Wellness Technology and Older Adults' Experience of Home©

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ABSTRACT

Purpose: The concept of aging at home is one that has seen massive gains in popularity amongst older adults in the last few years, especially with the advent of technologies that help them maintain autonomy and functional independence. However, in order to support such an endeavor and ensure the safety and well-being of older adults who choose to partake, an analysis of the concept of home and its many facets should be explored, including its relationship with technology. The aim of this research was to develop a model of the relationship between wellness technology and experiences of home for older persons and examine the role of loneliness (as an important component of wellness) in this relationship. The project addressed the following research questions: (i) Does technology influence experiences of loneliness in older adults? (ii) How does loneliness affect an older adult's experience of home?

Methods: A mixed methods study was used that included Go-Along interviews with 15 older adults receiving services from a unique, older adult centered facility in Ottawa, the Perley Rideau. Services at the Perley Rideau include but are not limited to providing short term care, long term care, as well as independent senior living apartments. Participants completed a number of scales that assessed their attitudes towards technology as well as their levels of loneliness. After conducting an initial round of interviews, participants were introduced to a wellness technology called WellAssist™. They were asked to use the technology for a period of three months after which an exit interview was conducted. The exit interview included an additional Go-Along interview, a loneliness assessment, and administration of the Psychosocial Impact of Assistive Devices Scale (PIADS) to examine the user's perceptions about the effects from using the WellAssist™. Twelve participants completed the exit interview.

Results: The pre and post intervention analysis of the UCLA Loneliness scale showed a statistically significant decrease in loneliness scores with increased usage of the wellness technology, WellAssist™. The thematic analysis of our interviews showed that loneliness affected the experience of home in the following way(s); diminished connection to home and feelings of home which negatively impacted the older adult's overall experience of home.

Discussion: The findings suggest that wellness technology can have an impact on the older adults' experience of home by reducing loneliness and improving their overall state of wellness. Further research is needed to explore how such results would carry over onto larger sample populations as well as to explore the direct of relationship between technology that promotes wellness and the older adult's experience of home.

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List of Acronyms

PSW – Personal Support Worker

LTC – Long Term Care

ICT – Information Communication Technology

ATTQ - Attitudes Toward Technology Questionnaire

Thesis Outline

This thesis has 5 distinct chapters.

Chapter 1 introduces the topic of this thesis and provide a brief overview into the research rationale in addition to the research questions.

Chapter 2 consists of a critical literature that covers 3 topics of interest; Aging and its Associated Challenges, The Concept of Home and Technology to Support Healthy Aging.

Chapter 3 presents the research design and method.

Chapter 4 describes the qualitative and quantitative data analyses and results of our study.

Chapter 5 opens a larger discussion of the findings from the study and how they relate to other similar and current studies.

Lastly the last chapter of this thesis will include a conclusion of this study that contains a discussion of limitations to the study, the interdisciplinary approach that was used, and recommendations for future research.

In the Appendix section, readers will find all material associated with the research method process of this study including consent forms, recruitment flyers, interview scripts and information letters.

Chapter 1 – Introduction

The practice of 'aging in place' has in recent years gained in popularity amongst older adults and their families. The concept is largely based on the belief that older adults would prefer to stay at home rather than age elsewhere. Further, it is believed that technology can be used as support in such an endeavour by compensating for certain functional and cognitive limitations that are commonly witnessed with aging. However, the root of both beliefs stems from two largely untested assumptions. The first being that we have insight into what the concept of home means to older adults, and more specifically how certain factors such as loneliness affect it and the second being that an older adults experience of home is independent of their experience of the concept of home. Thus, in order to be able to provide evidence either in support of or in opposition to the aforementioned assumptions, interdisciplinary research such as the one to be outlined in this thesis needs to be conducted.

The population dynamics of today's society are vastly different from previous generations. For the first time in history, aging individuals are living for much longer and well past previous life expectancies with population numbers that are only projected to rise even further (Atella et al., 2019; Kaeberlein et al., 2015). This change in dynamic comes as a result of the aging of what is known as the baby boomer generation, those born between 1946-1964, who make up 25.6% of Canada's overall population (Statisitcs Canada, 2019). In fact, in Canada the number of older adults has surpassed that of children aged 0-14, wherein as of July 2018 for every 100 children aged 0-14 there were 106 adults aged 65 or older. This is a staggering difference compared to the dynamics of the population in 1986 wherein there were twice as many children aged 0-14 as there were adults aged 65 and older (Statisitcs Canada, 2019). Further, these aging adults are living for much longer due in part to advances in medical care,

public health and nutrition. However, this does not necessarily directly translate over to a greater population of healthy individuals. In fact, although aging individuals are living for longer, they are also living with more chronic diseases and health conditions that affect both the individual's physical as well as their mental well-being (Atella et al., 2019; Kaeberlein et al., 2015).

The process of aging is one that is often associated with a shift away from the biological, physiological, environmental, psychological and social dynamics that individuals have grown accustomed to throughout their lives. Uniquely defined by a number of highly complex and personal decisions, the process is often one that can pose certain challenges to not just the individual going through the aging process but often those who surround them as well, such as family members, friends and in/formal caregivers. Some examples of such challenges include but are not limited to, increased susceptibility to disease and injury, decline in income, loss of a loved one, and functional decline. Functional decline in itself is associated with a downstream effect of decisions that need to be made in order to support an older adult currently going through it, such as the introduction of caregivers and even potentially the choice of new housing.

It is important to note that the older adult does not view their home simply as a physical structure, but rather a reflection of their community and environment that provides them a sense of security and support (Wiles et al., 2012). In fact, one study found that older adults perceived their homes as being the place that a) keeps them comfortable b) represents their life and c) allows them to maintain control and influence over their lives (Park & Ko, 2020). This in part is what makes the choice of housing a particularly difficult and multidimensional decision to make.

When older adults are faced with the decision as to whether or not to move away from what are often homes that they have lived in for decades, they tend to inform their decisions through a number of factors ranging from those of an economic nature to those of a psychological and

psychosocial one (Roy et al., 2018). Examples of such factors include opinions from trusted health care professionals, proximity to siblings and family, ties that they may have to their current neighborhood, the potential availability of social activities at their new homes as well as the current state of their health status (Roy et al., 2018).

In some cases, older adults may choose to move into houses where they are able to live independently but within close proximity of family members, while others may deem their functional or cognitive decline to be too severe to live independently in a secure fashion, thereby electing to move to a facility such as a retirement or long-term care home. This type of living situation will henceforth be referred to as institutionalized care unless explicitly stated otherwise. However, a common occurrence with a move towards institutionalized care is a perceived loss of autonomy and independence, which in turn will have a direct effect on the overall state of wellness of the older adult, in addition to further monetary strain and stress (Park & Ko, 2020).

Wellness, is defined as a "multidimensional state of being describing the existence of positive health in an individual as exemplified by quality of life and a sense of self being" (p3) (Corbin & Pangrazi, 2001). The proposed dimensions that contribute to an individual's state of wellness include physical, social, intellectual, emotional, and spiritual wellness. A more in-depth discussion of these concepts will be addressed in Chapter 2 of this thesis. However, for the purpose of this introduction it is important to acknowledge that social wellness and therefore levels of social activity and loneliness can have a significant impact on an individual's overall state of wellness (Moilanen et al., 2021). In older adults this state is often affected by the levels of independence and autonomy possessed by the older adult; thus, a loss of autonomy can lead to a decrease in wellness (Moilanen et al., 2021). Other factors that may affect an older adult's state of wellness include their levels of social isolation (Shankar et al., 2011). Social isolation refers to

the absence of significant social relationships in one's life (Umberson & Karas Montez, 2010) and is uniquely distinct from the concept of loneliness. The distinction in the two concepts and further exploration will be conducted in section 2.2.2.1 of this thesis.

