Midland Tower nursing home for one year, she does not have any active personal contacts, and she is estranged from her immediate family. She explained that she had increased mental health needs that resulted in having to move to Midland Tower. "Well, I get lonesome." When asked how she deals with being lonesome, she said, "I don't."

Karah, 76 years old, does not have any personal CT but uses the nurses' station for receiving and making phone calls. She has lived at River Villas nursing home permanently for a little over one year after experiencing a medical injury that prevented her from returning home while she was on vacation visiting a cousin. She has three children who live in other states and does not known when she will see them in person. Karah explained that when she gets a phone call, "They [person who called] ask for me, and one of the aides come down and get me, and then I trot down there and talk on the phone…My youngest daughter calls me about once every one or two months, and my oldest daughter calls me about every two or three months."

In addition to discussing loneliness during the interviews, participants completed the UCLA loneliness scale (Table 5.7). Participant scores from the UCLA loneliness scale ranged from 11 to 40, with a mean score of 21.20. A mean score of 20.10 is considered to be average for an older adult population (Anderson, 2010; Russell, 1996). The UCLA loneliness scale scores between 10 to 40 with higher numbers reflecting greater feelings of loneliness. The criterion score suggested to determine a moderately high level of loneliness is reflected with a score that is 1 SD above the mean. A score that is 2 SDs above the mean denotes a very high level of loneliness (Anderson, 2010; Russell, 1996). For this study, a score of 27.25 was 1 SD above the mean and a score of 33.3 was 2 SDs above the mean. For this study, the UCLA loneliness scale was found to have high internal reliablility ($\alpha = .857$). In evaluating the UCLA loneliness scale, 10 variables were measured. However, not all measurements are available for every participant. One participant did not answer question 7 and 8, and one participant did not answer question 5. There was no pattern detected for missing data. Analysis employed a pairwise deletion for missing values.

Although Karah and Harriet shared having feelings of loneliness during the semi-structured interview, only Harriet was found to have a high level of loneliness (40/40) on the UCLA loneliness scale. Karah had a score of 20/40. Additionally, Linda was found to have a moderately high level of loneliness (28/40) and Amos was found to have a high level of loneliness (37/40) on the UCLA loneliness scale. All three participants were from the Baby Boomer Generation and had an in-person visitor once a month or less. Both Linda and Amos had a landline telephone and used it monthly. Although neither Linda nor Amos directly stated they felt lonely, they both explained circumstances in their life

that may have affected their feelings of loneliness. Amos expressed that he was satisfied with the amount of in-person visits (once a month) and communication with his family (monthly). However, he did share his desire for female companionship, which he did not have at Locust Hills. Linda was estranged from three of her children and as a result they had limited communication. She did communicate with her granddaughter on the telephone (rarely).

Independent-samples t-tests were conducted to compare sex, CT use, and age with the UCLA loneliness scale. There was not a statistically significant difference between sex ($t(38) = .253$, $p =. 802$) or CT use ($t(38) = 1.24$, $p = .223$). There was a statistically significant difference between age groups ($t(38) = -2.96$, $p = .005$), with the Silent Generation ($M = 19.41$, $SD = 4.55$) scoring significantly lower than the Baby Boomer Generation ($M = 24.92$, $SD = 7.21$). These results suggest that the participants from the Silent Generation had lower feelings of loneliness than those of the participants from the Baby Boomer Generation which is consistent with the findings from the semi-structured interview.

Table 5.7: UCLA Loneliness (Version 3) 10-Item Scale

Question	Entire Sample (N=40)	Silent Generation (n=27)	Baby Boomer (n=13)	Male (n=16)	Female (n=24)
	Mean (SD)				
Overall Score	21.20 (6.05)	19.41 (4.55)*	24.92 (7.21)*	21.50 (4.73)	21 (6.88)

Sig (2-tailed); *p <.005; A mean score of 20.10 is considered to be average for an older adult population

5.4.2   Feeling of security

Feeling of security was a second CT theme revealed through the interviews

(13/34). Participants expressed that just having the CT provided a feeling of security.

Tash, 83 years old has a cellphone that she uses daily. She also has a tablet that she does

not use. She explained, "That's my security blanket, I guess…it goes everywhere I go. I

keep it constantly. I go to a doctor's appointment, my phone goes….when I leave the

room, it's always with me." Participants carried their cellphones or smartphones with

them whenever they left their room, even if they were not leaving the nursing home.

Aiesha, 92 years old has a landline telephone and cellphone. She stated, "I carry it with

me all the time….in case someone calls me or if I need to call someone."

A barrier to the feeling of comfort or security was noted when the CT was not

working or was broken (15/34). Barbara, 68 years old, uses her landline telephone,

smartphone and tablet daily. She explained, "I am lost when it don't work cause there's

times that I can't get on WiFi, I think 'Oh, I can't play this game. I can't message

anybody.' But yeah, it's become my lifeline right now really." Participants explained that

there is a deep loss associated with the lack of ability to use their CT. Simon, 94 years

old, uses his cellphone daily to keep in touch with his granddaughter, daughter, and

friends. He also has a laptop that he uses to play the lottery and for banking. At the time

of the interview, he was in CT transition as he had recently been given a smartphone

because he was having trouble pressing the buttons on his old cellphone due to arthritis.

He was having difficulty learning how to use the smartphone and was waiting for his new

cellphone with larger buttons to arrive. Three days after the interview, Simon had a new

cellphone and texted my phone number, which he located in the informed consent form,

to let me know he had a working cellphone. Simon shared that he had "…missed last 2-3 weeks that I haven't been able to text when I want to." He went on to explain that when he had his cellphone, he would text with his granddaughter, "…once a day probably we get with each other." Since he has not had his cellphone, he has been using the nurses' station phone to make a call once or twice a week. Simon also explained that without the use of his cellphone, he was not able to keep in touch with his friends: "I've got a lot of friends. I've got one…and he's been buggin' me on the cellphone, sending messages that he wants to come out [to Locust Hills] and I can't get back [cellphone isn't currently working]."

5.4.3   Support

Support was a theme that was crucial for participant CT intention to use and use. It involved family support and nursing home support.

5.4.3.1   Family support

Family support was vital for many aspects of the participants' CT use and CT support (18/34). Participants relied on family support to provide the CT, to teach them how to use the device, participate in the use of the CT, and for general technology support. There was a dichotomy noted between how participants explained their family member's thoughts about their CT use versus actual family support. Participants stated that their family members did not have strong opinions as to whether they used the CT or not (27/34). Yet, as participants explained how they used CT, it appeared their family member's did have strong views, which was why they were supporting most aspects of CT use for participants. Family members were the main source for paying cellphone or smartphone monthly bills (18/23; 78.3%; Table 5.8).

Table 5.8: Who Pays Monthly Cellphone/Smartphone Bill?

Payer Source	Number (%)	Silent Generation	Baby Boomer
Family	18 (78.3%)	11 (47.8%)	7 (30.4%)
Friend	1 (4.3%)	1 (4.3%)	0
Self	1 (4.3%)	1 (4.3%)	0
Government	2 (8.7%)	1 (4.3%)	1 (4.3%)
Church	1 (4.3%)	0	1 (4.3%)

n = 23 participants with a cellphone/smartphone

Family members played a pivotal role in providing CT for participants with or without a request from the participant. Maggy, 94 years old, uses her landline telephone and smartphone daily. Until two weeks before the interview, she used a cellphone, but the family member who was paying the cellphone bill was no longer able to do so. As a result, her cellphone service was disconnected. When speaking about this change with her sister, Maggy said her sister decided to purchase a smartphone for her and pay the monthly phone bill. Maggy recalled the conversation she had with her sister: "She [sister] said, 'You can call me if you want to…Use the phone with all this [phone numbers of important people stored in the phone].' Maggy explained, "What she [sister] has is my family, my cousin, my aunts, and stuff. She [sister] said, 'Call anybody you want anytime. They will never cost you a dime.'"

Participants explained that even without requesting it, their family members would bring them new CT options they thought could be useful (12/40). Alexa, 94 years old uses a landline telephone and a cellphone. She said, "they [daughter and son-in-law]

gave that to me for Christmas…I told [daughter] I'd pay for it. She said, 'No, that's your present.' It was a Chrismas present. Well, they even bought me that for my birthday, a new one." While family member's had kind intentions as they provided new CT, one issue shared by participants was the difficulty finding someone to teach them how to use the CT if their family member did not have the time. Tori, 82 years old, has a landline telephone and tablet. She had a computer at her home prior to moving to Summer Court nursing home six months before the interview, but she did not bring it with her. With the computer, Tori would get on Facebook to keep in touch with her family and friends, order things from the internet, and send emails. She explained that she did not bring her computer to Summer Court because of the limited space in her living quarters. "It [desktop computer] was too big and I didn't want to…in the apartment it was one thing."

Since this transition, she explained, her landline telephone is the main way she keeps in contact with people, aside from in-person visits. Tori explained that she lost contact with her godchild since she did not have a computer. "We would email, I think, every day just about. And I've lost contact with her. Not completely, I mean, I know she's there, but I'm not hearing from her like I wanted to." For her birthday (one month prior to the interview), she received a tablet from her daughter. Tori boasted, "She [daughter] knew I loved the computer, so she went with this [tablet]." Tori then explained that, "Right now I'm just listening to music on it [tablet]," but she stated with frustration, "I'm trying to learn this [tablet]." Tori wants to learn how to use the email feature on the tablet to connect with her Godchild and others, but due to her daughter's busy schedule, she has not had time to help Tori learn how to use the email feature. Participants who had family members support with CT lessons, were able to learn to use the CT (15/34). Marium

explained that learning how to use her tablet "…was not that bad." She said, "My grandson just showed me more than once. He [grandson] showed me a few times, and then I just picked it up. He [grandson] says, 'Nana, you have to use this to learn how to use this.'" He [grandson] said. "You have to practice it. You have to use that in order to keep it on your mind and remember it. Remember, Nana, you're getting older."

Family members supported participants CT use by using the CT with the participant or assisting the participant as they used the CT (16/34). Participants described how they and their family members used CT to keep in touch with each other. Nancy, 80 years old, uses a cellphone and a personal desktop computer daily. She also has a tablet that her son gave her. She explained:

> Well, usually [son] calls me somewhere between 10:00 am and 10:30 a.m. just to say good morning, how are you, how's your morning been? [Daughter], I call her. She'll text me or call me in the morning to let me know she's up and headed to work. And she'll call me in a couple minutes. I mean, sometimes when she gets off and gets home at night, we'll talk. And then [son], if he wants, "I'm headed over that way. You need me to stop and get you anything? You want anything?"

Participants who did not have certain CT options were able to use their family members' CT with assistance during in-person visits (3/34). Sam, 76 years old, has a cellphone for phone calls but needs assistance when using it. He also uses his wife's smartphone, when she visits daily, to see family pictures and to video conference [FaceTime] family members who live in other states. Sam, a retired physician, explained that his granddaughter had been in the hospital for surgery and he was able to medically follow along with the help of his wife's smartphone. His son messaged the pre- and post-surgery scans, and Sam was able to review them on his wife's smartphone.

Through FaceTime Sam talked to [granddaughter] when she was in the hospital and he asked about the medication she was on. In addition to seeing pictures of other

family members, Sam's wife also used her smartphone to "take[s] some pictures just of him in the bed and share that. But mostly it's them [family members] sharing the other way." Sam went on to explain how important it is to him that he gets to be an active part in his family's life and the CT helps him maintain that visual connection when he is not able to see family members in person. Recently, he shared, "We got a bunkbed for two of their middle girls and they sent us …and they sent us [wife and Sam] pictures of when it arrived and the girls standing by…It was really sweet. It was lovely." Sam added, "It really means everything if you think about it because without that [FaceTime or text messaging]…you know nobody writes letters anymore…and even if they did, you don't have that visual."

In addition to providing assistance with CT, family members also provided user support for participants who required assistance to use technology for non-communication purposes. Barry, 74 years old, has been a life-long fan of the Florida State University Seminoles football team. He enjoys using the facility desktop computer to keep up with news about practices and stats for the football team. Barry shared, "My wife comes so often that I get to go down and get on the computer and read [football updates], or whatever I want to read on the computer….it's easy for me to use, but it's easier for me to use when my wife enters my password and all that stuff."

When CT was not working or broken, participants mainly relied on their family members to solve the problem. Participants explained that if their CT is not working, they know that a family member will get them a new device if they ask. Tech support included many forms of assistance, from deleting something on a computer to fixing broken devices. The range was determined by each individual's comfort level using CT. Nancy

knows how to use certain aspects of her desktop computer, but when she needs additional support she relies on her son.

> If something happens, I'll tell Scott, "When you come over today, I want you to look at so and so, or check so and so." And they'll do things for me. But I don't [know] how to do half of it. I'm very dumb about it. And if I want to delete something, I don't know how to do it. I've been trying to delete some of this stuff and I-- Well, I'll just have to get somebody else to do it for me or my daughter or Scott or someone.

Tech support also includes taking and paying for CT repairs outside of the nursing home. Marium explained,

> It's [laptop] at home right now getting fixed…they [computer repair people] don't come to the nursing home to do laptops. So he [computer repair man] had to order a part for it, so it'll come in. He'll fix it and bring it back to my daughter-in-law. And then when my grandson comes back down the next time, he'll bring it back to me.

A barrier to CT use occurred when participants did not have active family support. What this meant was they were not able easily fix or purchase new CT when their CT broke. When John moved to Locust Hills nursing home, he had a laptop, but it broke after he dropped it in the year before the interview. John does not have active family support. Since then he has relied on the facility desktop computer. He explained that he would purchase a new laptop "If it ever came down to where I had any extra money." Karah currently does not use any personal CT, but when she first moved into River Villas nursing home, she had a cellphone. However, the minutes on her cellphone ran out and she has not been able to purchase additional minutes because she does not have disposable income.

5.4.3.2 Nursing home support

Nursing home CT support varied depending on the nursing home and the staff willing to provide assistance. One nursing home (Osprey Nest) had a framed sign in each

resident's room on the wall with information explaining who to reach out to for facility related technology problems (e.g., if the internet, TV, or landline telephone not working). None of the nursing homes had someone designated to assist with participants' personal CT, though. Of the participants who used CT (34/40), 27 had asked for CT help from nursing home staff (either a maintenance person or a CNA).

Participants reached out to the maintenance person for facility-related CT problems. The maintenance person would help with facility problems like faulty internet. Barbara explained that she would reach out to the maintenance man because "He's the one that finds out what's going on with the internet." The maintenance person would also help with landline telephone issues. Jim, 85 years old, has a landline telephone. He explained that when he has a problem with his telephone he reaches out to "… on maintenance that's Drew…..they some good people down in maintenance."

For personal CT issues participants often asked their nursing staff for assistance. Nursing staff helped fix broken CT. Alexa shared, "One of the aides, he's from India. Yeah, sometimes he has to help me if I get it [cellphone] all out of whack." Nursing staff also helped participants with completing tasks with CT. Brad, 61 years old, uses a smartphone and the facility desktop computer. He explained, "Yeah, Jason. He helps me. He's a nurses aid…he's kind of the tech on staff….yeah he helped night before last. I wanted to order Taco Bell, but they want an app now. They went on the computer, him and another aid, and they wouldn't do it without an app. Then they wanted to go through Grub Hub and then they wanted to go through Uber, but it would cost more than it was worth. So, we didn't do it."

Nursing home support was important for participants who did not have a personal

landline phone or any other form of CT because participants had to rely on the nurses'

station telephone to make phone calls (6/40). Lynn, 94 years old, does not use any

personal CT. She explained, "Well, I usually go down here to the office [nurses station]

and call them or something. They [nursing staff] let me call out whenever I need them,

but I don't never call no more than I have to." Some participants (6/40) also had to rely on

the nursing staff to receive phone calls. Mark, 80 years old, does not use any personal

CT. He explained that when his friend wants to call him, "He calls the people here

[nurses station] and they [nursing staff] get in touch with me."

5.4.4   Continued learning

Participants who used CT explained that they continue to learn how to use new

aspects of their CT (6/34). One of the main ways participants learned how use their CT,

aside from family support, was by trial and error (16/34). Maggy explained, "So I

figured, well, if I get one, if I'm smart enough to learn, then when I sit here and have

nothing to do I open it up and…oh, I wonder you how you do that."

Teaching themselves how to use the CT was not an easy task, but the value in

learning how to use the CT was worth the initial frustration. Larry explained,

> Yeah. I'm just learning how to do it [text messaging] you know. I ain't real fast at
> it, but I'm learning just by myself. Cause my brother just got a new phone and so
> he got a different number and I put him in my phone, and I don't know [how] I
> done it, but I done it. And I pressed the button and it called him, so I done it right.
> I ask someone once in a while to show me something on my phone and they'll do
> it…teach me how to do it and I'm learnin more. I learn a little every day. And
> after I bought this watch [Fitbit watch] then I got to messin with my phone and I
> found out I had the same features [heart rate monitor, steps, and calories burned
> tracker] on my phone. It tracks my steps and my calories and everything.

Another reason participants continued to learn how to use new aspects of their

CT was due to their health related changes. Health related changes such as hearing loss, vision loss, or loss in tactile acuity acted as potential barriers for CT use (21/34). Participants have to modify the way they use the CT to accommodate their gradual and/or acute health related changes. Joseph has a degenerative neurological disease that has impaired the full use of his hands. He explained that originally learning to use the text messaging feature on his smartphone was easy, but with the increased inability to use his fingers, he started to have difficulty texting. Joseph described his how irritated he was with texting:

> Text messages is relatively easy except for us that have poor hand coordination…I finally… I finally got really….grrr. I wanted to throw this thing across the room because I'd be doing a text thing and of course, I'm not like the thumb routine. Okay and I'd get about six characters out then my finger was too close to the screen so it would put a whole bunch of garbage in there. So I'd go back. It'd take me oh 30-45 minutes just to do three line thing. And I'm constantly…then I'd send it. Of course after you send it, you see all the misspelled words and everything. So, it was really trial and error.

To accommodate his ongoing health changes, he started using the voice-to-text feature. Joseph proudly explained,

> I just learned I can make messages and stuff like that by speaking and … I said oh that…I didn't know. It was kind of like…why didn't you tell me!? I've been telling you about this problem. This thing you just speak into it. Said even if it doesn't accept your words right, they're close enough that you're able to read through them. So that's… I use that like everything now.

Another CT modification shared by one participant was using a stylus with their smartphone. Maggy has ongoing losses in her tactile acuity and explained, "But I need to have [the stylus]… because it's hard for me with this hand."

In addition to gradual chronic health related changes, participants expressed frustration in having to figure out the best way to use CT options after an acute health

related change. Nancy had a stroke and lost the ability to use her left side. She has been trying to figure out the best CT option for her, a smartphone or cellphone.

> So that's not going to work anymore. So they're [children] going to have to get me a new phone and they've [children] tried. I've tried a couple phones and I'm having trouble with them. Mainly because they're [smartphones] bigger and it's hard for me to hold with one hand. And I had too hard of a touch for sliding or pressing like they do because they're [children] showing me something, a picture, say you slide it, and I slide it and I cut it off. I have too hard of touch.

As Nancy elaborated on how she currently uses her smartphone, she shared,

> And I never use this [touch screen]. I never use that, and I always use this [pressing the buttons]. Yeah. If I go real slow. But if I…but sometimes, I go to hit this number and I hit…when I would push this number to call, I push one instead. So when I put their numbers in I'll-- there'll be a space that I hit that I hadn't been meaning to. And it'll take me so long to text in something… sometimes I'll try to text something two or three times. And I just give up and call them. Because it's easier for me to do that.

While participants did modify the way they use CT due to their health, the majority of the participants (26/40; 65%) rated their health as good or higher (as noted in Table 5.3).

5.5 UTAUT Model

The applicability of the UTAUT model as a framework for understanding the CT adoption experience of nursing home residents was explored through semi-structured questions and the use of the modified UTAUT questionnaire. Data from the modified UTAUT questionnaire was tested for internal reliability and relationships among the four constructs. Thirty-four participants completed the UTAUT questionnaire. Six participants did not use CT and therefore could not complete the UTAUT questionnaire. There was no missing data. Table 5.9 provides the descriptive data from the modified UTAUT questionnaire.

Table 5.9: Modified UTAUT Questionnaire Reponses

	Strongly Disagree (1)	Disagree (2)	Neither (3)	Agree (4)	Strongly Agree (5)
			Number (%)		
Performance Expectancy PE1: Using _____ is helpful to me.	0	1 (2.9%)	1 (2.9%)	13 (38.2%)	19 (55.9 %)
PE2: _____ allows me to communicate more quickly.	0	1 (2.9%)	3 (8.8%)	13 (38.2%)	17 (50%)
PE3: _____ allows me to communicate more efficiency.	0	1 (2.9%)	2 (5.9%)	11 (32.4%)	20 (58.8%)
Effort Expectancy EE1: When I interact with ____, it is always clear and easy to understand	1 (2.9%)	2 (5.9%)	6 (17.6%)	19 (55.9 %)	6 (17.6%)
EE 2: I am familiar with using ____.	0	2 (5.9%)	0	20 (58.8%)	12 (35.3%)
EE3: I feel that____ is easy to use.	0	3 (8.8%)	0	24 (70.6%)	7 (20.6%)
EE4: Learning how to use _____ is easy.	1 (2.9%)	6 (17.6%)	4 (11.8%)	16 (47.1%)	7 (20.6%)
Social Influence SI1: My family thinks that I should use __.	0	0	7 (20.6%)	17 (50%)	10 (29.4%)
SI2: My friends think I should use _____.	0	0	11 (32.4%)	14 (41.2%)	9 (26.5%)
SI3: My family has been helpful with the use of ____.	0	2 (5.9%)	3 (8.8%)	14 (41.2%)	15 (44.1%)
SI4: My friends have been helpful with the use of _____.	1 (2.9%)	1 (2.9%)	12 (35.3%)	14 (41.2%)	6 (17.6%)

Table 5.9 (continued)

Facilitating Conditions

FC1: I have the resources necessary for using _____.	0	1 (2.9%)	0	27 (79.4%)	6 (17.6%)
FC2: I have the knowledge necessary for using __.	0	1 (2.9%)	5 (14.7%)	23 (67.6%)	5 (14.7%)
FC3: When I have problems using _____ my family can help me solve them.	0	2 (5.9%)	6 (17.6%)	21 (61.8%)	5 (14.7%)
FC4: When I have problems using ___ someone at the nursing home can help me solve them.	0	3 (8.8%)	7 (20.6%)	19 (55.9 %)	5 (14.7%)

Behavioral Intention to Use

BI1: I intend to use _____ in the next month.	0	1 (2.9%)	0	17 (50%)	16 (47.1%)
BI2: I predict I would use ___ in the next month.	0	1 (2.9%)	0	17 (50%)	16 (47.1%)
BI3: I plan to continue to use _____ to improve my communication opportunities.	1 (2.9%)	1 (2.9%)	2 (5.9%)	15 (44.1%)	15 (44.1%)

Internal realibility was assessed using Cronbach's alpha (see Table 5.10). The Cronbach's alpha for performance expectancy (0.811), effort expectancy (0.779), and behavioral intention to use (0.926) were all acceptable as they were above the 0.7 cutoff, indicating internal consistency. The Cronbach's alpha for social influence (0.680) and facilitating conditions (0.495) were below the 0.7 level indicating low reliability. Social influences and facilitating conditions were removed from further evaluation.

Table 5.10: Initial Construct Reliability Results

Construct	Number of Indicators	Cronbach's alpha
Performance Expectancy (PE)	3	0.811
Effort Expectancy (EE)	4	0.779
Social Influence (SI)	4	0.680
Behavioral Intention to Use (BI)	3	0.926
Facilitating Conditions (FC)	3	0.495

A Cronbach's alpha score of 0.7 or higher signifies construct reliability

Spearman's rho correlations were conducted to find any associations between the three UTAUT constructs and use behavior (see Table 5.11). The correlations indicated a statistically significant association between performance expectancy and behavioral intention to use ($r_s (34) = .628, p < .01$).

Table 5.11: Correlation matrix

	PE	EE	BI	UB
Performance Expectancy (PE)	1			
Effort Expectancy (EE)	0.316	1		
Behavioral Intention to Use (BI)	.628**	0.284	1	
Use Behavior (UB)	.379*	0.033	.464**	1

* $p < 0.05$ (2-tailed), ** $p < 0.01$ (2-tailed)

5.5.1 Exploration of each construct

This study found performance expectancy to have a statistically significant association with behavioral intention to use. This finding is consistent with the original UTAUT model (Venkatesh et al., 2003). Participants also supported this finding in their interviews, explaining that they used CT because it provided them connection to outside world and a feeling of security. Participants believed that using CT would support their desire to have people to connect with and help them remain in contact with those important to them. They shared that there were limited communication opportunities with other residents in the nursing home due to reduced personal mobility and the varying cognitive capabilities of other residents. Participants shared that without CT providing the ability to connect with people outside of the nursing home, they would feel socially isolated and lonely.

In this study, effort expectancy was not indicated to have an association with behavioral intention to use. This could be related to effort expectancy becoming less important with continued use of technology (Venkatesh et al., 2003). Participants described their comfort level with CT during their interviews. Participants explained that they felt comfortable using the aspects of their CT that they knew how to use but they also had a desire to learn new aspects of the CT. Participants used trial and error, along

with family or nursing home support, to learn new features of the CT. Although the learning process at times could be difficult, participants had an internal desire to continue acquiring knowledge and were able to push through the frustration. In addition to their desire to increase their CT skillset, health related changes (acute and chronic) pushed participants to find ways to adapt their CT use to accommodate their changing bodies so that they could continue to use the CT.

Social influence was not a valid construct in the UTAUT questionnaire and could not be analyzed further. Although the UTAUT model explains that social influence only plays a role in mandatory setting, like a work environment, (Venkatesh et al., 2003), I initially thought family members would be the main social influences encouraging participant CT use. While family members actively engaged in use of CT with the participants through calls text messages and/or video conferences, participants did not think that their family members believed that it was important that they use the CT. In fact, participants did not think that their family members had any opinions about their CT use.

Facilitating conditions was not a valid construct in the UTAUT questionnaire and could not be analyzed further. During the interviews participants explained that the nursing home facility, nursing home staff, and their family members all supported their CT use but to different degrees. Each nursing home provided Wi-Fi and telephone jacks in the walls for each resident. In contrast, providing individual telephones and facility desktop computers differed based on the nursing home. Another facility dependent facilitating condition was nursing home staff technical support. Participants were able to ask, and did ask, nursing staff for assistance with their CT use and fixing minor technical

92

issues like plugging in the cellphone for charging or dialing a phone number. For major

technical issues, where a device broke or needed repair, participants required another

person other than nursing home staff, typically a family member, to assist with these

issues. I found throughout the interviews that family support played a larger role in

facilitating conditions by providing CT, paying the monthly cellphone or smartphone bill,

teaching how to use CT, provding tech support, and engaging in CT use with participants.

CHAPTER 6. DISCUSSION

In this chapter I discuss and summarize the key findings that emerged from the data analysis.

6.1   CT Intention to Use and Use

Specific Aim 1: To describe the current use of CT with this population

Several of the CT findings were no different than one would expect for CT use by an older adult population. CT use by the nursing home residents, when compared to community dwelling older adults, was similar in terms of which devices were used, how devices were used, and why devices were used. I discuss this in terms of age classifications of the Silent Generation and Baby Boomer Generation as technology use has consistently differed based on age and generation (Connect, 2019; PEW, 2019; Vogels, 2019). Participants used CT including a landline telephone, cellphone, smartphone, desktop computer, laptop, and tablet. Community dwelling older adults are also using the same technology (Linkage Connect, 2019; PEW, 2019; Vogels, 2019).

Consistent with the literature that cellphone ownership is higher for community dwelling older adults over 65 years of age (PEW, 2019), cellphone ownership was higher for the Silent Generation participants. However, smartphone ownership by participants was similar between the generations. This finding is different from community dwelling older adults where the Baby Boomer Generation has a higher smartphone ownership than those in the Silent Generation (Linkage Connect, 2019; PEW, 2019; Vogels, 2019). This difference could be due to the CT and technology support provided by family members for nursing home residents or a reflection of the small sample size.

94

Consistent with community dwelling older adults who mainly use their cellphone (Wang et al., 2017) or their smartphones (Gao et al., 2015; Pheeraphuttharangkoon et al., 2014; Zhou et al., 2014) for phone calls and text messaging, this study found that cellphones were mainly used by participants for phone calls and smartphones were mainly used by participants for phone calls and text messaging. Participants also explained they use their smartphone for non-communication purposes such as surfing the web, watching TV, checking the weather, playing games, listening to music, and shopping. This finding is in line with community dwelling older adults who use their smartphone to browse the internet and play games (AARP, 2019; Pheeraphuttharangkoon et al., 2014).

Participants' personal desktop computer use was similar between the Silent Generation and Baby Boomer generation, which was different from the community dwelling older adults where desktop computer ownership is higher for the Silent Generation (Linkage Connect, 2019). This difference could be due to the nursing home's constrained living quarters, so residents could not or did not want to bring their desktop computer with them when they moved into the nursing home. As Tori explained, "It [desktop computer] was too big and I didn't want to…in the apartment it was one thing." For participants who had access to a facility desktop computer, Silent Generation participants use was higher than the Baby Boomer Generation participants. Participants used desktop computers for emailing, video conferencing, Facebook, playing the lottery, surfing the web, or playing games. Desktop computer use is similar for community dwelling older adults, who spend time on their computer researching information, shopping online, engaging with social media, emailing, reading newspapers and

magazines, watching YouTube videos, and streaming TV/movies (Linkage Connect, 2019).

Consistent with tablet ownership by community dwelling older adults (Linkage Connect, 2019; Vogels, 2019), tablet ownership was higher among the baby boomer participants. Participants mainly used tablets for text messaging, videoconferencing, and Facebook access. Facebook use was similar between the Silent Generation and Baby Boomer Generation participants, whereas, for community dwelling older adults Facebook use decreases with age (Vogels, 2019). This could be due to the small sample of participants using Facebook. Or it could be due to the desire of the nursing home residents to maintain their previous connections regardless of where they are living. Overall CT use by participants was consistent with community dwelling older adults. CT was used to connect with those who they wanted to remain in contact with through phone calls, text messages, emails, Facebook, and video chats (AARP, 2019).