The complex nature of the decisions on where to live often leaves older adults reluctant to move out of their homes, which has resulted in the new and emerging, societal concept of aging-in-place (Wiles et al., 2012).

Aging-in-place refers to older adults living safely and independently in their own homes and communities for as long as they wish and are able to, and presumes the availability of health and social supports and services that enable it (Wiles et al., 2012). An example of such supports can include the recruitment of formal caregivers to support any functional or cognitive declines that may emerge. However, the choice to use formal caregiving can be expensive and may not be affordable for everyone. Alternatively, an approach that could lead to a more affordable route may be to use assistive, health, and wellness technologies in conjunction with and in support of the formal caregivers. These technologies ca provide innovative solutions for some of the functional and cognitive limitations that arise with aging. However, these technologies do not act as an alternative to a caregiver but rather can help support caregivers in their endeavors by enabling older adults to live well within their own homes in more independent states (Mitzner et al., 2018)

Prior to entering into a discussion with respect as to how these technologies can be used to support the aging of an older adult, it is imperative to define and differentiate assistive technology, health technologies and wellness technology. Health technologies are defined as products with the primary purpose of decreasing an individual's susceptibility to death, disease, disability, discomfort or dissatisfaction (Edlin & Eric, 2019; Perelmutter et al., 2017). Examples

of such products can range from those of a rather simple nature to ones that are more complex such as closed loop insulin pumps.

Assistive technologies are designed to help individuals perform activities through self-support and support from others. Some examples of such technologies include powered wheelchairs, assistive devices for feeding as well simpler technologies such as print magnifiers to enable easier reading to the user (Jutai et al., 2009).

Wellness technologies on the other hand encompass all devices, applications and services that aim to improve the wellness state of the user. Fundamentally, health technologies and wellness technologies differ in that, health technologies only aim to prevent death, disease, disability, discomfort, or dissatisfaction while wellness technologies aim to support wellness in more lifestyle focused interventions such as supporting levels of socialization, physical activity levels and nutrition practices. Specifically certain wellness technologies play a pivotal role in combating loneliness. Examples of such technologies include web-based applications that easily enable video, text and voice communications for older adults who may not be as technologically literate as some of the younger members of their circle of family and friends. By engaging perhaps otherwise distant social circles, such wellness technologies attempt to decrease the users levels of social isolation. Other examples of wellness technologies include activity trackers that keep the user informed on their physical activity levels as well as their nutritional habits. A further exploration into how health and wellness technologies can be distinguished will be conducted in section 2.3.2 of this thesis.

Even though such technologies seemingly offer real life solutions to various issues older adults faces in different areas of their lives, as well as help adjust to their new life dynamics, research shows that older adults are not adopting these technologies at expected rates (Mannheim

et al., 2019). This is partially a result of the novel and emerging nature of the field but also relates back to the lack of input in the design and production process by older adults (Grigorovich et al., 2021). It has been argued that older adults are seldom receiving the kinds of technologies they need with respect to a few key factors including; simplicity of usage, technical support and feasible economic value (Grigorovich et al., 2021). This is in part due to the complexity of life situations aging individuals experience and for them to be addressed properly, a variety of factors including economical, ethical, psychological, social and physical need to be considered. In addition to this, it is important to note the input and influence that an older adult's environment may have on their adoption and usage of such technologies. Examples of such environmental influences could include their perception of their living environment and how it factors into their overall states of well-being.

A theory that has been put forth in an attempt to explain this gap in available technologies for older adults, is that currently available technologies are designed and developed according to what designers, researchers and stake holders perceive older adults will need rather than obtaining direct input from the target population themselves (Grigorovich et al., 2021). Therefore, in order to ensure the successful development and usage of such technologies, a collaborative relationship between older adults, researchers and stakeholders as well, is necessary thus highlighting the importance of research such as that undertaken in this thesis.

For the purpose of this thesis, I explored the relationship between an older adult's experience of home and wellness technologies. The interest stems from the fact that these technologies may play a key deciding factor in whether or not an older adult chooses to age in place. Further, should the option of aging at home be unattainable, the introduction of such technologies could result in a more fluid and effortless transition process to the user's new home by mirroring certain aspects

of their old home that truly stand out to them. In order for the development of such technologies to take place and ensure their success, we first must understand what factors contribute to an older adult's sense of home and how wellness technologies relate to these factors.

Research Questions & Objectives

a) The aim of my research is to develop a model of the relationship between wellness technology and experiences of home for older persons. This includes exploring how loneliness, a contributor to one's state of wellness, can influence the experience of home through technology by addressing the following research questions:

   i. Does technology influence experiences of loneliness in older adults?

   ii. How does loneliness affect an older adult's experience of home?

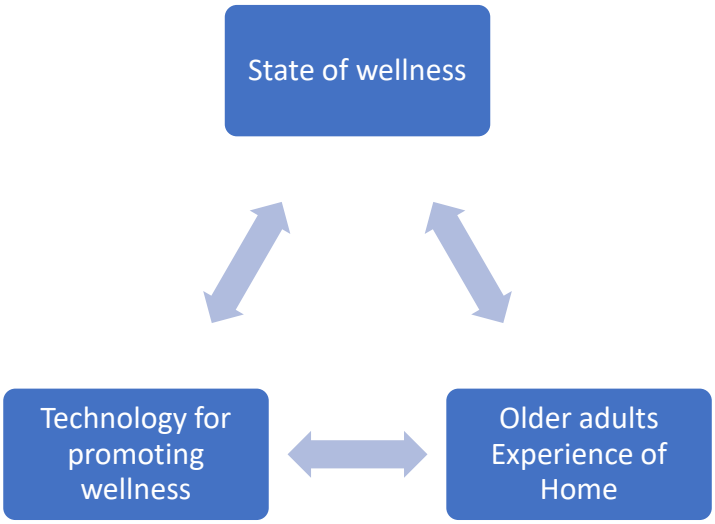


Figure 1: Relationship between wellness technologies and older adults' experience of home.

Figure 1 looks at the relationship between three factors: the older adults state of wellness, technology for promoting wellness and the older adult's experience of home. The bidirectional arrows between each box represent our exploration into the relationships that may or may not exist. For example, is each factor affecting and is affected by the other or is the relationship unidirectional? Does technology affect experience of home directly, or indirectly by influencing wellness?

Chapter 2 – Critical Literature Review

Chapter 2.1: Aging and its Associated Challenges

2.1.1 Canada's Aging Population

In 2016, Canada reached a new population milestone; for the first time in history the number of seniors (those aged 65+) exceeded that of children (those aged 0-14). These numbers only continued to rise and by 2018, the number of seniors was reported to be 6.4 million across Canada (Statisitcs Canada, 2019). The significance of these numbers lies in the fact that they represent a quadruple increase in the senior population size when compared to numbers measured only 50 years prior to. This change in the population dynamic is largely attributed to the aging of what is known as the baby boomer generation.

The baby boom is described as a period during which there was a significant and sudden rise in birth rates, the largest of which occurred between the years of 1946 and 1965 in Canada. During this time, more than 8.2 million births were recorded in Canada at an average of 4 babies per woman. The baby boom lasted for a period of almost 20 years resulting in a generation that would come to make up almost one fourth (25.6%) of the population total that we see today (Statisitcs Canada, 2019). However, the true impact of this historical baby boom may only just be witnessed as the referenced population now slowly ages into their senior years, resulting in an accelerated aging population in Canada and across the world. In fact, the population is projected to reach peak numbers at 12.3 million seniors by the year 2068.