In addition to addressing their communication needs, nursing home residents used CT and other technologies to support their personal interests and activities. While nursing homes do provide programming and socializing activities for residents (Knight & Mellor, 2007; McCann, 2013), it is not uncommon for residents to feel like the activities provided for them by the nursing home are "childlike" (Tse & Howie, 2005). CT presents the opportunity for nursing home residents to spend time doing the activities that interest them such as searching online, using Facebook, listening to music, or playing games.

6.2   Supports and Barriers to CT Use

Specific Aim 2: To identify, document, and develop an understanding of the

supports and barriers to CT intention to use and use with this population

96

Remaining connected to family and friends was one of the major supports of CT use shared by participants in this study and is consistent with community dwelling older adults (AARP, 2019; Linkage Connect, 2019). The ability to connect with those outside of the nursing home was one of the main reasons why participants did not feel lonely or socially isolated because they could maintain relationships with people regardless of their residence. As Chris explained, "I don't feel imprisoned. I think technology has given me a way to unlock the bars and go out wherever I want to." It is interesting to note that the majority of the participants in this study were not found to be lonely. Although, I was not able determine if there is an association between CT use and feelings of loneliness.

Whereas moving into a nursing home has previously been linked to a loss of freedom and social contacts (Porter & Clinton, 1992), CT use, as reported by participants in this study, allowed them to feel in control and remain in contact with whomever they wanted to remain in contact. These findings contradict the negative stereotype that nursing home residents are dependent on others and incapable of using advanced technology by themselves. Participants CT use was influenced by the presence of their family and the nursing home where they resided

Family provided the main support for the nursing home residents' CT use by paying the monthly cellphone or smartphone bill, providing CT, teaching how to use CT, engaging with the residents through CT, and providing technology support. However, participants who did not have an active family presence did not have a way to fix the broken CT due to due to a lack of disposable income and minimal options to take the CT to be repaired or replaced. As a result, a lack of family presence acted as a barrier to CT use.

Nursing home support ranged from providing technical infrastructure so that residents could use CT, to offering hands on technical support. Each nursing home had Wi-Fi access for residents to use, a contrast to previous research noting nursing homes had limited to no Wi-Fi access for residents (Abramson, Stone, & Bollinger, 2001; Tak, Beck, & McMahon, 2007). This contrast in Wi-Fi availability in nursing homes could be due to an evolving nursing home infrastructure in which Wi-Fi has became a necessity for nursing homes to function. The Improving Medicare Post-Acute Care Transformation Act of 2014 required nursing homes to create a standarized and interoperable reporting for the Minimum Data Set data along with nursing homes ongoing transition to electronic medical records. Residents access to Wi-Fi may just be a byproduct of changes in the nursing home infrasctructure.

As mandated by law, each nursing home had landline telephone access available for residents at the nurses station. This access was important for residents who did not have personal CT because it gave them a CT option if they wanted to use CT. In addition to the nursing station telephone access, each nursing home provided a landline phone jack in each resident's room for their personal use. Although nursing homes supported CT use by providing landline telephone jacks in residents rooms, a barrier to landline telephone use was that the majority of the nursing homes required that residents provide their own telephone, arrange for the telephone line to be connected, and pay a monthly phone bill. This is a practically impossible task for residents who rely on Medicaid to pay for their nursing home care to pay without additional financial support.

Facility desktop computer access for residents was available at a majority (4/6) of the nursing homes in this study, which is a finding that contrasts with previous research

noting that only 14% of nursing homes had at least one desktop computer accessible for residents use (Tak, Beck, and McMahon, 2007). This could also be due to nursing homes' technological evolution. It could also be due to the small sample size. Access to facility desktop computers acted as a support for participants who wanted to use a computer.

In addition to nursing homes providing the technological infrastructure for CT use, hands on technical support was provided by nursing home staff. Maintenance staff provided assistance with CT problems such as faulty internet. Nursing staff assisted with basic technical support for personal CT, such as dialing a number or plugging in a phone to a charger.

6.3   UTAUT Model

Specific Aim 3: To explore the use of the UTAUT model with this population

A modified UTAUT model concentrating on CT was employed to guide this research. The model assisted in the development of the semi-structured questions, identification of survey instruments, data analysis, and discussion. The goal of guiding this study using the UTAUT model was meant to allow for a deeper understanding of all the variables that in combination affect CT intention to use and use by nursing home residents. Data was collected, organized, and analyzed through the framework of the UTAUT model. Through this approach, it was possible to identify gaps and revisions needed for future work. Some of the components of the model were useful, including performance expectancy, effort expectancy, and facilitating condition; however, the overall UTAUT model should be revised to address the specific needs of this population.

Participants believed that using CT would help them keep in contact with those important to them and so they did not feel "cut off" from those who lived outside of the

nursing home. As Akieya said, "It's [cellphone] my connection to the outside world…to friends and one or two different organizations that I belong to." Participants explained that this ability to remain in contact was a reason why they did not feel lonely. As a result, the construct performance expectancy was highly valuable in influencing CT intention to use and use. This finding is consistent with the literature (Boontarig et al., 2012; Nägle & Schmidt, 2012; Or et al., 2011)

In contrast to effort expectancy as posited in the original UTAUT model (Venkatesh et al., 2003), participants explained that effort expectancy continued to influence intention to use CT even after they have learned how to use the device. This could be due to participants having to learn how to use new devices brought by family members. It could also be due to the ongoing need to modify their use of CT to accommodate their changing dexterity and ability to use CT devices, a dimension of functional health. Participants were able to learn how to use and feel comfortable using aspects of their CT, but due to their ongoing functional health changes they had to continue to learn new ways to use CT. As Maggy shared, "But I need to have [the stylus]… because it's hard for me with this hand."

Social influence was a construct that had little value in understanding CT intention to use and use by particpants, a finding that is consistent with the literature (Cimperman et al., 2016; de Veer et al., 2015; Lian & Yen, 2014; Or et al., 2011). This could be due to social influence only being instrumental in a mandatory setting such as a workplace (Venkatesh et al., 2003). It could also be due to changes placed on the importance of societal pressures as one ages (Carstensen & Charles, 1998), as older CT users become less concerned about their perceived social status or image.

Support from family members and the nursing home were the main facilitating conditions found to influence CT intention to use and use for participants. Family members paid the monthly cellphone or smartphone bill, provided CT, engaged with the residents through CT, and provided technology support. Participants explained that they learned to use CT by someone teaching them (mainly family members), trial and error, and reading instructions, a finding that is consistent with the literature (Barnard et al., 2013). The nursing home provided the infrastructure including Wi-Fi, access to a landline telephone, and phone jacks in each residents room. The nursing home staff (maintenance and nursing staff) provided minor technology support.

I did not test the UTAUT moderators (age, sex, and experience) in this study. Based on the findings, age, as represented by generation, was found to influence CT types and CT use. Baby Boomers used more advanced CT than a landline telephone compared to those from the Silent Generation. Paradoxically, there was more variation in the types of CT (e.g., landline telephone, cellphone, smartphone, desktop computer, laptop, tablet) used by participants in the Silent Generation than those in the Baby Boomer Generation. Sex was not found to influence CT intention to use or use as there was minimal difference found between male and female CT use (although the small sample size of males should be emphasized again). Experience did appear to have an influence on CT intention to use and use. Participants were using CT, but they were only using features of the device that they felt comfortable using.

While I did not directly assess personal communication preferences in this study, there appeared to be a link between CT use and the amount of communication preferred by participants. The majority of the participants were pleased with the amount of

communication they had with the people they wanted to be in contact with. This varied by participants from multiple times a day to monthly. John explained, "Don't use the phone that much. I just don't have a need to."

Based on the findings from this study, I propose a revised UTAUT model modified for the cognitivetly intact long-term nursing home population (Figure 6.1). The revised UTAUT model incorporates three of the four original constructs to predict CT intention to use and use (performance expectancy, effort expectancy, and facilitating conditions) along with four moderators (age, experience, functional health, and personal communication preferences).

Figure 6.1: Revised UTAUT model
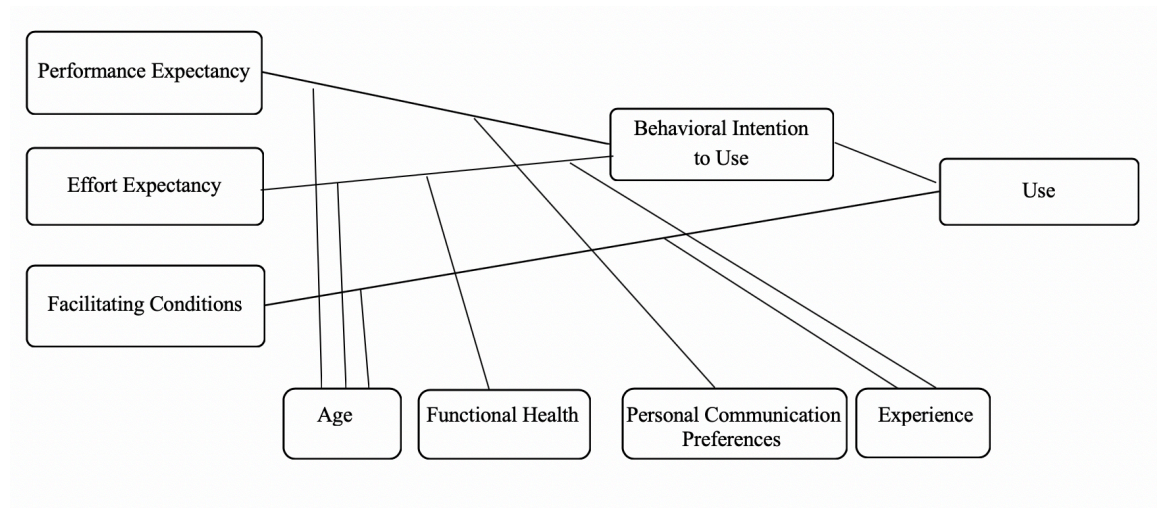
In the revised model, performance expectancy is defined as the "degree to which an individual believes that using CT will help them maintain communication." In line with the findings from this study, the original UTAUT questionnaire questions would remain in this model, "Using _(CT)__ is helpful to me," " _(CT)__ allows me to communicate more quickly," and " _(CT)_ allows me to communicate more efficiently."

In addition to the three questions, this construct would also add questions related to loneliness.

In the revised model, effort expectancy is defined as the "degree of ease associated with using CT." The original four questions from the UTAUT questionnaire would remain in this model, "When I interact with __(CT)_, it is always clear and easy to understand," "I am familiar with using _(CT)__," " I feel that _(CT)_ is easy to use," and "Learning how to use_(CT)_ is easy." I would add a question related to functional health, "I have difficulty physically using _(CT)_."

In the revised model, facilitating conditions is defined as the degree to which an individual believes that their family and nursing home is supportive of their use of CT. Facilitating conditions questions would be revised to note differences between family support and nursing home support based on the findings from the interviews. For example, it would be more appropriate to use, "My family makes sure I have the resources necessary for using _(CT)_" and "The nursing home makes sure I have the resources necessary for using _(CT)_." Questions in this section about technical support will differentiate between minor tech support and major tech support. "When I have minor problems (e.g., plugging in my device, pressing buttons, finding an app) using _(CT)__a family member can help me solve them," "When I have minor problems (e.g., plugging in my device, pressing buttons, finding an app) using _(CT)__ someone at the nursing home can help me solve them," "When I have major problems (e.g., a broken device) using _(CT)_ a family member can help me solve them." and "When I have major problems (e.g., a broken device) using _(CT) _ someone at the nursing home can help me solve them."

In order to differentiate between the variation in CT use from daily to monthly that was noted by the particpants, the behavioral intention to use questions " I intend to use _(CT)_ in the next month" and "I predict I would use _(CT)_ in the next month" would change the time frame to the next "day." Although, the original UTAUT questionnaire does not have any questions about current use, I recommend incorporating five questions within the revised UTAUT questionnaire pertaining to this issue: "I currently use _(CT)_ daily," " I currently use _(CT)_ 3-4 times a week," "I currently use _(CT)_ once a week," "I currently use _(CT)_ every other week," and "I currently use_(CT)_ once a month."

The revised model will have age, functional health, personal communication preferences, and experience as moderators. Age, either defined by chronological age or generation, will moderate all three constructs. Functional health will moderate effort expectancy. Personal communication preferences will moderate performance expectancy. Experience will moderate effort expectancy and facilitating conditions.

6.4   Summary of the Key Findings

The findings from this study indicate that there are cognitively intact long-term nursing home residents using CT including landline telephones, cellphones, smartphones, desktop computers, laptops, and tablets. Generational differences were noted in CT use. The Silent Generation participants had higher use of cellphones and facility desktop computers (for those who had access to them). Tablet use was higher among the Baby Boomer Generation.While communication is the predominant reason these residents used CT, they also use the technology for other purposes such as surfing the web, games,

banking, and playing the lottery. Participants' CT use varied by CT availability, interest in using CT, and availability of CT support.

Family was the main support for the nursing home residents' CT use and consistent with Giger et al. (2015) findings showing family support grew over time. This support was expressed by paying the monthly cellphone or smartphone bill, providing CT, teaching on how to use CT, engaging with the residents through CT, and providing technology support. Participants who did not have an active family presence had limited options to fix or replace their CT due to their lack of disposable income and an inability to easily take their CT for repairs. As a result, the lack of an active family presence acted as a barrier to continued CT use.

The UTAUT model was explored as a way to understand CT intention to use and use by nursing home residents. Findings suggest that elements of the UTAUT model were useful including performance expectancy, effort expectancy, and facilitating conditions. However, the overall model was of limited value. The model does not, at present, address the specific needs of this population which include the importance of family member support and function health changes. A revised UTAUT model was developed based on the findings of this study to understand CT intention to use and use by nursing home residents. The model included three constructs performance expectancy, effort expectancy, and facilitating conditions, along with four moderators: age; functional health; personal communication preferences; and experience.

CHAPTER 7. LIMITATIONS, FUTURE DIRECTIONS, AND CONCLUSION

This study was constructed to increase our understanding of CT use by nursing home residents. The study addressed the research question, "How do nursing home residents intend to use and use CT?" The Specific Aims were designed to contribute to the literature on CT intention to use and use by nursing home residents. Specific Aim 1 contributes to an understanding of how CT is currently being used by nursing home residents. Specific Aim 2 contributes to understanding the supports and barriers to CT intention to use and use by nursing home residents. Specific Aim 3, an exploration of the value of a modified UTAUT model to predict CT intention to use and use by nursing home residents, resulted in further refinement of the model to make it more appropriate for this population. In this chapter I note the limitations of the study, discuss future directions for research, and draw some conclusions.

7.1   Limitations

Limitations of the study include recruitment of nursing home facilities, sample size, analysis of the UTAUT questionnaire, and analysis of health.

7.1.1   Recruitment of nursing home facilities

Recruitment of nursing home facilities began six months prior to the start of this study through phone calls, emails, and/or in-person visits to facilities, and it posed an ongoing challenge throughout the study. Cognitively intact nursing home residents are a subsection of the overall nursing home population. In order to achieve my proposed

sample size for cognitively intact nursing home residents, I needed to have multiple nursing homes agree to participate in the study.

The majority of the nursing home administrators I reached out to were neither easily accessible nor receptive to having research conducted in their facility. This could be due to their incredibly busy schedules which limits time available to meet with anyone who is not directly related to their nursing home. It could also be due to the fact that the administrators did not know me and as a result they did not want me to conduct research in their facility. Administrators have a responsibility to protect their residents who are a vulnerable population and allowing in an unknown person who is researching their residents may make administrators nervous about their ability to protect their residents. As a result, I had to expand the range of nursing homes that I contacted. I also relied heavily on nursing home administrators, who agreed for their facility to participate in the study, to promote the study to other nursing home administrators. Using nursing home administrators' word of mouth, I was able to get additional nursing homes to participate in the study.

7.1.2 Sample Size

This study only addresses a subsample of the nursing home population and can not be generalized to the entire nursing home population. This study's sample is similar to the nursing home population in the United States (Harris-Kojetin et al., 2019), as this study was composed predominately of participants who were 65 years of age or older (36/40), female (24/40), White (38/40), and used Medicaid as their payer source (26/40). However, it excluded other nursing home residents such as cognitively impaired nursing home residents, short-term residents receiving rehabilitation, or respite care residents.

Additionaly, the sample included only residents of a subsection of nursing homes in Kentucky. It does not geographically represent the nursing home population.

Due to the small sample size, the depth in analysis for the UTAUT questionnaire was limited due to the smaller than anticipated sample size of completed questionnaires (34/40). Participants who did not use CT could not complete the UTAUT questionnaire, which decreased the overall sample size for analysis by six participants. As a result of the small sample size, I could only use descriptive and correlational analyses. A much larger sample is required to fully analyze the UTAUT questionnaire.

7.1.3 Value of the UTAUT questionnaire

As a component of exploring the modified UTAUT model, the UTAUT questionnaire could have been useful in assessing the overall strength of the UTAUT with the nursing home population. I originally modified the UTAUT questionnaire to fit the nursing home population known from the limited research about CT intention to use and use in nursing homes. Unfortunately, this modified UTAUT questionnaire still did not accurately reflect the specific population because it did not incorporate a question about CT use with functional health changes, it did not address the differences between nursing home CT support and family CT support, it did not have behavioral data showing actual usage, and it did not use a time frame that would notice temporal differences for the behavioral intention to use questions. This information was gleaned from the semi-structured interview questions and was not known prior to this study. As a result, many of the modified UTAUT questionnaire responses were highly skewed toward "agree" to "strongly agree" and were limited in showing overall differences in CT intention to use and use.

While the majority of the participants "strongly agreed" with the performance expectancy questions, there was a change to "agree" for the majority of the responses for effort expectancy questions. This could be due to participants expressing the difficulty in use after having to adapt their CT use as a result of their functional health changes. This concern could have been better understood if the modified questionnaire had incorporated a functional health changes question. It was a missed opportunity to fully understand effort expectancy.

The facilitating conditions questions in the modified UTAUT questionnaire broadly asked about "having the resources necessary to use CT" and receiving help from family support or the nursing home support. The findings from this study indcate that more detailed questions should be asked about each supportive role to differentiate between minor technical support (e.g., plugging in the cellphone for charging, dialing a phone number) and major technical support (e.g., repairing a broken device). As a result, the questionnaire reponses did not address differences in facilitating factors of CT use for nursing home residents.

The questions related to behavioral intention to use did not shed light on temporal differences of intention to use CT as they all focused on "use in the next month." The findings from this study showed a variation in use from "every day" to "once a month." As a result, the majority of the responses on the questionnaire were "agree" to "strongly agree" and they did not reflect the intricate differences for intention to use. Future research with this measure should take into consideration the variability of intention to use by participants by changing the question to ask about intention to use daily versus monthly.

7.1.4 Analysis of health

This study assessed health through the self-rated health scale. As a result, it was not possible to extrapolate on CT use affected by health changes. It would have been useful to have an understanding of resident medical history in order to assess how health affected the overall CT use and CT use differences between groups. In addition, findings noted that functional health affected use. A functional health assessment would have been helpful to a deeper understanding the extent to which functional changes experienced by participants affected their CT use.

7.2 Future Research

The findings from this study highlight areas for future research with nursing home residents to increase the scope of knowledge on how they are using CT and to what extent they are using CT. We need to move to a nationwide study on CT intention to use and use by cognitively intact long-term residents to fully understand the needs for this population. A unique challenge to accomplishing this research, will be in recruiting nursing homes. As demonstrated by this study, recruitment of nursing homes can be difficult and requires the administrator to trust the researcher who is typically considered an outsider. The recruitment of additional nursing home administrators by nursing home administators who were participating in the research, along with support by a nursing home corporation was vital to increasing the participant pool. Researchers need to continue to develop relationships with nursing home administrators and nursing home corporations to determine effective methods of outreach.

As shown by this study, modifiying the UTAUT model based on the existing data on nursing home residents and data on CT use by community dwelling older adults did

not fully address the needs of cognitively intact long-term nursing home residents. The UTAUT model has the potential to provide a theoretical guide for CT intention to use and use by cognitively intact long-term nursing home residents. However, we need to continue to assess each component that influences CT intention to use by testing the revised UTAUT questionnaire. We also need to increase our understanding of additional components including loneliness, functional health, and personal communication preferences.

Although, participants shared information about their CT use and how it related to feelings of loneliness, I was not able to find a relationship between CT use and feelings of loneliness. Loneliness is a well-known problem for nursing home residents (Hicks, 1999) that may affect their physical, psychological, and social health. Researchers should investigate if there is a link between CT use and feelings of loneliness. In-depth interviews and the UCLA lonelines scale should be employed to assess feelings of loneliness for nursing home residents who are currently using CT. Research on residents who are not using CT should tailor a CT intervention using a pre and post assessment with the UCLA loneliness scale.

Functional health was another component that influenced CT use. While participants learned how to use aspects of their CT and were comfortable using them, they had ongoing functional health changes that caused them to have to learn new ways to use their CT. For example, using the voice to text feature when using their fingers to text became too difficult. This study touches on the complexities that surround CT use and function health. Future research should consider each functional health change (e.g.,

decrease in feeling at the finger tips, decrease in ability to hold larger items, hearing loss, voice changes) and how nursing home residents using CT adapt to the change.

Research should also consider how nursing home staff can support these health changes. Researchers should explore the role that certified nursing aids should have with CT support as they spend the most face-to-face time with residents and, as noted in this study, currently play a role in CT support. Reseachers should also explore how other nursing home staff such as occupational therapists can help residents who are experiencing functional health changes adapt their CT use or how the activity staff can incorporate CT use into residents care plan or provide technology support such as teaching how to use new technology.

Although I did not assess personal communication preferences in this study, there appeared to be a link between CT use and the amount of communication preferred by participants. Researchers should investigate residents personal communication preferences by in-depth interviews and tracking actual use to determine if they influence CT intention to use and use. By increasing our understanding of the different components that influence nursing home resident CT use, we can extend the UTAUT model so that it explains CT intention to use and use by this specific population. This will better equip researchers as they develop CT interventions with nursing home residents.

7.3   Conclusion

At the outset of this dissertation I assumed, based on previous work experience in nursing homes and supported by the literature, that some nursing home residents were using CT with assistance from others. I did not know to what extent CT was used or understand the underlying value that the nursing home residents placed on CT. In this

study, I examined nursing home residents' CT use, developed a deeper understanding of the supports and barriers to their CT use, and explored the use of the UTAUT model. A significant finding, contrary to what one might anticipate, is that the majority of cognitively intact long-term nursing home residents in this study were independently engaged in digital communication through CT. For these nursing home residents, using CT provided a way to connect with people outside of the nursing home and a feeling of security. More importantly it gave them a feeling of freedom where they were not constrained by the walls of the nursing home.

This dissertation has reinforced the need to more deeply understand the processes, supports and barriers, that influence intention to use and use of CT by nursing home residents. It has revealed supports that influence the intention to use and use of CT in nursing homes including the ability to connect with people outside of the nursing home, family member support, and nursing home support. It has revealed barriers that influence the intention to use and use of CT in nursing homes such as a lack of family support, lack of disposable income, or broken CT.

This dissertation presents a revised UTAUT model that removes the role of some dimensions of the original model that were found to be of limited relevance in studying nursing home populations including social influences and sex. The revised UTAUT model has also improved questions in the facilitating conditions construct, added a loneliness question to the performance expectancy construct, added a funcational health question to the effort expectancy construct, and added two new moderators, functional health and personal communication preferences, that will enable us to use the model to

more deeply understand CT adoption in nursing facilities. As research moves forward on this important topic, insights from this dissertation and the findings that may result from future application of the revised UTAUT model will hopefully provide the basis for interventions that will enrich the lives of nursing home residents by maximizing their effective utilization of CT.

APPENDICES

APPENDIX 1. EIGHT THEORIES THAT FORMED UTAUT

Theory of Reasoned Action (TRA). The TRA was developed as a way to understand behavior by looking at the fundamental motivation to perform an action. TRA explains the link between attitudes and behaviors. People's attitudes toward the behavior and subjective norms are determinants of behavioral intentions (Fishbein & Ajzen, 1975). Davis, Bagozzi, and Warshaw (1989) used the TRA for individual technology intention to use and discovered that the variance accounted for was similar to other studies that had used TRA.

Theory of Planned Behavior (TPB). An extension of TRA, TPB explains that behavioral intention is shaped by three factors: attitude toward behavior, subjective norms, and perceived behavioral control (Ajzen, 1991). TPB has been applied to understand technology intention to use and use with many technologies (Harrison et al., 1997; Mathieson, 1991; Taylor & Todd, 1995).

Technology Acceptance Model (TAM). The TAM was originally created to predict information technology intention to use and use (Davis, 1989). The original TAM was composed of five areas: perceived ease of use, perceived usefulness, attitude towards using, behavioral intention to use, and actual use. TAM was then adapted to exclude attitude towards using because perceived ease of use and perceived usefulness were determined to directly affect behavior intentions. The final version of TAM is composed of external variables, perceived ease of use, perceived usefulness, behavioral intention, and usage behavior (Venkatesh & Davis, 1996). TAM2 expands on TAM by

incorporating subjective norm as another predictor of intention. TAM2 proposes that subjective norms directly affect perceived usefulness, intention to use, and are influenced by experience and voluntariness (Venkatesh & Davis, 2000).

Combined TAM and TPB (C-TAM-TPB). The C-TAM-TPB is a hybrid model of technology intention to use based on attitude toward behavior, subjective norms, perceived behavioral control, and perceived usefulness (Taylor & Todd, 1995).

Motivational Model (MM). The MM explains that there are extrinsic and intrinsic motivations that affect user behavior. Extrinsic motivations involve an individual's belief that performing the activity will achieve valued results that are separate from the activity itself (Vallerand, 1997). Intrinsic motivations involve an individual's doing an activity that gives a feeling of pleasure and ends in satisfaction. The MM was extended to study information technology adoption and use (Davis et al., 1992; Venkatesh & Speier, 1999). Davis, Bagozzi, and Warshaw (1992) applied the MM to technology use in the workplace where extrinsic motivation was conceptualized as job-related productively as a result of using the technology and intrinsic motivation was conceptualized as perceived enjoyment of using the technology. They found that intention to use technology was led by extrinsic and intrinsic motivation. Venkatesh and Speier (1999) studied technology adoption and use in relation to a person's mood during technology training. They found that a positive mood temporarily increased intrinsic motivation and intention to use technology whereas participants with negative moods had a continuing decline in intrinsic motivation and intention to use technology.

Model of PC Utilization (MPCU). The MPCU originally explained human behavior in a different way than TRA and TPB (Triandis, 1977). The MPCU was modified for IS and

applied to predict PC utilization (Thompson & Higgins, 1991). The MPCU explains that job-fit, complexity, long-term consequences, affect toward use, social factors, and facilitating conditions determine behavioral intention.

Diffusion of Innovations Theory (DOI). DOI seeks to address how, why and at what rate new technology becomes adopted within cultures. The core theory discusses the process of diffusion, which involves an innovation's being conveyed through specific means to those in a social system (Rogers, 1995). Four elements impact the spread of a new idea: the innovation itself, communication channels, time, and a social system. In order for the innovation to self-sustain, it must be widely adopted to the point of critical mass. There are five types of adopters: innovators, early adopters, early majority, late majority, and laggards (Moore & Benbasat, 1991).

Social Cognitive Theory (SCT). The SCT argues that learning takes place in a social context with a dynamic and reciprocal interaction among the person, environment, and behavior (Bandura, 1986). SCT was modified by Compeau and Higgins (1995a) for computer utilization but then extended it to information technology intention to use and use (Compeau & Higgins, 1995b). The model, guided by SCT, evaluated computer use and could be applied to intention to use and use of information technology. This model explains that self-efficacy, affect, anxiety, performance outcome expectations, and personal outcome expectations determine use.

APPENDIX 2. PERSONAL HISTORY/ RAPPORT BUILDING

I'd really like to get to know a little bit about you before we begin the interview.

      a. Can you tell me a little bit about your life…family?

      b. How did you become a resident at ____?

Sex: ☐ Male   ☐ Female

Birthdate:_____

Highest Level of Education: _____

Nursing Home Payor Source: ☐ Private Pay ☐ Medicaid ☐ Other

APPENDIX 3: NURSING HOME RESIDENT COMMUNICATION TECHNOLOGY CHECKLIST

	Telephone	Cellphone	Smartphone	Desktop Computer	Laptop	Tablet	Other
Receive Calls							
Make Calls							
Requires Assistance							
Receives Video Conferencing							
Calls with Video Conferencing							
Requires Assistance with VC							
Receive Texts							
Send Texts							
Requires Assistance with Texts							
Receive Emails							
Send Emails							
Requires Assistance with Emails							
Social Media Platform *							

APPENDIX 4. SEMI-STRUCTURED INTERVIEW PROTOCOL

1. When did you first get ___?
2. What led you to want to have this item?
3. Going back to that first day or first week when you got _____. Describe the how you learned to use _____
   a. What parts were/are easy?
   b. What parts were/are difficult?
   c. How do you deal with the difficult parts?
   d. How comfortable with ____do you feel when you use it?

Ask the participant to "talk me through" one of their days from waking up to going to sleep---focusing on when they use the technology---

4. Tell me about how you use the CT
   a. How often do you use ___?
   b. Is there a time/day that you use ___?
5. How does using _____affect your ability to communicate with other people?
   a. Is it clear and understandable?
   b. How does it compare to other technologies you use for communication?
   c. Will it detract or take away from face-to-face visits?
   d. Will take too much time away from other daily activities.
6. How does your health affect using the technology?
   a. Issues with hearing?
   b. Vision issues?
   c. Fine motor skills issues?
7. What are some of the ways you believe that using _____ to communicate with those outside the nursing home affects your life?
   a. Will it improve your social connections?
   b. Do you think you have better quality of life?
   c. Does it enhance your effectiveness to communicate with others?
   d. Does it help you get specific information to someone easier?

  e. Do you think _____ keeps you in contact with people that you want to keep in contact with?

    i. How so? If no, please explain.

    ii. Who are the people that you want to keep in touch with? Are you able to do this with the assistance of technology?

    iii. Is there anyone that you are not able to keep in touch with? Why?

    iv. How do you feel when you are or are not able to keep in touch with the people that you want to keep in touch with?

    v. Does it play a role in any other area of your life?