The continual aging of this population can largely be attributed to advances in medicine, public health care and nutrition (Atella et al., 2019; Kaeberlein et al., 2015). However, a significant increase in aging adults does not directly correlate to a greater population of healthy individuals. In fact, although aging individuals are living for longer, they are also living with more chronic diseases and health conditions as a result of the functional decline that is generally

associated with aging (Atella et al., 2019; Kaeberlein et al., 2015). As noted by the Canadian Survey on Disability, seniors represent almost 40% of the population of individuals who identify as having some form of a disability be it physical, sensory, cognitive or mental health related (Canadian Survey on Disability, 2017, 2018). With aging population numbers only projected to rise, as noted earlier, we would be remiss to assume that this does not translate over to a greater population of individuals who will report having some form of disability and will need further help and support in order to cope with their changing life dynamics (Canadian Survey on Disability, 2017, 2018). One such example of support may come in the form of either privately hired or publicly funded PSWs and caregivers who generally provide care to their clients at home in an effort to prolong their independent living situations. In fact, in 2012 it was estimated that just over 2.2 million Canadians received care in the form of household work, personal care, transportation and others, in their homes. Out of those 2.2 million Canadians, 70% were identified as being older adults. If independent living is not possible and could pose a health hazard to the older adult, an alternative form of support that can be considered and utilized is the choice of housing for the older adult, more specifically the choice to move to a residential facility.

2.1.2 Residential options for older persons

The availability of choice of housing for older persons has seen significant development. Current choices include but are not limited to long-term care homes, retirement homes, independent living facilities, senior apartment complexes and senior communities amongst others (Governement of Ontario, 2021). The choice of housing is one that is often informed by a variety of factors, as previously discussed, but will often be largely influenced by the overall state of health of the individual at hand (Roy et al., 2018).

With respect to individuals who would prefer to live outside of institutionalized care facilities, either because they are still able to live largely independent lifestyles or because they have put in place certain fallbacks such as caregivers to support them in this endeavor, senior communities or senior only housing complexes may prove to be the better choice.

Senior housing complexes and communities are built with the potential needs of older persons in mind. Often the physical living space is well adapted in anticipation of any physical changes that may arise with the aging process (Tyvimaa, 2011). Examples include single floor homes such as bungalows that eliminate the need to use stairs, safety supports in the form of grab bars in the shower and bathroom to reduce the risk of falls and accidents and easy to reach work and storage stations within different areas of the home (Tyvimaa, 2011). An additional benefit of senior communities and complexes is the exposure to a population that community members are able to relate to, thereby opening up the opportunity for more social interaction and creating a sense of belonging. This may be especially prudent with individuals who have experienced the loss of a spouse, family member or friend, as they may be able to find others with similar experiences and find comfort in the support and community (Tyvimaa, 2011).

For older persons who face significant health challenges, be they physical, cognitive, or mental and require constant access to nursing and care services, a long-term care (LTC) or nursing home may present as the best option. Within the scope of services of a LTC home, individuals are able to get 24-hour access to both nursing and personal care services. Further, residents have access to a variety of health professionals who are able to assess, construct and make recommendations for individualized care plans in addition to, access to daily meals as well as other recreational activities (Governement of Ontario, 2021). In the province of Ontario, all individuals who require accommodation within a LTC home must pay out of pocket for charges such as those of room and

board. These charges can range anywhere between $1,800 - $2,700 per month. Individuals who are unable to cover the cost of a basic room are eligible for funding through the Long-Term Care Home Rate Reduction program which will subsidize up to $1,800/month for basic room and board (Governement of Ontario, 2021). Although the cost of room and board must either be paid for out of pocket or subsidized by the government through annual applications, the cost of personal and nursing care is directly funded and provided by the government. Perhaps the most significant barrier with respect to LTC homes is access. Due to the fact that a portion of the care and services provided at such homes is either paid for or subsidized by the government, the number of available spots is often limited and ensured for those who meet a certain criterion such as age, the extent of care the individual may need and the possibility of attaining such care elsewhere, namely in their homes, through publicly funded endeavors (Governement of Ontario, 2021).

Much like LTC homes, retirement homes are able to provide their residents with a wide variety of services ranging from personal health and nursing care, meal service and recreational activities. Retirement homes do not have a set of eligibility criteria with respect to who may or may not become a resident (Governement of Ontario, 2021). However, unlike LTC homes, retirement homes are entirely privately funded, and residents must pay out of pocket for all services with no possibility for government subsidies. Therefore, although physical accessibility may be improved at places such as retirement homes, financial barriers may make this an inaccessible option to a large portion of the population. At retirement homes, residents not only pay out of pocket for room and board, but they will often additionally pay for care services that are provided by the home or through private institutions (Governement of Ontario, 2021).

2.1.3 Issues for transition from independent living to institutional care

Regardless of whether or not the older adult is transitioning into a long-term care home or a retirement home, the move from an independent living environment over to institutionalized care can be quite daunting and overwhelming to the individual at hand. This transition period is often characterized by increased vulnerability on the part of the older adult, especially in situations where the choice to move was not made by the individual (Sullivan & Williams, 2017; Tracey & DeYoung, 2004). This can lead to increased resistance and an aversion to accept their new environment as home (Tracey & DeYoung, 2004).

The transition period over to institutionalized care is steeped in change. These changes encompass not only changes to the environment but changes to activities of daily living, relationship dynamics, social circles and levels of autonomy. Research has found that individuals often experience adverse outcomes on their mental health, through impacts on levels of depression, anxiety and loneliness (Sullivan & Williams, 2017). This experience can be further compounded by changes to the social circles the individual may have grown accustomed to. Once transitioned over to their new living environment, the older adult must learn how to, not only navigate away from the dynamics of the social circles they once kept but also find new and meaningful relationships with others who exist within their new environment (Cutchin et al., 2003). These types of social interactions are defined as nonfamily social involvement. However, this is not to say that previous social circles are forever discarded, but rather that they are no longer the focal point for socialization.

In addition to changes in social dynamics, a number of other factors have either a direct or indirect effect on how smoothly the transition process to a new living environment takes place (Cutchin et al., 2003). The factors include, how attached the older adult is to the community where

their new residence is located, how satisfied they are with their new accommodation and lastly whether or not the choice to move was made by them or for them (Cutchin et al., 2003).

Of the aforementioned factors, the two that play the most significant role in the transition process from independent to institutional care, and therefore acceptance of the new residence as home, are nonfamily social involvement and participation in the choice to move (Cutchin et al., 2003). The significance of nonfamily relationships lies in the broadening of an older adult's social circles. As previously discussed, often as older adults age, family members will often take on the capacity of a caregiver in some form. This may result in blurred lines in relationship roles. When older adults are able to form social circles that exist outside of family involvement, they are able to maintain clear and unblurred lines with respect to the roles that certain individuals play in their lives thereby increasing self-perceived levels of autonomy (Committee on Family Caregiving for Older Adults et al., 2016).

Research has found that social involvement helps shape the perception that an older adult has of their new residence. Once the older adult has physically transitioned into their new space, if they are unable to create and keep the kinds of social relationships they had at their previous home, they form a bigger resistance to accepting this new environment as their permanent home (Cutchin et al., 2003). A similar trend is observed with the choice to move. In situations where the older adult was not consulted in the decision-making process, they will perceive this new environment as being forced upon them rather than being chosen by them, therefore making the transition process particularly stressful and strenuous which can eventually lead to manifestations of adverse effect on both their physical and mental health (Tracey & DeYoung, 2004).