8. Describe the ways people who you keep in contact with think that you should use _____.

9. Tell me about the ways others in your life have been supportive of your use of _____.

10. What are some of the ways you perceive that your family or friends have supported your use of _____?

11. How would you describe the ways your family and friends view your use of _____?

12. In what ways do you think that using _____ to communicate with others is a status symbol?

13. Are there others in the nursing home who use _____ to communicate with people? If so, do you perceive those individuals to have a high profile?

14. Tell me about the resources or individuals that you think are available to you for guidance or specialized instruction on using _____.

15. Describe the knowledge that you believe it takes to use _____ to keep in contact with other people.

16. In what ways do you believe that you have control over _____ to communicate with others.

17. Tell me about the resources that you think are needed to use _____ for communication.

  a. If you have technology issues how do you resolve them?

    i. Who do you ask for help? Why?

    ii. Is there someone in the nursing home that could ask to help?

18. How do you think that using _____ to communicate fits into the nursing home?

APPENDIX 5. UTAUT QUESTIONNAIRE

		Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
	Performance Expectancy					
1.	Using _____ is helpful to me					
2.	_____ allows me to communicate more quickly.					
3.	_____ allows me to communicate more efficiency.					
	Effort Expectancy					
1.	When I interact with _____, it is always clear and easy to understand.					
2.	I am familiar with using ___.					
3.	I feel that____ is easy to use.					
4.	Learning how to use _____ is easy.					
	Social Influence					
1.	My family thinks that I should use _____.					
2.	My friends think I should use _____.					
3.	My family has been helpful with the use of _____.					
4.	My friends have been helpful with the use of _____.					
	Facilitating Conditions					
1.	I have the resources necessary for using _____.					
2.	I have the knowledge necessary for using _____.					
3.	When I have problems using _____ my family can help me solve them.					
4.	When I have problems using _____ someone at the nursing home can help me solve them.					
	Behavioral Intention to Use					
1.	I intend to use _____ in the next month.					
2.	I predict I would use _____ in the next month.					
3.	I plan to continue to use _____ to improve my communication opportunities.					

(adapted from Venkatesh et al., 2003)

APPENDIX 6. UCLA LONELINESS SCALE 10 ITEM VERSION

Instructions: The following statements describe how people sometimes feel. For each statement please indicate how often you feel the way described by writing a number in the space provided.

The scale is (1) never, (2) rarely, (3) sometimes, and (4) always.

Here is an example: How often do you feel happy? If you never felt happy, you would respond "never." If you always felt happy, you would respond, "always."

		Never (1)	Rarely (2)	Sometimes (3)	Always (4)
1	How often do you feel that you lack companionship?				
2*	How often do you feel that you have a lot in common with the people around you?				
3*	How often do you feel close to people?				
4.	How often do you feel left out?				
5.	How often do you feel that no one really knows you well?				
6.	How often do you feel isolated from others?				
7.*	How often do you feel that there are people who really understand you?				
8.	How often do you feel that people are around you but not with you?				
9.*	How often do you feel that there are people you can talk to?				
10.*	How often do you feel that there are people you can turn to?				

Scoring: Items that are asterisked should be reversed (i.e. 1=4, 2=3, 3=2, 4=1), and the scores for each item then summed together. Higher scores indicate greater degrees of loneliness

APPENDIX 7. SELF-RATED HEALTH QUESTION

1. Please rate your health in general on a scale of 1-5 with 1= poor, 2=fair, 3=good, 4=very good, and 5=excellent.

	Poor (1)	Fair (2)	Good (3)	Very Good (4)	Excellent (5)
Rate your health in general					

APPENDIX 8. CODEBOOK

Name	Description	#
Performance Expectancy		
How using CT affects your life		
Big Loss--CT broken	When participants are unable to use their CT because it is broken or not working	15
Feeling of Security	Having CT provides a feeling of comfort. Participants bring CT with them wherever they go.	13
Connection	CT allows participants to connect at anyt ime with people they want to communicate with	24
Grandchildren	Participants maintain active communication with grandchildren by using CT	7
Nursing Home Residents	Not a lot of communication opportunities with other nursing home residents so using CT allows participants to connect with people they can communicate with	8
Effort Expectancy		
How learned to use CT		
Continued Learning	Participants continue to learn how to use new areas of their CT	6
Family Assistance	Family assist with teaching participants how to use CT	15
Reading Directions	Participants read the "how to use" directions that come with each device	5
Trial and Error	Participants teach themselves how to use CT	16
Comfort level using CT		
Comfortable with their use	Participants feel confident with their ability to use CT	21
Confident using certain features	Able to use the aspects of CT that they know how to use, but not comfortable using areas they don't know how to use	18

Not comfortable	Participants do not feel comfortable with their ability to use CT	11
Social influence		
Ways your family/friends view your use of CT		
Care	Family members tell participants to use CT	7
Does not care	Family members do not have an opinion on participants CT use	9
Facilitating Conditions		
Resources available for using CT		
Family	Family pays for monthly phone plans. Family uses CT to keep in touch with participant.	16
Nursing Home	Participants use the nurses station to make and receive phone calls	6
How do you resolve technology issues?		
Family	Family helps fix CT when broken	13
Nursing Home	Maintenance or nursing staff help with technology issues	15
Health Factors	Functional issues that influence CT use	
How does health affect technology use	Hearing loss, tactile acuity loss, grip strength loss	21
Hearing Loss	age related hearing loss and hearing loss due to work related trauma	8
Tactile Acuity and Dexterity	grip strength loss, loss of feeling in finger tips	16
Vision Loss	Macular degeneration, cataracts	3
Behavioral Intention to Use		
What types of Technology Used	landline telephone, cellphone, smartphone, desktop computer, laptop, tablet	

CT owned but not used	laptop broken, cellphone ran out of minutes, tablet do not know how to use	8
Don't like Using the Telephone	Participants do not enjoy talking on the telephone	9
Additional		
Money Issues	Limited to no disposable income	7
Ease dropping	Concerns about privacy	2
Video Conferencing		11
Back up CT if CT is broken		4

APPENDIX 9. PARTICIPANT LIST

Participant	Age	Sex	Race	Highest Degree
Simon	94	Male	White	High School
Alexa	94	Female	White	8th Grade
Maggy	94	Female	White	High School
Lynn	94	Female	White	8th Grade
Aiesha	92	Female	White	High School
Moon	87	Female	White	High School
Eula	87	Female	White	8th grade
Elsie	87	Female	White	unknown
Connor	86	Male	White	College
Jim	85	Male	White	Some College
David	83	Male	White	Some College
Tash	83	Female	White	College
Courtney	82	Female	White	Some High School
Amanda	82	Female	White	Some College
Tori	82	Female	White	Some College
Mark	80	Male	White	College
Jodie	80	Female	White	Some College
Nancy	80	Female	White	High School
Marshall	78	Male	White	Graduate School
Fabian	78	Male	African American	8th Grade
Lillian	77	Female	White	Graduate School
Sam	76	Male	White	Graduate School
Karah	76	Female	White	Some High School
Susan	76	Female	White	High School
Barry	74	Male	White	College
Chris	74	Male	White	Graduate School
John	73	Male	White	Some College
Akieya	72	Female	White	College
Larry	71	Male	White	High School
Linda	70	Female	White	Middle School
Joseph	69	Male	White	College
Cailyn	69	Female	White	Some High School
Myra	69	Female	White	High School
Barbara	68	Female	White	High School
Harriet	68	Female	White	High School
Marium	66	Female	White	Some College

Amos	62	Male	African American	High School
Brad	61	Male	White	High School
Daniel	59	Male	White	Graduate School

REFERENCES

AARP. (2019). 2019 Tech and the 50+ survey. In.

Abramson, C. I., Stone, S. M., & Bollinger, N. (2001). Internet access for residents: Its time has come. *Nursing Homes Long Term Care Management, 50*(4), 6-7.

Adams, K. B., Sanders, S., & Auth, E. A. (2004). Loneliness and depression in independent living retirement communities: Risk and resilience factors. *Aging & Mental Health, 8*(6), 475-485.

Adams, P. F., Hendershot, G. E., & Marano, M. A. (1999). *Current estimates from the national health interview survey, United States, 1996*.

Administration, U. S. S. S. (2005). Social Security: A program and policy history. *Social Security Bulletin, 66*(1).

Agarwal, R., & Prasad, J. (1997). The role of innovation characteristics and perceived voluntariness in the acceptance of information technologies. *Decision Sciences, 28*(3), 557-582. doi:10.1111/j.1540-5915.1997.tb01322.x

Agarwal, R., & Prasad, J. (1998). A conceptual and operational definition of personal innovativeness in the domain of information technology. *Information Systems Research, 9*(2), 204-215. doi:10.1287/isre.9.2.204

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211. doi:10.1016/0749-5978(91)90020-T

Anderson, G. O. (2010). Loneliness among older adults: A national survey of adults 45+. In. Washington, D.C.: AARP Research.

Anderson, G. O., & Thayer, C. (2018). Loneliness and social connections: A national survey of adults 45 and older.

Anderson, K. A., & Dabelko-Schoeny, H. I. (2010). Civic engagement for nursing home

    residents: A call for social work action. *Journal of Gerontological Social Work,*

    53(3), 270-282.

Annear, M. J., Elliott, K. E. J., Tierney, L. T., Lea, E. J., & Robinson, A. (2017).

    'Bringing the outside world in': Enriching social connection through health

    student placements in a teaching aged care facility. *Health Expectations, 20*(5),

    1154-1162. doi:10.1111/hex.12561

Ashida, S., & Heaney, C. A. (2008). Differential associations of social support and social

    connectedness with structural features of social networks and the health status of

    older adults. *Journal of Aging and Health, 20*(7), 872-893.

    doi:10.1177/0898264308324626

Aylaz, R., Aktürk, Ü., Erci, B., Öztürk, H., & Aslan, H. (2012). Relationship between

    depression and loneliness in elderly and examination of influential factors.

    Archives of Gerontology and Geriatrics, 55(3), 548-554.

    doi:10.1016/j.archger.2012.03.006

Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory.

    Journal of Social and Clinical Psychology, 4(3), 359-373.

    doi:10.1521/jscp.1986.4.3.359

Barbour, R. S. (2001). Checklists for improving rigour in qualitative research: A case of

    the tail wagging the dog? *BMJ (Clinical Research Ed.), 322*(7294), 1115-1117.

Barnard, Y., Bradley, M. D., Hodgson, F., & Lloyd, A. D. (2013). Learning to use new

    technologies by older adults: Perceived difficulties, experimentation behaviour

    and usability. *Computers in Human Behavior, 29*(4), 1715-1724.

Berg, B. L. (2001). *Qualitative research methods for the social sciences*. Boston, MA: Allyn and Bacon.

Bishop, G. A., Bolton, R. P., & Jones, R. S. (1976). Improved nursing home care: Desirable and possible. *The Journal Of Long Term Care Administration, 4*(2), 2-17.

Bitzan, J. E., & Kruzich, J. M. (1990). Interpersonal relationships of nursing home residents. *The Gerontologist, 30*(3), 385-390.

Blixen, C. E., & Kippes, C. (1999). Depression, social support, and quality of life in older adults with osteoarthritis. *Journal of Nursing Scholarship, 31*(3), 221-226.

Bohm, D. A. (2001). Striving for quality care in America's nursing homes: Tracing the history of nursing homes and noting the effect of recent federal government initiatives to ensure quality care in the nursing home setting. *DePaul Journal of Health Care Law, 4*, 317-362.

Boontarig, W., Chutimaskul, W., Chongsuphajaisiddhi, V., & Papasratorn, B. (2012). *Factors influencing the Thai elderly intention to use smartphone for e-Health services*. Paper presented at the IEEE symposium on humanities, science and engineering research, Kuala Lumpur. Malaysia.

Borson, S., Scanlan, J., Brush, M., Vitaliano, P., & Dokmak, A. (2000). The mini-cog: A cognitive 'vital signs' measure for dementia screening in multi-lingual elderly. *International Journal of Geriatric Psychiatry, 15*(11), 1021-1027. doi:10.1002/1099-1166(200011)15:11<1021::AID-GPS234>3.0.CO;2-6

Boulton-Lewis, G. M., Buys, L., Lovie-Kitchin, J., Barnett, K., & David, L. N. (2007). Ageing, learning, and computer technology in Australia. *Educational Gerontology, 33*(3), 253-260. doi:10.1080/03601270601161249

Bowers, B. J. (1988). Family perceptions of care in a nursing home. *Gerontologist, 28*, 361-368.

Burnard, P. (1991). A method of analysing interview transcripts in qualitative research. *Nurse Education Today, 11*(6), 461-466.

Burnard, P. (1995). Interpreting text: An alternative to some current forms of textual analysis in qualitative research. *Social Sciences in Health, 1*, 236-245.

Burns, N., & Grove, S. K. (2005). *The practice of nursing research: Conduct, critique, & utilization*. St Louis, MO: Elsevier Saunders.

Cacioppo, J. T., & Cacioppo, S. (2014). Social relationships and health: The toxic effects of perceived social isolation. *Social & Personality Psychology Compass, 8*(2), 58-72. doi:10.1111/spc3.12087

Cacioppo, J. T., Hawkley, L. C., Crawford, E., Ernst, J. M., Burleson, M. H., Kowalewski, R. B., . . . Berntson, G. G. (2002). Loneliness and health: Potential mechanisms. *Psychosomatic Medicine, 64*(3), 407-417. doi:10.1097/00006842-200205000-00005

Cacioppo, J. T., & Patrick, W. (2008). *Loneliness: Human nature and the need for social connection*. New York, NY: W W Norton & Co.

Campbell, J. L., Quincy, C., Osserman, J., & Pedersen, O. K. (2013). Coding in-depth semistructured interviews: Problems of unitization and intercoder reliability and

agreement. *Sociological Methods & Research, 42*(3), 294-320.
doi:10.1177/0049124113500475

Carpenter, B. D., & Buday, S. (2007). Computer use among older adults in a naturally
occurring retirement community. *Computers in Human Behavior, 23*(6), 3012-
3023.

Carstensen, L. L. (1995). Evidence for a life-span theory of socioemotional selectivity.
Current Directions in Psychological Science, 4(5), 151-156. doi:10.1111/1467-
8721.ep11512261

Carstensen, L. L., & Charles, S. T. (1998). Emotion in the second half of life. *Current
Directions in Psychological Science, 7*(5), 144-149. doi:10.1111/1467-
8721.ep10836825

Caruso, A. J., Mueller, P. B., & Shadden, B. B. (1995). Effects of aging on speech and
voice. *Physical & Occupational Therapy in Geriatrics, 13*(1-2), 63-80.
doi:10.1300/J148v13n01_04

Charmaz, K. (2006). *Constructing grounded theory*. Thousand Oaks, CA: Sage.

Cheng, S.-T., Lee, C. K. L., & Chow, P. K.-Y. (2010). Social support and psychological
well-being of nursing home residents in Hong Kong. *International
Psychogeriatrics, 22*(7), 1185-1190. doi:10.1017/S1041610210000220

Chou, K. L., & Chi, I. (2003). Reciprocal relationship between social support and
depressive symptoms among Chinese elderly. *Aging & Mental Health, 7*, 224-
231.

Chu, L., Chen, H.-W., Cheng, P.-Y., Ho, P., Weng, I. T., Yang, P.-L., . . . Yeh, S.-L. (2019). Identifying features that enhance older adults' acceptance of robots: A mixed methods study. *Gerontology*, 1-10. doi:10.1159/000494881

Cimperman, M., Makovec Brenčič, M., & Trkman, P. (2016). Analyzing older users' home telehealth services acceptance behavior-applying an extended UTAUT model. *International Journal of Medical Informatics, 90*, 22-31. doi:10.1016/j.ijmedinf.2016.03.002

Compeau, D. R., & Higgins, C. A. (1995). Application of social cognitive theory to training for computer skills. *Information Systems Research, 6*(2), 118-143. doi:10.1287/isre.6.2.118

Connect, L. (2019). Technology survey older adults age 55-100. In.

Cornwell, E. Y., & Waite, L. J. (2009). Social disconnectedness, perceived isolation, and health among older adults. *Journal Of Health And Social Behavior, 50*(1), 31-48.

Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks, CA: Sage Publications, Inc.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Los Angeles, CA: Sage Publications.

Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory Into Practice, 39*(3), 124. doi:10.1207/s15430421tip3903_2

Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). Los Angeles, CA: Sage Publications.

Czaja, S. J., Charness, N., Fisk, A. D., Hertzog, C., Nair, S. N., Rogers, W. A., & Sharit, J. (2006). Factors predicting the use of technology: Findings from the center for

research and education on aging and technology enhancement (CREATE). *Psychology and Aging, 21*, 333-352.

Dalgard, O. S., & Lund Haheim, L. (1998). Psychosocial risk factors and mortality: A prospective study with special focus on social support, social participation, and locus of control in Norway. *J Epidemiol Community Health, 52*(8), 476-482.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*(8), 982-1003.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of Applied Social Psychology, 22*(14), 1111-1132. doi:10.1111/j.1559-1816.1992.tb00945.x

de Veer, A. J. E., Peeters, J. M., Brabers, A. E. M., Schellevis, F. G., Rademakers, J. J. D. J. M., & Francke, A. L. (2015). Determinants of the intention to use e-Health by community dwelling older people. *BMC Health Services Research, 15*(1), 1-9. doi:10.1186/s12913-015-0765-8

Demiris, G., Parker-Oliver, D., Hensel, B., Dickey, G., Rantz, M., & Skubic, M. (2008). Use of videophones for distant caregiving: an enriching experience for families and residents in long-term care. *Journal of Gerontological Nursing, 34*(7), 50-55.

Denzin, N. (1970). Strategies of multiple triangulation. In N. Denzin (Ed.), *The research act in sociology: A theoretical introduction to sociological method*. London: Butterworths.

Dickinson, A., & Hill, R. (2007). Keeping in touch: Talking to older people about
computers and communication. *Educational Gerontology, 33*(8), 613-631
doi:10.1080/03601270701363877

Dixon, D., Cruess, S., Kilbourn, K., Klimas, N., Fletcher, M. A., Ironson, G., . . . Antoni,
M. H. (2001). Social support mediates loneliness and human herpesvirus Type 6
(HHV-6) antibody titers. *Journal of Applied Social Psychology, 31*(6), 1111-
1132. doi:10.1111/j.1559-1816.2001.tb02665.x

Diño, M. J. S., & de Guzman, A. B. (2015). Using partial least squares (PLS) in
predicting behavioral intention for telehealth use among Filipino elderly.
Educational Gerontology, 41(1), 53-68. doi:10.1080/03601277.2014.917236

Donabedian, A. (1988). Quality assessment and assurance: Unity of purpose, diversity of
means. *Inquiry, 25*(1), 173-192.

Downe-Wamboldt, B. (1992). Content analysis: Method, applications, and issues. *Health
Care for Women International, 13*(3), 313-321.

Drageset, J., Espehaug, B., & Kirkevold, M. (2012). The impact of depression and sense
of coherence on emotional and social loneliness among nursing home residents
without cognitive impairment – a questionnaire survey. *Journal of Clinical
Nursing, 21*(7-8), 965-974. doi:10.1111/j.1365-2702.2011.03932.x

Dugan, E., & Kivett, V. R. (1994). The importance of emotional and social isolation to
loneliness among very old rural adults. *34*, 340-346.

Dunlop, B. (1979). *The Growth of Nursing Home Care* Lexington, MA: Lexington
Books.

Dutton, W. H. E. J., & Gerber, M. M. (2009). *The Internet in Britain: 2009*. Oxford, UK:
Oxford Internet Institute, University of Oxford.

Ellis, P., & Hickie, I. (2001). What causes mental illness? In S. Bloch & B. Singh (Eds.),
Foundations of clinical psychiatry (pp. 43-62). Melbourne: Melbourne University
Press.

Erickson, J., & Johnson, G. M. (2011). Internet use and psychological wellness during
late adulthood. *Canadian Journal on Aging, 30*, 197- 210

Evans, L. K., & Strumpf, N. E. (1989). Tying down the elderly. A review of the literature
on physical restraint. *Journal of the American Geriatrics Society, 37*(1), 65-74.

Findlay, R. A. (2003). Interventions to reduce social isolation amongst older people:
Where is the evidence? *Ageing & Society, 23*(5), 647-658.
doi:10.1017/S0144686X03001296

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An
introduction to theory and research*. Reading, MA: Addison-Wesley.

Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). "Mini-mental state" A practical
method for grading the cognitive state of patients for the clinician. *Journal of
Psychiatry Research, 12*, 189-199.

Foucault, M. (1972). *The archeology of knowledge*. New York, NY: Pantheon Books.

Fratiglioni, L., Wang, H.-X., Ericsson, K., Maytan, M., & Winblad, B. (2000). Influence
of social network on occurrence of dementia: A community-based longitudinal
study. *Lancet, 355*(9212), 1315. doi:10.1016/S0140-6736(00)02113-9

Freedman, V., Calkins, M., & Haitsma, K. V. (2005). An exploratory study of barriers to implementing technology in US residential long-term care settings. *Gerontechnology, 4*(2), 86-101.

Friedman, E. M., Hayney, M. S., Love, G. D., Urry, H. L., Rosenkranz, M. A., Davidson, R. J., . . . Ryff, C. D. (2005). Social relationships, sleep quality, and interleukin-6 in aging women. *Proceedings Of The National Academy Of Sciences Of The United States Of America, 102*(51), 18757-18762.

Furlong, M., & Kearsley, G. (1986). Computer instruction for older adults. *Generations, 11*(1), 32-34.

Gao, S., Yang, Y., & Krogstie, J. (2015). *The adoption of smartphones among older adults in China*. Paper presented at the International Conference on Informatics and Semiotics in Organisations, Campinas, Brazil.

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.

Gaugler, J. E., Anderson, K. a., & Leach, C. R. (2004). Predictors of Family Involvement in Residential Long-Term Care. *Journal of Gerontological Social Work, 42*(1), 3-26.

Gaugler, J. E., & Ewen, H. H. (2005). Building relationships in residential long-term care: determinants of staff attitudes toward family members. *Journal of gerontological nursing, 31*(9), 19-26.

Geib, H. F. (1980). Visitation patterns and economic support of nursing home patients. *The Gerontologist, 20*, 108-111.

Gell, N. M., Rosenberg, D. E., Demiris, G., LaCroiz, A. Z., & Patel, K. V. (2013).
Patterns of technology use among older adults with and without disabilities. *The Gerontologist, 55*(3), 412-421.

Gibbs, G. (2007). *Analyzing qualitative data*. Thousand Oaks, CA: Sage Publications Ltd.

Giger, J. T., Pope, N. D., Vogt, H. B., Gutierrez, C., Newland, L. A., Lemke, J., & Lawler, M. J. (2015). Remote patient monitoring acceptance trends among older adults residing in a frontier state. *Computers in Human Behavior, 44*, 174-182.

Glaser, R., Kiecolt-Glaser, J. K., Speicher, C. E., & Holliday, J. E. (1985). Stress, loneliness, and changes in herpesvirus latency. *Journal of Behavioral Medicine, 8*(3), 249-260. doi:10.1007/BF00870312

Goffman, E. (1961). *Asylums: Essays on the social situations of mental patients and other inmates*. Oxford: Doubleday (Anchor).

Green, L. R., Richardson, D. S., Lago, T., & Schatten-Jones, E. C. (2001). Network correlates of social and emotional loneliness in young and older adults. *Personality and Social Psychology Bulletin, 27*(3), 281-288. doi:10.1177/0146167201273002

Greenberg, M. T., Weissberg, R. P., O'Brien, M. U., Zins, J. E., Fredericks, L., Resnik, H., & Elias, M. J. (2003). Enhancing school-based prevention and youth development through coordinated social, emotional, and academic learning. *American Psychologist, 58*(6/7), 466. doi:10.1037/0003-066X.58.6-7.466

Greene, V. L., & Monahan, D. J. (1982). The impact of visitation on patient well-being in nursing homes. *The Gerontologist, 22*(4), 418-423.

Greenglass, E., Fiksenbaum, L., & Eaton, J. (2006). The relationship between coping, social support, functional disability and depression in the elderly. *Anxiety, Stress, & Coping: An International Journal, 19*, 15-32.

Groger, L., & Straker, J. K. (2001). Counting and recounting: Approaches to combining quantitative and qualitative data and methods. In G. D. Rowles & N. E. Schoenberg (Eds.), *Qualitative gerontology: A contemporary perspective* (pp. 179-199): Springer Publishing Company.

Guadagnoli, E., & Mor, V. (1991). Daily living needs of cancer outpatients. *Journal of community health, 16*(1), 37-47.

Gueldner, S. H., Clayton, G. M., Schroeder, M. A., Butler, S., & Ray, J. (1992). Environmental interaction patterns among institutionalized and non-institutionalized older adults. *Physical & Occupational Therapy in Geriatrics, 11*(1), 37-53.

Gugel, R. N. (1989). Psychosocial interventions in the nursing home. In P. R. Katz & E. Calkins (Eds.). New York: Springer.

Günter, V. K., Schäfer, P., Holzner, B. J., & Kemmler, G. W. (2003). Long-term improvements in cognitive performance through computer-assisted cognitive training: A pilot study in a residential home for older people. *Aging and Mental Health, 7*(3), 200-206.

Harris-Kojetin, L., Sengupta, M., Lendon, J. P., Rome, V., Valverde, R., & Caffrey, C. (2019). Long-term care providers and services users in the United States, 2015–2016. In (Vol. 3). Vital Health Stat National Center for Health Statistics.

Harrison, C., & Stewart, A. (1997). Branching out. *Communications News, 34*(11), 40.

Hawes, C., Mor, V., Phillips, C. D., Fries, B. E., Morris, J. N., Steele-Friedlob, E., . . .
Nennstiel, M. (1997). The OBRA-87 nursing home regulations and
implementation of the resident assessment instrument: Effects on process quality.
Journal of the American Geriatrics Society, 45(8), 977-985.

Hawes, C., Morris, J. N., Phillips, C. D., Mor, V., Fries, B. E., & Nonemaker, S. (1995).
Reliability estimates for the minimum data set for nursing home resident
assessment and care screening (MDS). *Gerontologist, 35*(2), 172-178.

Hawkley, L. C., & Cacioppo, J. T. (2007). Aging and loneliness downhill quickly?
Current Directions in Psychological Science, 16(4), 187-192.

Hawkley, L. C., Hughes, M. E., Waite, L. J., Masi, C. M., Thisted, R. A., & Cacioppo, J.
T. (2008). From social structural factors to perceptions of relationship quality and
loneliness: The Chicago health, aging, and social relations study. *The Journals of
Gerontology, 63*(6), S375-S384. doi:10.1093/geronb/63.6.S375

Hawkley, L. C., Masi, C. M., Berry, J. D., & Cacioppo, J. T. (2006). Loneliness is a
unique predictor of age-related differences in systolic blood pressure. *Psychology
and Aging, 21*(1), 152-164.

Hawthorn, D. (2000). Possible implications of aging for interface designers. *Interacting
with Computers, 12*(5), 507-528.

He, W., Goodkind, D., & Kowal, P. (2016). *An Aging World: 2015*. Retrieved from
Washington, DC:
https://www.census.gov/content/dam/Census/library/publications/2016/demo/p95-
16-1.pdf

Heart, T., & Kalderon, E. (2013). Older adults? Are they ready to adopt health-related

     ICT? *International Journal of Medical Infomatics, 82*, e209-e232.

Heerink, M., Kröse, B., Evers, V., & Wielinga, B. (2010). Assessing acceptance of

     assistive social agent technology by older adults: The Almere Model.

     International Journal of Social Robotics, 2(4), 361-375. doi:10.1007/s12369-010-

     0068-5

Heinrich, L. M., & Gullone, E. (2006). The clinical significance of loneliness: A

     literature review. *Clinical Psychology Review, 26*(6), 695-718.

     doi:10.1016/j.cpr.2006.04.002

Hensel, B., Parker-Oliver, D., & Demiris, G. (2007). Videophone communication

     between residents and family: A case study. *Journal of the American Medical

     Directors Association, 8*(2), 123-127.

Hicks, T. J. (1999). Spirituality and the elderly: Nursing implications with nursing home

     residents. *Geriatric Nursing, 20*(3), 144-146.

Hilt, M. L., & Lipschultz, J. H. (2004). Elderly americans and the internet: E-mail, TV

     news, information and entertainment websites. *Educational Gerontology, 30*, 16.

Himmelstein, D. U., Jones, A. A., & Woolhandler, S. (1983). Hypernatremic dehydration

     in nursing home patients: An indicator of neglect. *Journal of the American

     Geriatrics Society, 31*(8), 466-471.

Holmén, K., & Furukawa, H. (2002). Loneliness, health and social network among

     elderly people--a follow-up study. *Archives of Gerontology and Geriatrics, 35*(3),

     261-274. doi:10.1016/S0167-4943(02)00049-3

Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2013). Social relationships and mortality risk: A meta-analytic review. *PLoS Medicine, 7*(7), e1000316. doi:10.1371/journal.pmed.1000316

Hook, W. F. S. J., & Oak, J. C. (1982). Frequency of visitaion in nursing homes: Patterns of contact across the boundaries of total institutions. *The Gerontologist, 22*(4), 424-428.

Hoque, R., & Sorwar, G. (2017). Understanding factors influencing the adoption of mHealth by the elderly: An extension of the UTAUT model. *International Journal of Medical Informatics, 101*, 75-84. doi:10.1016/j.ijmedinf.2017.02.002

Howard, J. (1977). Medication procedure in a nursing home: Abuse of PRN orders. *American journal geriatric soc, 25*, 83-84.

Howden, L. M., & Meyer, J. A. (2011). *Age and sex composition: 2010*. Retrieved from http://www.census.gov/prod/cen2010/briefs/c2010br-03.pdf

Idler, E. L., & Benyamini, Y. (1997). Self-rated health and mortality: A review of twenty-seven community studies. *Journal Of Health And Social Behavior, 38*(1), 21-37.

Institute of Medicine Improving the Quality of Care in Nursing Homes. (1986). Washington, DC: National Academy of Sciences Press.