It is due in part to some of these issues that arise with the transition process that many adults are choosing to age in place. The idea of aging in place has been particularly enticing to

older adults because they believe that it allows for them to maintain some level of independence and autonomy while avoiding the extensive costs of living in a residential facility (Wiles et al., 2012). However, for aging to take place at home, the surrounding environment must be optimal. The physical environment, including the absence of obstacles and introduction of mobility aids can help enhance the independence of the older adult. Further, the presence of social supports such as links to their family and the community in addition to access to services such as health care and home maintenance, can all help enhance the process of aging in place (Wiles et al., 2012). These accommodations, however, do not guarantee satisfactory aging at home. For example, the provision of long-term home care can disrupt the intimate, co-constituted relationship between the home and sense of self that an older adult had developed (Angus et al., 2005). This is why it is so important to improve our understanding of older adults' concept of home and how it may be dismantled and reconstructed as they transition to long-term care.

Chapter 2.2: The concept of home

2.2.1: Theories of Home

The theories that surround home and its meaning have been widely researched and addressed across a number of disciplines and populations, each through their own targeted approach. One common theme that has emerged as a result of this multi-lens initiative is that there does not appear to be a clear definition as to what home represents and how it is understood across populations (Mallett, 2004). Rather than existing as one clear cut definition, the term home acts as a bucket that houses a number of complex, inter-related ideologies that at times conflict when viewed across populations (Mallett, 2004). In fact, sociologists have described home as an idea or state of mind (Hammer, 1999).

However, most ideologies can largely fall into one of the following four categories; home as sense of security, home as a site of activity, home as a place for relationships & continuity and finally home as an identify and values (Gram-Hanssen & Darby, 2018; Hammer, 1999).

Gram-Hanssen and Darby (2018) argue that when speaking of home as being as security and control, we view it as a place to which we can escape to and seek refuge. This space acts as a safe haven within which you can seek protection from the outside world, be it protection from the stressors that may be occurring within your workplace, stressors that may exist within your community due to political instability or even stressors that may exist due to familial instability. An example of this would be in the case of those who are suffering abuse at the hands of an intimate partner or family member. Victims of such abuse may not view the physical space where the violence occurs as home, regardless of this being their permanent residence, but rather will seek shelter elsewhere and thus associate that safety with home.

The idea that we view home as a site of activity implies it to be the space within which activities such as cooking, cleaning, sleeping or any other activities that are central to our day to day lives take place. When put into practice on a population such as university students who live in dorms on campus, some may associate their previous family accommodations as home, as this is where the bulk of the activities took place. To further add to this concept, the anthropologist Gullestad theorized that home is the central part of life and thus it is the place from which we depart and return to (Ewart & Luck, 2013).

With respect to home being viewed as a place for relationships and continuity, this concept suggests that we associate home with the strong connections and relationships that exist within our life (Gram-Hanssen & Darby, 2018). When leveraging the example of expats, rather than associating home with the new physical space they occupy upon moving, they would associate it

with the strong connections and relationships they possess such as those with family members, and by association connect that with a physical space known as "home".

Lastly when referring to home as an identity and values, this concept refers to the idea that we view home as an extension of our personalities and a place within which we can express ourselves (Gram-Hanssen & Darby, 2018). Thus, going back to the example of students who live in dorms, they may not view the physical space they occupy as their home simply because they are unable to truly express themselves through decorating their space.

It important to note that the study of home and its meaning is of particular interest in the field of health sciences because the loss of home, in any sense, can have catastrophic consequences for one's health and wellness (Hammer, 1999).

In conclusion, the theories that surround home and its meaning have been addressed across a number of discipline (Mallett, 2004). What has emerged as a result of such research is that a singular meaning of home does not appear to exist but that all ideologies of home can fall into one of four categories; homes as a sense of security, home being a sense of security or control, home as the site of activity, a place of relationships and continuity or as a identity and value as described by Gram – Hanssen and Darby (2018). Although Gram – Hanssen and Darby's (2018) study provided a detailed overview into the meaning of home, their study did not consider the older adult's perspective and therefor may not be an accurate reflection of an older adult's views on home. Thus, further exploration into the meaning of home for older adults is warranted.

2.2.2 Meaning of Home for Older Adults

The meaning of home for older adults in particular, is an important concept to explore and grasp for a number of reasons. As adults being to age into their senior years, certain changes to their overall physical, mental and cognitive health are to be expected, although the extent of change can greatly vary from individual to individual based on a number of factors (Kaeberlein

et al., 2015). Perhaps the most associated change with respect to the aging process is that of an individual's physical abilities and overall health status, more specifically a decrease in their physical abilities. A subsequent effect of this change is that older adults are often forced to spend more time inside of their homes, with some data even suggesting that they spend up to 80% of their time indoors (Simoni et al., 2003). Their homes and spaces become a way in which they compensate for their reduced functional capacity with some going even further by creating microenvironments within their homes where they spend the vast majority of time (Ewart & Luck, 2013). Often these spaces will include comfortable pieces of furniture such as armchairs and will be within reach of other necessities that are crucial to their daily lives in addition to a beautiful view (Ewart & Luck, 2013). These microenvironments act as the control centers of the house out of which the older adult functions. Additionally, exploration of the meaning of home for older adults has gained in significance due to the increased popularity of "aging-in-place" (Wiles et al., 2012).

As the concept of "aging-in-place" becomes a more accepted and utilized alternative to institutionalized care for those older adults who are capable of living at home in the community, it is imperative that we begin to identify and fill certain gaps in knowledge so as to not only ensure the success of such an endeavor (aging in place) but also to provide scientific data to support it (Dupuis-Blanchard et al., 2015; Wiles et al., 2012).

For the purpose of this section a summary table (Table 1), on the meaning of home, of the referenced studies has been created and will be referred to. It is important to note, that all studies were conducted across almost a decade in very different population and cultural groups, with different methodologies in place. As a result of these circumstances, the data from the research may not be generalizable and a true reflection of the older adult's experience of home across

varying cultures and populations. This is true for this thesis as well, thus the data presented in Table 1 should be used as a guide into the current themes and theories on what home means to older adults across different studies.

Table 1: Summary of Studies Looking at Older Adult's Experience of Home

Study Authors	Study Population	Meaning of Home
Ewart, I., & Luck, R. (2013)	6 people (4 individuals, 1 married couple). Aged 68-89 living in independent housing in United Kingdom	The meaning of home is not necessarily contained by the walls of house
Park, S., & Ko, Y. (2020)	10 Korean women aged 74-87 living in independent housing	Three categories representing the meaning of "my place" were emerged: keeping me safe and comfortable, representing my life, and maintaining my control and influence.
Cater, D. et al. (2021).	617 older adults with a mean age ranging from 71-81 depending on living situation (Nursing Home, Assisted Living Facility or Adult Foster Home)	The qualitative analysis revealed five distinct themes that encompassed social connection; autonomy, control, and choice; engagement with the physical environment; organizational environment; and perceptions and coping.
Wada, M., Canham, S., Battersby, L., Sixsmith, J., Woolrych, R., Fang, M., & Sixsmith, A. (2020).	35 older adults, 23 family members and 81 staff.	Physical environment features are foundational for the emergence of social and personal meanings associated with a sense of home and highlight the impact of care practices on the sense of home when the workplace becomes a home.
Gillsjö C, Schwartz-Barcott D (2011)	Three older women living outside of residential homes with one soon moving to one.	No single comprehensive and measurable definition was found. However, three major components were identified (place, relationship, and experience) and used to define home as a place to which one is attached, feels comfortable and secure and has the experience of dwelling.
Dahlin-Ivanoff S, Haak M, Fänge A, Iwarsson S. (2007)	40 older adults between the ages of 80-99 (17 men, 23 women) living in independent housing	Home means security and home means freedom. In home means security, these are: living in a familiar neighborhood, everything functions, and having memories to live on. Home means freedom comprises a place for

	reflection, a social meeting-point, and leaving your own mark.