Jacobs, J. M., Cohen, A., Hammerman-Rozenberg, R., & Stessman, J. (2006). Global sleep satisfaction of older people: The Jerusalem cohort study. *Journal of the American Geriatrics Society, 54*(2), 325-329.

Kane, R. A., Caplan, A. L., Urv-Wong, E. K., Freeman, I. C., Aroskar, M. A., & Finch, M. (1997). Everyday matters in the lives of nursing home residents: Wish for and

perception of choice and control. *Journal of the American Geriatrics Society, 45*(9), 1086-1093.

Kane, R. A., & Kane, R. L. (1988). Long-term care: Variations on a quality assurance theme. *Inquiry, 25*(1), 132-146.

Kane, R. L., & Kane, R. A. (2000). Assessment in long-term care. *Annu Rev Public Health, 21*, 659-686. doi:10.1146/annurev.publhealth.21.1.659

Kane, R. L., Williams, C. C., Williams, T. F., & Kane, R. A. (1993). Restraining restraints: Changes in a standard of care. *Annu Rev Public Health, 14*(1), 545-584.

Karavidas, M., Lim, N. K., & Katsikas, S. L. (2005). The effects of computers on older adult users. *Computers in Human Behavior, 21*(5), 697-711.

Kautzmann, L. N. (1990). Introducing computers to the elderly. *Physical & Occupational Therapy in Geriatrics, 9*(1), 27-36.

Keenen, T. A. (2009). Internet use among midlife and older adults: An AARP bulletin poll. Retrieved from http://www.aarp.org/technology/innovations/info-12-2009/bulletin_internet_09.html

Kiecolt-Glaser, J. K., Ricker, D., George, J., Messick, G., Speicher, C. E., Garner, W., & Glaser, R. (1984). Urinary cortisol levels, cellular immunocompetency, and loneliness in psychiatric inpatients. *Psychosomatic Medicine, 46*(1), 15-23. doi:10.1097/00006842-198401000-00004

Kim, J., Lee, H. Y., Christensen, M. C., & Merighi, J. R. (2017). Technology access and use, and their associations with social engagement among older adults: Do women and men differ? *The Journals Of Gerontology. Series B, Psychological Sciences And Social Sciences, 72*(5), 836-845. doi:10.1093/geronb/gbw123

Krippendorff, K. (1980). *Content analysis: An introduction to its methodology*. Newbury
Park: Sage Publications.

Kurasaki, K. S. (2000). Intercoder reliability for validating conclusions drawn from open-
ended interview data. *Field Methods, 12*(3), 179.
doi:10.1177/1525822X0001200301

Laganà, L. (2008). Enhancing the attitudes and self-efficacy of older adults toward
computers and the internet: Results of a pilot study. *Educational Gerontology, 34*,
831-843.

Laganà, L., Oliver, T., Ainsworth, A., & Edwards, M. (2011). Enhancing computer self-
efficacy and attitudes in multi-ethnic older adults: a randomised controlled study.
Ageing and Society, 31, 911-933.

Lai, H.-J. (2018). Investigating older adults' decisions to use mobile devices for learning,
based on the unified theory of acceptance and use of technology. *Interactive
Learning Environments*. doi:10.1080/10494820.2018.1546748

Lee, B., Chen, Y., & Hewitt, L. (2011). Age differences in constraints encountered by
seniors in their use of computers and the internet. *Computers in Human Behavior,
27*, 1231-1237.

Lee, R. H., Gajewski, B. J., & Thompson, S. (2006). Reliability of the nursing home
survey process: A simultaneous survey approach. *Gerontologist, 46*(6), 772-779.

Lian, J.-W., & Yen, D. C. (2014). Online shopping drivers and barriers for older adults:
Age and gender differences. *Computers in Human Behavior, 37*, 133-143.
doi:10.1016/j.chb.2014.04.028

Lidz, C., Fischer, L., & Arnold, R. M. (1992). *The erosion of autonomy in long-term care*. New York, NY: Oxford University Press.

Lin, F. R., Niparko, J. K., & Ferrucci, L. (2011). Hearing loss prevalence in the United States. *Archives Of Internal Medicine, 171*(20), 1851-1852. doi:10.1001/archinternmed.2011.506

Lugo, L., Cooperman, A., Funk, C., & O'Connell, E. (2013). Views on end-of-life medical treatments. 1-88.

Luo, Y., Hawkley, L. C., Waite, L. J., & Cacioppo, J. T. (2012). Loneliness, health, and mortality in old age: A national longitudinal study. *Social Science & Medicine, 74*(6), 907-914. doi:10.1016/j.socscimed.2011.11.028

Ma, Q., Chan, A. H. S., & Chen, K. (2016). Personal and other factors affecting acceptance of smartphone technology by older Chinese adults. *Applied Ergonomics, 54*, 62-71. doi:10.1016/j.apergo.2015.11.015

Magsamen-Conrad, K., Upadhyaya, S., Joa, C. Y., & Dowd, J. (2015). Bridging the divide: Using UTAUT to predict multigenerational tablet adoption practices. *Computers in Human Behavior, 50*, 186-196. doi:10.1016/j.chb.2015.03.032

Marquié, J. C., Jourdan-Boddaert, L., & Huet, N. (2002). Do older adults underestimate their actual computer knowledge? In (Vol. 21, pp. 273-280).

Marron, K. R., Fillit, H., Peskowitz, M., & Silverstone, F. A. (1983). The nonuse of urethral catheterization in the management of urinary incontinence in the teaching nursing home. *Journal of the American Geriatrics Society, 31*(5), 278-281.

Maslow, A. H. (1968). *Toward a psychology of being* (2nd ed.). New York: Van Nostrand Reinhold.

Mathieson, K. (1991). Predicting user intentions: Comparing the technology acceptance

model with the theory of planned behavior. *Information Systems Research, 2*(3),

173-191. doi:10.1287/isre.2.3.173

Maxwell, J. A. (1992). Understanding and validity in qualitative research. *Harvard*

Educational Review, 62(3), 279-300. doi:10.17763/haer.62.3.8323320856251826

McDowell, I. (2006). *Measuring health: A guide to rating scales and questionnaires* (3rd

ed.). New York, NY: Oxford University Press.

McInnis, G. J., & White, J. H. (2001). A phenomenological exploration of loneliness in

the older adult. *Archives of Psychiatric Nursing, 15*(3), 128-139.

doi:10.1053/apnu.2001.23751

Medicine, I. o. (1986). *Improving the Quality of Care in Nursing Homes*. Washington,

DC: National Academy Press.

Melenhorst, A.-S., Rogers, W. A., & Bouwhuis, D. G. (2006). Older adults' motivated

choice for technological innovation: Evidence for benefit-driven selectivity.

Psychology and aging, 21(1), 190-195.

Merkel, K. L. (2001). *An investigation into neglected (untreated) late life depression*

among lonely, community-dwelling elderly. (62). ProQuest Information &

Learning, Available from EBSCOhost psyh database.

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. San

Francisco, CA: Jossey-Bass.

Mickus, M. A., & Luz, C. C. (2002). Televisits: sustaining long distance family

relationships among institutionalized elders through technology. *Aging & Mental*

Health, 6(4), 387-396.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook, 2nd ed*. Thousand Oaks, CA: Sage Publications, Inc.

Mitzner, T. L., Boron, J. B., Fausset, C. B., Adams, A. E., Charness, N., Czaja, S. J., . . . Sharit, J. (2010). Older adults talk technology: Technology usage and attitudes. *Computers in Human Behavior, 26*(6), 1710-1721.

Money, A. G., Atwal, A., Boyce, E., Gaber, S., Windeatt, S., & Alexandrou, K. (2019). Falls sensei: A serious 3D exploration game to enable the detection of extrinsic home fall hazards for older adults. *BMC Medical Informatics And Decision Making, 19*(1), 85-85. doi:10.1186/s12911-019-0808-x

Montgomery, R. J. (1982). Impact of institutional care policies on family integration. *Gerontologist, 22*, 54-58.

Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research, 2*(3), 192-222. doi:10.1287/isre.2.3.192

Morris, A., Goodman, J., & Brading, H. (2007). Internet use and non-use: Views of older users. *Universal Access in the Information Society, 6*(1), 43-57.

Morris, J. N., Hawes, C., Fries, B. E., Phillips, C. D., Mor, V., Katz, S., . . . Friedlob, a. S. (1990). Designing the national resident assessment instrument for nursing homes. *The Gerontologist, 30*(3), 293-307.

Morse, J. M. (1991). Approaches to qualitative-quantitative methodological triangulation. *Nursing Research, 40*(2), 120-123.

Morse, J. M. (1994). Designing funded qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research.* (pp. 220-235). Thousand Oaks, CA: Sage Publications, Inc.

Morse, J. M. (1995). The significance of saturation. *Qualitative Health Research, 5*(2), 147-149.

Morse, J. M., & Field, P. A. (1995). *Qualitative research methods for health professionals*. Thousand Oaks, CA: Sage Publications.

Morse, J. M., & Niehaus, L. (2009). *Principles and procedures of mixed methods design*. Walnut Creek, CA: Left Coast Press.

Moyle, W., Kellett, U., Ballantyne, A., & Gracia, N. (2011). Dementia and loneliness: An Australian perspective. *Journal of Clinical Nursing, 20*(9-10), 1445-1453. doi:10.1111/j.1365-2702.2010.03549.x

Namazi, K. H., & McClintic, M. (2003). Computer use among elderly persons in long-term care facilities. *Educational Gerontology, 29*(6), 535-550.

Ng, C. H. (2008). Motivation among older adults in learning computer technologies: A grounded model. *Educational Gerontology, 34*(1), 15.

Nichols, J. (2017). Caring for the cognitively intact. *Caring for the Ages, 18(5),* 4-5.

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

Norman, G. (2010). Likert scales, levels of measurement and the "laws" of statistics. *Advances in Health Sciences Education, 15*(5), 625-632.

Nägle, S., & Schmidt, L. (2012). Computer acceptance of older adults. *Work, 41*, 3541-3548.

Olsen, R. B., Olsen, J., Gunner-Svensson, F., & Waldstrøm, B. (1991). Social networks and longevity: A 14 year follow-up study among elderly in Denmark. *Social Science & Medicine, 33*(10), 1189-1195. doi:10.1016/0277-9536(91)90235-5

Or, C. K., Karsh, B. T., Severtson, D. J., Burke, L. J., Brown, R. L., & Brennan, P. F. (2011). Factors affecting home care patients' acceptance of a web-based interactive self-management technology. *Journal of the American Medical Informatics Association, 18*(1), 51-59.

Ortiz, H. (2011). Crossing new frontiers: Benefits access among isolated seniors. In. National Center for Benefits Outreach and Enrollment: National Council on Aging.

Ouslander, J. G., & Fowler, E. (1983). Incontinence in VA nursing home care units: Epidemiolgy and management. *Gerontologist, 23*, 257-257.

Ouslander, J. G., & Kane, R. L. (1984). The costs of urinary incontinence in nursing homes. *Medical Care, 22*(1), 69-79.

Ouslander, J. G., Kane, R. L., & Abrass, I. B. (1982). Urinary incontinence in elderly nursing home patients. *JAMA : the journal of the American Medical Association, 248*(10), 1194-1198.

Patton, M. Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). Thousand Oaks, CA: Sage Publications, Inc.

Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Peacock, S. E., & Kunemund, H. (2007). Senior citizens and internet technology: Reasons and correlates of access versus non-access in a European comparative perspective. *European Journal of Ageing, 4*(4), 10.

Perissinotto, C. M., Stijacic Cenzer, I., & Covinsky, K. E. (2012). Loneliness in older persons: A predictor of functional decline and death. *Archives of Internal Medicine, 172*(14), 1078-1084. doi:10.1001/archinternmed.2012.1993

PEW. (2019). Mobile fact sheet. June 12, 2019. Retrieved from https://www.pewresearch.org/internet/fact-sheet/mobile/

Pheeraphuttharangkoon, S., Choudrie, J., Zamani, E., & Giaglis, G. (2014). *Investigating the adoption and use of smartphones in the UK: A silver-surfers perspective.* Paper presented at the European Conference on Information Systems, Tel Aviv, Israel.

Pinquart, M., & Sorensen, S. (2001). Influences on loneliness in older adults: A meta-analysis. *Basic and Applied Social Psychology, 23*(4), 245-266. doi:10.1207/S15324834BASP2304_2

Polit, D. F., & Beck, C. T. (2004). *Nursing research: Principles and methods.* Philadelphia, PA: Lippincott, Williams, & Wilkins.

Polit, D. F., & Beck, C. T. (2006). *Essentials of nursing research methods, appraisal, and utilization.* Philadelphia, PA: Lippincott, Williams, & Wilkins.

Port, C. L., Gruber-Baldini, A. L., Burton, L., Baumgarten, M., Hebel, J. R., Zimmerman, S. I., & Magaziner, J. (2001). Resident contact with family and friends following nursing home admission. *Gerontologist, 41*(5), 589-596.

Prieto-Flores, M.-E., Forjaz, M. J., Fernandez-Mayoralas, G., Rojo-Perez, F., &
Martinez-Martin, P. (2011). Factors associated with loneliness of non
institutionalized and institutionalized older adults. *Journal of Aging and Health,*
23(1), 177-194.

Purnell, M., & Sullivan-Schroyer, P. (1997). Nursing home residents using computers:
The Winchester House experience. *Generations, 21*(3), 61.

Rainie, L., & Perrin, A. (Producer). (2016). Technology adoption by baby boomers (and
everybody else). Retrieved from

https://www.pewinternet.org/2016/03/22/technology-adoption-by-baby-boomers-and-everybody-else/

Ray, W. A., Federspiel, C. F., & Schaffner, W. (1980). A study of antipsychotic drug use
in nursing homes: Epidemiologic evidence suggesting misuse. *American Journal*
of Public Health, 70(5), 485-491.

Revicki, D. A., & Mitchell, J. P. (1990). Strain, social support, and mental health in rural
elderly individuals. *J Gerontol, 45*(6), S267-274.

Rickards, G., Magee, C., & Artino, A. R., Jr. (2012). You can't fix by analysis what
you've spoiled by design: Developing survey instruments and collecting validity
evidence. *Journal Of Graduate Medical Education, 4*(4), 407-410.
doi:10.4300/JGME-D-12-00239.1

Rogers, E. M. (1995). *Diffusion of innovations*. New York: Free Press.

Rogers, W. A., Stronge, A. J., & Fisk, A. D. (2005). Technology and Aging. In (Vol. 1,
pp. 130-171).

Rosenthal, R. L. (2008). Older computer-literate women: Their motivations, obstacles, and paths to success. *Educational Gerontology, 34*(7), 610-626.

Rothman, D. (1971). *The discovery of the asylum*. Boston, MA: Little, Brown.

Rubin, A., & Shuttlesworth, G. E. (1983). Engaging families as support resources in nursing home care: Ambiguity in the subdivision of tasks. *The Gerontologist, 23*(6), 632-636.

Russell, D. W. (1996). UCLA loneliness scale (version 3): Reliability, validity, and factor structure. *Journal of Personality Assessment, 66*(1), 20-40. doi:10.1207/s15327752jpa6601_2

Sandelowski, M. (1995). Qualitative analysis: What it is and how to begin. *Research In Nursing & Health, 18*(4), 371-375.

Sanford, A. M., Orrell, M., Tolson, D., Abbatecola, A. M., Arai, H., Bauer, J. M., . . . Vellas, B. (2015). An international definition for "nursing home". *Journal of the American Medical Directors Association, 16*(3), 181-184.

Savikko, N., Routasalo, P., Tilvis, R. S., Strandberg, T. E., & Pitkälä, K. H. (2005). Predictors and subjective causes of loneliness in an aged population. *Archives of Gerontology and Geriatrics, 41*(3), 223-233. doi:10.1016/j.archger.2005.03.002

Scanlan, J., & Borson, S. (2001). The mini-cog: Receiver operating characteristics with expert and naïve raters. *International Journal of Geriatric Psychiatry, 16*(2), 216-222. doi:10.1002/1099-1166(200102)16:2<216::AID-GPS316>3.0.CO;2-B

Schenk, L., Meyer, R., Behr, A., Kuhlmey, A., & Holzhausen, M. (2013). Quality of life in nursing homes: Results of a qualitative resident survey. *Quality of Life Research, 22*(10), 2929-2938.

Schnelle, J. F., Sowell, V. A., & Traugher, B. (1988). Reduction of urinary incontinence
in nursing homes: Does it reduce or increase costs? *Journal of the American
Geriatrics Society, 36*, 34-39.

Schuster, A. M., Giger, J. G., & Hunter, E. G. (2016). *Communication and technology
patterns of long-term residents pre and post admissions to a nursing home:
A pilot study*.

Schwindenhammer, T. M. (2014). *Videoconferencing intervention for depressive
symptoms and loneliness in nursing home elders.* (3623466). Illinois State
University, Ann Arbor. ProQuest Dissertations & Theses Global database.

Selwyn, N., Gorard, S., Furlong, J., & Madden, L. (2003). Older adults' use of
information and communications technology in everyday life. *Ageing and Society,
23*(5), 561-582.

Settersten, R. A., Jr., & Lovegreen, L. D. (1998). Educational experiences throughout
adult life: New hopes or no hope for life-course flexibility? *Research on Aging,
20*(4), 506-538.

Shankar, A., McMunn, A., Banks, J., & Steptoe, A. (2011). Loneliness, social isolation,
and behavioral and biological health indicators in older adults. *Health
Psychology, 30*(4), 377-385. doi:10.1037/a0022826

Sherer, M. (1996). The impact of using personal computers on the lives of nursing home
residents. *Physical and Occupational Therapy in Geriatrics, 14*(2), 13-31.

Short, J. W. E., & Christie, B. (1976). *The social psychology of telecommuncations*.
London: John Wiley.

Siedler, R. D., & Stelmach, G. E. (1996). Motor control In J. E. Birren & K. W. Schaie

    (Eds.), *Handbook of the Psychology of Aging*. San Diego, CA: Academic Press.

Siniscarco, M. T., Love-Williams, C., & Burnett-Wolle, S. (2017). Video conferencing:

    An intervention for emotional loneliness in long-term care. *Activities, Adaption*

    and Aging, 41(4), 316-329.

Skre, H. (1972). Neurological signs in a normal population. *Acta neurologica*

    Scandinavica, 48(5), 575-606.

Smith, A. (2014). *Older adults and technology use*. Retrieved from

Social Security Act Amendments of 1965, U.S.C., Pub. L. No. 89-97, 286 Stat. (1965).

Social Security Act: 1950 Amendments, U.S.C., Pub. L. No. 81-734 (1950).

Spiggle, S. (1994). Analysis and interpretation of qualitative data in consumer research.

    Journal of Consumer Research, 21(3), 491-503.

Starer, P., & Libow, L. S. (1985). Obscuring urinary incontinence: Diapering the elderly.

    Journal of the American Geriatrics Society, 12, 842-846.

State operations manual, 483.10 C.F.R. (2017).

Steele, R., Lo, A., Secombe, C., & Wong, Y. K. (2009). Elderly persons' perception and

    acceptance of using wireless sensor networks to assist healthcare. *International*

    Journal Of Medical Informatics, 78(12), 788-801.

    doi:10.1016/j.ijmedinf.2009.08.001

Stewart, A. L., & King, A. C. (1994). Conceptualizing and measuring quality of life in

    older populations. In R. P. Abeles, H. C. Gift, & M. G. Ory (Eds.), *Aging and*

    quality of life. (pp. 27-54). New York, NY: Springer Publishing Co.

Sum, S., Matthews, R., & Hughes, I. (2009). Internet use as a predictor of sense of
   community in older people. *CyberPsychology & Behavior, 12*, 5.

Szajna, B. (1996). Empirical Evaluation of the Revised Technology Acceptance Model.
   Management Science, 42(1), 85-92. doi:10.1287/mnsc.42.1.85

Tak, S. H., Beck, C., & McMahon, E. (2007). Computer and internet access for long-term
   care residents: Percieved benefits and barriers. *Journal of Gerontological
   Nursing, 33*(5), 9.

Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology: Combining qualitative and
   quantitative approaches*. Thousand Oaks, CA: Sage Publications, Inc.

Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of
   competing models. *Information Systems Research, 6*(2), 144-176.
   doi:10.1287/isre.6.2.144

The medical facilities survey and construction act of 1954, U.S.C., Pub. L. No. 482
   (1954).

The Omnibus Budget Reconciliation Act of 1987, U.S.C., Pub. L. No. 100-203 (1987).

Theeke, L. A. (2010). Sociodemographic and health-related risks for loneliness and
   outcome differences by loneliness status in a sample of US older adults. *Research
   in Gerontological Nursing, 3*(2), 113-125.

Thomas, W. H. (1996). *Life worth living: How someone you love can still enjoy life in a
   nursing home: The Eden Alternative in action* . MA: VanderWyk&Burnham.

Thompson, R. L., & Higgins, C. A. (1991). Personal computing: Toward a conceptual
   model of utilization. *MIS Quarterly, 15*(1), 125-143. doi:10.2307/249443

Thompson, R. L., Higgins, C. A., & Howell, J. M. (1994). Influence of Experience on

>Personal Computer Utilization: Testing a Conceptual Model. *Journal of
>
>Management Information Systems, 11*(1), 167-187.
>
>doi:10.1080/07421222.1994.11518035

Thurston, R. C., & Kubzansky, L. D. (2009). Women, loneliness, and incident coronary

>heart disease. *Psychosomatic Medicine, 71*(8), 836-842.
>
>doi:10.1097/PSY.0b013e3181b40efc

Tombaugh, T. N., & McIntyre, N. J. (1992). The Mini-Mental State Examination: A

>comprehensive review. *Journal of the American Geriatrics Society, 40*(9), 922-
>
>935. doi:10.1111/j.1532-5415.1992.tb01992.x

Triandis, H. C. (1977). *Interpersonal behavior*: Brooks/Cole Publishing Co.

Tsai, H.-H., & Tsai, Y.-F. (2010). Older nursing home residents' experiences with

>videoconferencing to communicate with family members. *Journal of Clinical
>
>Nursing, 19*(11-12), 1538-1543. doi:10.1111/j.1365-2702.2010.03198.x

Tsai, H.-H., & Tsai, Y.-F. (2011). Changes in depressive symptoms, social support, and

>loneliness over 1 year after a minimum 3-month videoconference program for
>
>older nursing home residents. *Journal of Medical Internet Research, 13*(4), 11-11.

Tsai, H.-H., & Tsai, Y.-F. (2015). Attitudes toward and predictors of videoconferencing

>use among frequent family visitors to nursing home residents in Taiwan.
>
>*Telemedicine & e-Health, 21*(10), 838-844. doi:10.1089/tmj.2014.0206

Tsai, H.-H., Tsai, Y.-F., Wang, H.-H., Chang, Y.-C., & Chu, H. H. (2010).

>Videoconference program enhances social support, loneliness, and depressive

status of elderly nursing home residents. *Aging & Mental Health, 14*(8), 947-954. doi:10.1080/13607863.2010.501057

Turner, P. T. S., & Van DeWaller, G. (2007). How older people account for their experiences with interactive technology. *Behaviour & Information Technology, 26*, 287-296.

Unger, R. (1979). Toward a redefinition of sex and gender. *American Psychologist, 34*(11), 1085-1094.

Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In M. P. Zanna (Ed.), *Advances in experimental social psychology, Vol. 29.* (pp. 271-360). San Diego, CA: Academic Press.

van Baarsen, B. (2002). Theories on coping with loss: The impact of social support and self-esteem on adjustment to emotional and social loneliness following a partner's death in later life. *The Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 57*(1), S33-S42. doi:10.1093/geronb/57.1.S33

Van Baarsen, B., Smit, J. H., Snijders, T. A. B., & Knipscheer, K. P. M. (1999). Do personal conditions and circumstances surrounding partner loss explain loneliness in newly bereaved older adults? *Ageing and Society, 19*(4), 441-469.

Venkatesh, V. (1999). Creation of favorable user perceptions: Exploring the role of intrinsic motivation. *MIS Quarterly, 23*(2), 239-260. doi:10.2307/249753

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science, 46*(2), 186-204.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly, 27*(3), 425-478.

Vercruyssen, M. (1997). Movement control and speed of behavior. In A. D. Fisk & W. A. Rogers (Eds.), *Handbook of human factors and the older adult.* (pp. 55-86). San Diego, CA: Academic Press.

Verrillo, R. T. (1980). Age related changes in the sensitivity to vibration. *Journal of gerontology, 35*(2), 185-193.

Victor, C., Scambler, S., & Bond, J. (2009). *The social world of older people: Understanding loneliness and social isolation in later life*. Maidenhead, UK: Open University Press, McGraw Hill Education.

Vladeck, B. C. (1980). *Unloving care: The nursing home tragedy*. New York, NY: Basic Books.

Vogels, E. A. (2019, September 9, 2019). Millennials stand out for their technology use, but older generations also embrace digital life. Retrieved from https://www.pewresearch.org/fact-tank/2019/09/09/us-generations-technology-use/

Wallhagen, M. I., Strawbridge, W. J., Shema, S. J., Kurata, J., & Kaplan, G. A. (2001). Comparative impact of hearing and vision impairment on subsequent functioning. *Journal of the American Geriatrics Society, 49*(8), 1086-1092. doi:10.1046/j.1532-5415.2001.49213.x

Wang, K. H., Chen, G., & Chen, H. G. (2017). A model of technology adoption by older adults. *Social Behavior & Personality: An International Journal, 45*(4), 563-572.

Watson, S. D. (2009). From almshouses to nursing homes and community care: Lessons

    from Medicaid's history. *Georgia State University Law Review, 26*(3), 937-969.

Weisman, S. (1983). Computer games for the frail elderly. *The Gerontologist, 23*(4), 361-

    363.

Werner, J. M., Carlson, M., Jordan-Marsh, M., & Clark, F. (2011). Predictors of

    computer use in community-dwelling, ethnically diverse older adults. *Human*

    Factors, 53(5), 431-447. doi:10.1177/0018720811420840

Wilson, R. S., Krueger, K. R., Arnold, S. E., Schneider, J. A., Kelly, J. F., Barnes, L. L., .

    . . Bennett, D. A. (2007). Loneliness and risk of Alzheimer disease. *Archives of*

    General Psychiatry, 64(2), 234-240. doi:10.1001/archpsyc.64.2.234

Worrall, L., & Hickson, L. M. (2003). *Communication disability in aging: from*

    prevention to intervention: Delmar Learning, Clifton Park, NY.

Wyszewianski, L. (1988). Quality of care: Past achievements and future challenges.

    Inquiry, 25, 13-22.

Yamamoto-Mitani, N., Aneshensel, C. S., & Levy-Storms, L. (2002). Patterns of family

    visiting with institutionalized elders: the case of dementia. *The journals of*

    gerontology. Series B, Psychological sciences and social sciences, 57(4), S234-

    S246.

Yeung, D. Y., Kwok, S. Y., & Chung, A. (2013). Institutional peer support mediates the

    impact of physical declines on depressive symptoms of nursing home residents.

    Journal of Advanced Nursing, 69(4), 11.

Yuan, S., Hussain, S. A., Hales, K. D., & Cotten, S. R. (2016). What do they like?

    Communication preferences and patterns of older adults in the United States: The

role of technology. *Educational Gerontology, 42*(3), 7.

doi:10.1080/03601277.2015.1083392

Zhou, J., Rau, P.-L. P., & Salvendy, G. (2014). Older adults' use of smart phones: An

investigation of the factors influencing the acceptance of new functions.

Behaviour & Information Technology, 33(6), 552-560.

doi:10.1080/0144929X.2013.780637

Zickuhr, K., & Madden, M. (2012). Older adults and internet use: For the first time, half

of adults ages 65 and older are online. *PEW Internet and American Life Project*,

1-23.

CURRICULUM VITAE

Amy M. Schuster

Education

Graduate Certificate of Applied Statistics
University of Kentucky, Lexington, KY. (2016)

Master of Social Work
University of Georgia, Athens, GA. (2009)

Bachelor of Social Work
Florida State University, Tallahassee, FL. (2008)

Professional Appointments

<u>**Instructor Positions**</u>

Teaching Assistant, Public Health Through Popular Film (CPH 202), College of Public Health, University of Kentucky, 2019-2020.

Teaching Assistant, Public Health Profession and Practice (CPH 472), College of Public Health, University of Kentucky, 2019-2020.

Adjunct Instructor, Social Work Practice with Older Adults (SW 580-201), College of Social Work, University of Kentucky, 2017- 2018.

Instructor of Record Teaching Assistant, Aging in Today's World (GRN 250) Graduate Center for Gerontology, University of Kentucky, Spring 2018.

Teaching Assistant, Aging in Today's World (GRN 250) Graduate Center for Gerontology, University of Kentucky, 2016-2018.

<u>**Research Positions**</u>

Research Assistant: Hunter, E. G. and **Schuster, A. M. "**Emergency Preparedness for Aging and Long Term Care" Kentucky Department for Public Health (2015-2016) $47,500.

Research Assistant: Lamberth, C. and **Schuster, A. M. "**Emergency Preparedness for Aging and Long Term Care" Kentucky Department for Public Health (2014-2015) $47,500.

Program Coordinator: Choi, M., Schoenberg, N., and **Schuster A. M**. **"**Needs Assessment of Mobility Planning Education in Appalachia" University of Kentucky Research Support Grant (2013-2014).

Clinical Experience

Social Services and Admission Coordinator, Marsh's Edge CCRC
St Simons Island, GA (3/2013- 8/2013)

Social Service and Admission Coordinator, Glenmoor CCRC
St. Augustine, FL (7/2011-1/2013)

Social Services Specialist, Department of Family and Children Services
Covington, GA (11/2009- 9/2010)

Publications

Refereed Journal Articles

Choi, M., **Schuster, A. M.** & Schoenberg, N. E. (2019). Solutions to the challenges of meeting rural transportation needs: Middle-Aged and older adults' perspectives. *Journal of Gerontological Social Work. 62*(4), 415-431. doi: 10.1080/01634372.2019.1575133

Schuster, A. M. & Hunter, E.G. (2017). Video communication with cognitively intact nursing home residents: A scoping review. *Journal of Applied Gerontology*, *38*(8). doi: 10.1177/0733464817711962

Awards & Honors

Donovan Scholarship in Gerontology (2016, 2017)
Lois E. Layne Award (2016)
Southern Gerontological Society Student Support Scholarship (2015)