Ewart and Luck (2013) postulate that the meaning of home does not necessarily lie within the four walls of the physical space that an older adult may occupy, but rather that home is a place you leave for activities and not a place in which just reside. They arrived at this conclusion after conducting interviews with 6 older adults of different senior age groups, martial statuses and living locations.

Throughout the interviews, the researchers used the cultural probe method, by leaving the participants with packages containing items such as postcards, a camera, maps and a series of questions. The cultural probe method is a well utilized qualitative research technique that utilizes open ended activities given to participants to learn more about their daily lives and environment. Participants in Ewart and Luck's (2013) study were each asked to answer each of the questions in the package with a series of photos that best reflected their response, using the camera. The developed photos were then utilized in a follow up interview, to set up a more structured discussion with the participants. By utilizing this technique, they hoped to draw inspirational data from their participants' lives, values and thoughts. What emerged as a result were frank conservations on what role physical restrictions associated with aging played in the participants view of their homes (Ewart & Luck, 2013).

Participants found that as their physical restrictions increased and that the more they required help, be it in the form of professional or informal caregivers, to conduct activities of daily living, the more they began to lose control over their environment. Their homes, which were once private territories, now turned into working places and environments (Angus et al., 2005). As a result of this change and loss of control, the physical and symbolic aspects they once associated to

home, began to lose their meaning thus causing a shift away from seeing their homes as a reflection of their identities, and away from the need to maintain the interior of their homes to some personal standard (Ewart & Luck, 2013). Home simply had lost the significance of being a personal statement and instead home became a place wherein the older adult could plan out and envision doing activities outside of. Examples of such activities may include planning out a trip to the local market or to visit family. The meaning of home was not simply contained within the four walls of the house. This dispensed with the old assumption that, since older adults have spent extended periods of time within their homes, the importance of their home only increased with age. Instead, what emerged was that when the boundaries of home do not feel homely anymore, older adults seek this feeling by viewing their home as a place to which they can leave and return (Angus et al., 2005; Ewart & Luck, 2013)

In the study by Ewart and Luck (2013), all participants were of British heritage and had spent their lives living in the United Kingdom (Ewart & Luck, 2013). The results may not be generalizable, comparable and applicable across other population groups. In fact, Park & Ko's (2020) article that explored the meaning of home amongst elderly Koreans showed distinctly different perspectives with respect to what home represented to their study population.

These researchers interviewed 10 Korean women, all of whom were 70 years or older, widowed and had lived in their community for more than three decades. The overarching theme that emerged out of interviews with the participants was that home to them, was a place in which they felt present. This could be further broken down into three categories which play into the overall theme; home as a place within which the participants feel safe and comfortable, home as a place which represents their lives and finally home as a place in which they are able to maintain control and influence (Park & Ko, 2020).

Many participants of Park and Ko's (2020) study highlighted their mistrust of care facilities and the various stories of older adults they have heard about, pass away due to an accident at such facilities. This fits into the theme of home being described as a place in which participants felt safe and comfortable. However, what was most poignant was their highlighting of the levels of control they felt they would be losing should they have to move to such a facility, even at a basic level such as the choice of food they would prefer on a day-to-day basis (Park & Ko, 2020). They viewed their homes as places within which they are able to maintain full control over the lives without needing to compromise for the sake of others.

Further, in contrast to Ewart's and Luck's (2013) study, the participants of Park and Ko's (2020) study, did view their physical space as a symbolic reflection of their lives and a way in which they were able to define their identities, while Ewart and Luck specifically highlighted how home as an extension of people's personalities had lost its meaning. In fact, the participants in Park and Ko's (2020) study noted that their homes actually had deeper meaning to them as in Korean culture they often believe that the home itself has a spirit, Jib-Tur, which they must be compatible with as it brings them luck to all other avenues of life (Park & Ko, 2020). So rather than just representing an extended part of their lives, the participants of this particular study saw their houses as spirits rather than just built structures.

Lastly, participants further discussed what influence the community they lived in had over their feelings of home. As a result of their long tenure, the participants built strong ties and relationships with their neighbors. They stressed the idea of the intimacy of the relationships they had formed and how much they valued their social sessions during which they host one another with tea, coffee and fruits. Further, leading productive lives by working in their own homes, paddies and fields also affects the participants influence over the own homes and thus their feelings

of home. By being productive the participants feel as though they contribute to the overall state of upkeep of their homes and take great pride in doing so. Many participants also highlighted the importance that owning their own homes had, as it played into their feelings of safety and security.

Lastly, their homes represent a way in which they would be able to preserve their roles of being parents by creating a space in which their children could come visit them, under their own control rather than hours dictated by administrative officials such is the case in institutionalized care settings (Park & Ko, 2020) .

Similar to the findings of Park and Ko's (2020) research, Dahlin-Ivanoff et al. (2007) found that home largely represented a sense of security and freedom to their participants. Dahlin-Ivanoff et al. (2007) identified potential study participants using data from the Swedish ENABLE-AGE Survey study. Overall, 40 participants were identified, with a median age of 85 years; 17 were women and 23 were men (Dahlin-Ivanoff et al., 2007). Similar to Park and Ko's (2020) study, none of the participants lived in assisted living facilities and all lived in ordinary housing, with a majority living in apartments and a few in single family homes (Park & Ko, 2020). The participants were interviewed by 1 of 4 experienced occupational therapists on the research team. The authors found that two key themes emerged as a result of their interviews: home mean security and home means freedom. When discussing home through the lens of security, participants often noted a feeling of being "within one's own four walls" (Dahlin-Ivanoff et al., 2007). This being very different to the participants of Ewart and Luck's (2013) study who actively sought out activities outside of their homes (Ewart & Luck, 2013). Specifically highlighted was the importance of living in a familiar neighbourhood, with someone close by should a need for help arise. Participants also highlighted the importance of everything functioning, with their surroundings being adapted and planned for according to their own needs. Examples of such features include, functioning elevators

to compensate for lack of physical mobility (Dahlin-Ivanoff et al., 2007). Lastly under the theme of home meaning security, participants highlighted the importance of memories be they of a past life, things they have inherited or saved through the years as well as photos on display that take them back to times in their lives (Dahlin-Ivanoff et al., 2007).

With respect to home being viewed as freedom, participants specifically highlighted the ability to come and go as they pleased in addition to being able to do a variety of things such as clean and cook in their own way and time (Dahlin-Ivanoff et al., 2007). This is a similar pattern to what Park and Ko's (2020) participants highlighted wherein they cited when they cited the fear of losing control over things that they are able to do in their own space versus if they were made to move to an assisted living facility. An additional similarity in pattern with respect to Park and Ko's (2020) study was that participants of Dahlin-Ivanoff et al. (2007) study citied the importance of home being a place for reflection for them (Dahlin-Ivanoff et al., 2007; Park & Ko, 2020). Participants highlighted how home represented a place where they could have freedom to withdrawn from the outside world and have peace and quiet. Additionally, under the theme of home meaning freedom, they highlighted how home was a meeting place for them, a permanent structure to which they could always come back to and receive family in (Dahlin-Ivanoff et al., 2007). This too is similar in pattern to what Park and Ko's (2020) participants cited. Lastly, participants highlighted home as being a place in which they could leave their own mark on, one that is to their taste. This is in contrast to the participants of Ewart and Luck's (2013) study where they cited that home had simply lost the significance of being viewed as a personal statement (Dahlin-Ivanoff et al., 2007; Ewart & Luck, 2013; Park & Ko, 2020).

While all previously mentioned studies took place with participants who lived outside of residential and assisted living facilities, Cater et al. (2021) conducted their study with older adults

across different residential facilities including, assisted living, nursing home as well as adult foster homes in Oregon (Cater et al., 2021). Researchers conducted structured interviews with 632 older adults. Participants were selected using a stratified random sampling process. Participants were asked about the person-centered care practices as well as characteristics related to their person. Lastly, they were asked an open-ended question with respect to the importance of home to them; 15 participants chose either not to answer the open-ended question or provided ones that were not interpretable by the team and thus were excluded from the study (Cater et al., 2021). The qualitative analysis revealed five distinct themes including, social connection, autonomy, control and choice, engagement with the physical environment, organizational environment and lastly perceptions and coping (Cater et al., 2021).

Social connectedness in particular was highlighted as the most frequent contributor of at-homeness with participants pointing out that the presence of family members or pets who help contribute to them feeling at home (Cater et al., 2021). However, in the absence of the aforementioned, a relationship with the staff and other residents helped contribute to the feeling of home at their residential setting. Although the home setting is vastly different from the previously mentioned studies, it is important to highlight that social connection seems that be a theme across all populations with respect to older adults' feeling "at home" (Cater et al., 2021).

Similarly, to the residents' reference with respect to social connections and how this relates back to previously mentioned pieces of literature; autonomy, control and choice were other factors that largely contributed to residents feeling at home in their long-term care settings. Namely, residents emphasized that they felt most at home when they had the freedom to do whatever they wanted in their own time (Cater et al., 2021). This included moving around the LTC setting, ability to control when they socialized as well as helping staff maintain their LTC by performing tasks

such as sweeping or wiping the table. This too is a pattern seen amongst older adults who are in independent living situations wherein they cite the importance of having control over their environment such as the participants of Park and Ko's (2020) study who specifically pointed out the importance of being able to maintain their homes and communities through chores (Cater et al., 2021; Park & Ko, 2020).

Further highlighted was the ability to personalize their private spaces. Specifically, participants mentioned the importance of having their possessions within their living space. Examples of such possessions included pictures, collections, furniture, hobbies and activities and objects with sentimental meaning (Cater et al., 2021). Additionally, having access to private rooms or portions of a garden helped contribute to feeling at home for the participants. Lastly, participants highlighted how meaningful support from staff helped ease them into feelings of at homeness as well as a variety choice in desired food and food choices (Cater et al., 2021). This too is a theme similar to one mentioned amongst the participants of Park and Ko's (2020) who highlighted that one of the fears they faced about moving to a LTC setting was the lack of control they would have with respect to their food choices (Park & Ko, 2020).

Similar to Cater et al. (2021), Wada et al. (2020) conducted their study with older adult living in long term care facilities, however the authors of this study wanted to examine what effects relocation of LTC's had on an older adult's perception of home (Wada et al., 2020). The authors of the study conducted 210 semi-structured interviews with 139 participants at 5 different time points over a two-year period. This approach was undertaken in order to gain understanding with respect to how residents, their family members and staff members perceived home in LTC settings and how these perceptions were affected by relocation to a new LTC home (Wada et al., 2020). What emerged as a result of this study were four themes that seemingly contributed to enhancing

the sense of home for older adults. These themes included, physical environmental features, privacy and personalisation, autonomy, choice and flexibility and lastly connectedness and togetherness. Similar to the previously discussed pieces of literature, privacy and personalisation, autonomy, choice and flexibility and lastly connectedness and togetherness seem to be prominent themes with respect to perceptions of home for older adults (Wada et al., 2020).

The participants of Wada et al.'s (2020) study emphasized the importance of having private and personal spaces such as private bedrooms and being able to decorate them with their own personal furniture, artwork and pictures, as this not only gave the older adult a sense of comfort and familiarity but also a sense of ownership of the space which they occupied (Wada et al., 2020).

Further, with respect to autonomy, choice and flexibility, the authors found that participants frequently identified autonomy as an important factor in feelings of homeness, with many highlighting the importance of food choices such as the participants of Park and Ko's (2020) study as well as the study by Cater et al. (2021). Additionally highlighted was the autonomy of choice to do certain activities such as accessing different floors independently, with no staff supervision did not contribute to them feeling at home at the LTC. However, many pointed out that the ability to dictate their own schedules with respect to matters such as choice of dining table and general flexibility with the eating schedule positively influenced the participants feelings of home (Wada et al., 2020).

Lastly, the access and ability to have common areas in which the participants could congregate helped embrace feelings of social connectedness and positively contributed to the overall feelings of home. However, what was highlighted was that the current spaces only allowed for small group settings and thus a desire for a larger space in which bigger groups of residents could congregate was expressed.

One theme that emerged as a result of the study that is fairly different to the rest of the literature is that of physical environment features (Wada et al., 2020). Participants brought up the importance of size of the LTC homes, in that the bigger bedrooms and more expansive layout of their new homes post move helped positively contribute to feelings of homeness. Further highlighted was the general feeling of their new environment with many alluding to the fact that it did not feel institutional as they had access to big windows and patios with lots of natural light streaming in, thus giving them access to protected outdoor environment (Wada et al., 2020). Additional features that helped positively contribute to the participants feeling of home included amenities such as television lounges, fireplaces, kitchens, patios and artificial plants, although some expressed a desire for real ones. Overall, what the study found was that features of the physical environment can act as building blocks for building more social and personal meaning associated with the sense of home (Wada et al., 2020).

Lastly Gillsjö and Schwartz-Barcott (2011) conducted a literature review on the concept of home for older adults in conjunction with semi-structured interviews with three older women, 2 of whom lived independent of residential home settings and one who had recently moved to one (Gillsjö & Schwartz-Barcott, 2011). The study found that no single comprehensive and measure definition of home was found. However, through the discussions of the concept of home, three major contributing themes were identified, place, relationship and experience (Gillsjö & Schwartz-Barcott, 2011).

Although the presentation of data from all studies may seem paradoxical in certain aspects, common themes have emerged. First, as was saw during the discussion on theories of home, there is not one set definition as to what home means to older adults. In fact, extensive variability is seen across cultures.

What this does inform us on though is that for all future research with respect to the meaning of home for older adults, it will be important to highlight and address any and all cultural difference that may impact the data. However, the main common theme that has emerged from all papers is the valuing of control of the space and autonomy that all sets of participants occupy. Often participants from the studies mentioned how much they value their own space and independence. In the case of Ewart and Luck's (2013) participants, they understood that in order to maintain the current homes and independent living statuses that would mean giving up some privacy for the sake of a caregiver, formal or otherwise, to come in and help them out. However, at what cost would this be to their overall state of health. With respect to Park and Ko's (2020) participants, they emphasized that they were spiritually connected to their homes but that they experienced anxiety and resistance to the thought of moving into an institutionalized care home.

Further, all of the studies reviewed in this section, although perhaps not intentionally, made mention of the impact that home or the feeling of home could have on the overall health and wellness state of the older adult through reference on the impact that social connectedness can have. Ewart's participants highlighted the importance of remaining social by planning out trips into the community while Park & Ko's (2020) participants discussed the strong connections they felt to their neighbors and community members. Cater et al. (2021) specifically pointed to social connection as the single most important contributing factor to feelings of homeness amongst their participants, while Wada et al. (2020)'s study participants at several points spoke on the contribution that social connections had on their feelings of homeness.

In summary, social connection and loneliness can have an impact on the overall state of wellness of older adults and according to the studies referenced in Table 1, social connection seems to be one of the most prominent themes with respect to the meaning of home for older adults. More

specifically, social connection had a positive impact on the feeling of home for older adults. Therefore, one could assume that a more positive relationship with home would result in an improved state of wellness of an older adult.

In order to fully understand the impact that home can have on the state of wellness of an older adult, an exploration into the concepts and roles of health and wellness is necessary.

2 .2.2.1 Roles for the Concepts of Health and Wellness

The concept of health, to those outside the realms of health research and education, is often viewed through the lens of the absence of disease (Edlin & Eric, 2019). However, such a narrow definition does not leave much room for exploration and research. As a result, both researchers and educators alike worked to develop alternative models of health through which further exploration of certain concepts, models and relationships would be enabled. The two models of health that emerged are known as the medical model of health and the wellness model of health (Edlin & Eric, 2019).

Through the lens of the medical model of health, one views health as the absence of death, disease, disability, discomfort or dissatisfaction. This model is largely interpreted through the biological malfunctioning of cells, organs and other biological systems in order to explain present health ailments. However, a downfall of the medical model is that it does not consider certain social factors such as food and housing insecurity, gender and religion as having an effect on the overall state of health of an individual or in fact being a part of the solution (Edlin & Eric, 2019). This need for a more holistic approach to health has led to the development of the wellness model of health.

The World Health Organization (WHO) defines health as a "state of complete physical, mental and social well-being and not merely the absence of disease and infirmity". Through this more expansive model we can interpret that an individual's state of health is not just affected by

certain biological infringements but rather can be largely affected by various social factors such as the relationships an individual entertains or the job security they possess (Edlin & Eric, 2019).

The wellness model of health is largely driven and impacted by 6 interrelated dimension that will be briefly discussed; emotional wellness, intellectual wellness, spiritual wellness, occupational wellness, social wellness and lastly physical wellness. It is important to note that the term wellness is often confused with well-being when clear distinctions exist between the two. Holdsworth (2019) distinguishes wellness and well-being by outlining wellness as the freedom from illness in addition to a lifestyle of prevention. Holdsworth further distinguishes wellness from well-being by stating that, although wellbeing is also wellness, it also includes happiness which is not explicitly referenced in wellness. To narrow it down simply, wellness refers to an individual living well while well-being refers to an individual living well and enjoying happiness (Holdsworth, 2019).

Emotional wellness refers to an individuals' ability to process emotions in addition to being able to cope with issues that arise with everyday life while being able to manage different stressors. Intellectual wellness refers to an individual's open mindedness to new ideas and concepts. Spiritual wellness addresses the state of balance an individual is able to achieve with themselves and others around them (Edlin & Eric, 2019). Occupational wellness leverages the idea of an individual being able to enjoy what they do for a living while contributing to society and lastly social wellness refers to an individual being able to perform social activities comfortably without harming others while physical wellness refers to the health of an individual's physical being which is promoted through certain lifestyle approaches such as clean eating, regular exercise in addition to the ability to make informed and responsible decisions about one's own health (Edlin & Eric, 2019). It is the

dynamic contribution of each of these dimensions that helps to shape an individual's overall state of health wellness or well-being.

It is important to acknowledge that with respect to factors that may influence a person's state of wellness, there is significant variability across the lifespan. To elaborate on this concept, we will consider the comparison of the state of wellness of a young adult compared to that of an older adult as a case study. The young adults' state of wellness is more likely to be influenced by factors that affect their emotional and intellectual wellness. It is during this time that individuals experience significant growth and attempt to forge their own paths in life (Lansford, 2018). When we compare this individual to an older adult, we can appreciate that the difference in their life situations may result in an impact on their wellness from a different angle. Perhaps, the older adult's state of wellness is more influenced by factors that related to their physical wellness due to the presence of chronic health conditions. That is not to say that when comparing the young adult to the older adult, that they will not experience similar levels of wellness, but rather to emphasize that their states of wellness are influenced by different factors (Lansford, 2018).

For the purpose of this thesis, I am concerned with factors that influence the state of wellness of an older adult. In their paper, Creaney et al. (2021) highlight the different perspectives through which wellness can be approached but conclude that relational wellness may be of critical importance with respect to older adults. Relational wellness focuses on the relationships and connections an individual possesses to people and other material things as well as their interactions.

Specifically highlighted in Creaney et al.'s (2021) text is the contribution of the school of thought of three different researchers and their approach to relational wellness. Although each researcher approached the concept of relational wellness from their own unique perspective, all

highlighted a few key factors that are imperative stepping stones on the path to relational wellness promotion, especially as we age. These factors include autonomy over one's decisions and surroundings, empowerment, a positive mood and overall life satisfaction. Specifically highlighted was the importance of autonomy (Creaney et al., 2021).

Autonomy refers to the right or power of self-government an individual may possess. As we begin to age, our ability to maintain autonomy over life decisions, both big and small, may begin to waiver (Moilanen et al., 2021). This is largely a result of the belief that older adults no longer possess the cognitive capabilities to make said decisions. As a result, often the children or other family members of the older adult, who may also serve as the informal caregiver, will be entrusted with the role of chief decision maker. Current literature largely suggests that even in situations of diminished autonomy, older adults are consulted and made part of the decision-making process (Horowitz et al., 1991). However, one would be remiss to believe that conflicts or difference of opinions will never arise. When such situations do occur, they will often result in conflict within the family ties, which in turn can negatively impact not only the of the older adult, but their caregiver as well (Horowitz et al., 1991). Further, as was previously discussed in section (2.1.3), autonomy can play a big role in the transition process from independent to institutionalized care in older adults; was the decision made for the older adult or by the adult? By including the older adult in the decision-making process, we may relieve the stressors they may experience in various transition processes in their lives (Tracey & DeYoung, 2004). The concept of autonomy is further played into through empowerment.

Empowerment refers to the granting of power, right or authority to an individual to perform a series of acts or duties. Specifically, amongst older adults, according to Francescato et al. (2017), empowerment may be achieved by promoting the autonomy of the older adult at hand. Through

enabling the decision-making process of the older adult, we are able to promote their confidence levels and thus their levels of empowerment. However, it is important to note that simply improving levels of autonomy and empowerment that are present in an older adult's life may not have significant effects on their well-being. In fact, it is the dynamic relationships between the two aforementioned factors and the older adults overall outlook on life (positive attituded, levels of functioning and life satisfaction) that will have a true impact on their overall wellbeing (Creaney et al., 2021). One variable that plays a significant role in a person's overall life satisfaction, is the social relationships they engage with in their lives or in some situations the lack thereof (Umberson & Karas Montez, 2010).

Social isolation refers to the absence of significant social relationships in one's life. Studies have overwhelmingly found that a lack of social ties and relationships creates a vulnerability within the individual that makes them more susceptible to a variety of adverse physical health effects but also increases their risk of mortality (Cacioppo et al., 2014). Aging individuals are no exception to this pattern and in fact may perhaps be more at risk due to a variety of factors such as steady decline of available monetary funds, illness and the loss of a spouse and friends to name a few (Ong et al., 2016). Social isolation has been found to affect aging individuals in the following ways; increases to the risk of developing anxiety and depression disorders, reduced physical activity, greater susceptibility to chronic diseases such as hypertension and stroke as well as impaired cognition and progression of dementia if present (Cacioppo et al., 2014).

It is important to differentiate social isolation and loneliness. Loneliness is defined as an objective state of lacking affection or closeness that is otherwise desired (Ong et al., 2016). Therefore saying, that a person may be socially isolated but not otherwise lonely if they are not craving those connections. Much like social isolation, loneliness has been linked to adverse health

effects such as a lack of physical activity and engagement in risky practices such as excessive drinking and smoking as well as susceptibility to a variety of adverse health conditions (Ong et al., 2016). Further, loneliness has been correlated with having an over-all negative impact on the wellness of individuals in the form of decreased satisfaction with one's life, and increase prevalence of depressive symptoms in addition to others (Fang et al., 2018; Windle & Woods, 2004).

In conclusion, the wellness model of health was developed by researchers and educators alike in order to expand the criteria of factors that may influence an individual's health. With respect to older adult's and their states of wellness in particular, some of the factors that can have a highly influential effect are the levels of autonomy the older adult possess on decisions that pertain to their lives and their levels of social isolation, and by relation loneliness. Therefore further investigation into how both could be supported may result in an overall positive effect on the state of wellness of an older adult.

Chapter 2.3: Technology to Support Healthy Aging

2.3.1 Review of Available Technologies

Assistive technologies devices are usually defined as "any piece of equipment or product system, whether acquired commercially modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities." (Klimova et al., 2018). Such technologies can range anywhere from very simple devices such as walking canes to more complex and sophisticated devices such as fall detectors and activity monitors. The current stock of technologies can be further categorized into one of 4 types of technologies based off of their purpose of usage; devices of daily living, safety devices, telecare devices and devices to support engagement, social participation and leisure (Klimova et al., 2018).

Devices of daily living constitute pieces of technology that help older adults with their memory, orientation and any communication difficulties (Klimova et al., 2018). Examples of such devices include simplified remote controls and radios, alerts and alarms such as a stove-top boil alert (Gibson et al., 2016). Other examples include orientation devices that alert caregivers of the whereabouts of their loved ones or clients (Klimova et al., 2018).

Safety devices are pieces of technology that have been developed to help enable older adults to live as independently for as long as safely possible. The implementation of such technology into an individual's life brings relief not only to the individuals themselves, but their family and loved ones as well, as they can help reduce any worries they might have. Examples of safety devices include automatic lights as well as ON/OFF switches for devices such as a gas stove and water isolation devices to prevent flooding (Klimova et al., 2018). Other examples of such devices include tracking and location monitoring devices that enable caregivers/family to locate individuals in the case that they wander off and get lost (Gibson et al., 2016; Klimova et al., 2018)

Telecare devices or systems that allow for remote monitoring of older adults within their own homes. These devices usually consist of a community alarm which is triggered by additional movements, pressure, or magnetic sensors. When the alarm goes off, the individual is connected via phone or internet to a caregiver or a call center. In the case that the individual cannot be reached by either the caregiver or call center, an additional alarm would sound off alerting family and emergency services. Fall detectors also fit under this category, as they too sound off an alarm if any sudden changes in orientation or motion occur (Gibson et al., 2016).

Lastly are those devices that support social connectedness, engagement, social participation, and leisure. Although these devices may directly be attempting to influence the aforementioned factors, they may have downstream effects on other aspects of an individual's life.

As previously discussed in section 2.2.2.1 of this thesis, an individual's states of wellness is highly influenced by a number of factors including but limited to their levels of social wellness. Therefore, one can extrapolate that should a device support social connectedness it may have downstream effects on their overall state of wellness (Edlin & Eric, 2019). However, there is limited research evidence on the effectiveness of such devices in promoting social connectedness as a multitude of systematic reviews cite the fact that currently such technologies exist far and few between. Although the largely unchallenged assumption is that technology can be used to target social connectedness specifically, rather than loneliness, the assumption is that an increase in social connectedness will have an indirect correlation on levels of loneliness one may experience (Gibson et al., 2016; Klimova et al., 2018). Moreover, conceptual frameworks for describing the relationships among technology, social isolation, loneliness, health and well-being have not been well-articulated and investigated, thereby creating a gap in research (Gibson et al., 2016; Klimova et al., 2018).

2.3.2 Can we Distinguish Technologies for Health Versus Wellness?

Even though we are able to classify most assistive technologies into one of four categories, it is important to explore and determine whether or not we are able to distinguish technologies that are developed solely for the purpose of supporting health versus ones that are developed to support wellness. As previously discussed, although at first glance the concept health and wellness may seem to be one in the same, fundamental differences exist between the two. Wherein the concept of health looks at the absence of disease or disability, the wellness refers to the freedom from illness in addition to a lifestyle of prevention (Holdsworth, 2019). It is because of this fundamental difference, that we can infer that the development and basis of technologies used to support either concept will be different.

Technologies that have been developed with the primary purpose of decreasing an individual's susceptibility to death, disease, disability, discomfort, or dissatisfaction are referred to as medical technologies. As previously discussed some examples of such technologies may include closed loop insulin pumps (Jutai et al., 2009).

With respect to technologies that have been developed to help individuals perform activities through self-support and support from others examples of such technologies may include walking aids such as walking canes, walking sticks or walkers and are commonly referred to as assistive technologies (Jutai et al., 2009; Klimova et al., 2018). Although such technologies may have unintentional effects on other social factors that affect health, such as one's ability to socialize, they are not developed for said purpose.

Although currently a definition for wellness technologies does not exist, one can extrapolate that these technologies are created to help support lifestyle factors in prevention of illness (Holdsworth, 2019). Such factors may include how their nutrition habits are influenced, as well as their activity levels as well as interventions with the aim of supporting a persons' social interactions (Kari et al., 2017). Examples of such technologies may range anywhere from activity trackers that help promote an active lifestyle and keep their users informed on their overall physical health, ICTs that help connect the user with others in their networks as well as technologies that inform users on keeping healthier habits such as reminders to drink water or to get up and move your body if they sense a long period of immobility (Fang et al., 2018). Additionally a recent development in the field of wellness technologies has been in that of healthcare smart homes (Creaney et al., 2021). According to Creaney et al. (2021) healthcare smart homes refer to any homes that have been digitalized with systems such as fall alarms, remote GPS trackers and heart rate monitors to name a few with the aim of promoting independence and wellbeing of the users.

What the authors found was that a users sense of wellbeing is enhanced by ensuring their sense of home but that healthcare smart homes can be development of such technologies can be further enhanced and benefit from focusing on the input of individual residents and their caring network (Creaney et al., 2021).

With respect to distinguishing technologies that have been developed for the purpose of supporting health versus those developed for the purpose of supporting wellness, a clear distinction can be made between the two. Whereas health technologies have been developed namely for the purpose of prevention of disease and death, wellness technologies are developed with the purpose of enhancing the wellness state of their users. Although a clear definition for such technologies has not been developed it is important to note that some common theme amongst wellness technologies do exist, namely in that such technologies aim to influence their users levels of nutrition, environment, mental health and physical activity levels (Grinter et al., 2010). Branching off the aforementioned, the 4 highlighted areas may all have an influence in individual's experience and interpretation of the meaning of home (Grinter et al., 2010)

2.3.3 Technologies and the meaning of home

The fast-paced world of technology development has seen significant advances in all fields over last decade or so, but none more impressive than technologies geared at improving a user's experience of home.

Known as the field of home automation, scientists within this field attempt to create technologies that will create seamless connection between all devices in a person's home. By implementing such features into ones' life, users would be able to control virtually all technologies in their home through one central hub (Khedekar et al., 2017). Technologies within this field range from simple inexpensive solutions such as automatic and timed ON/OFF features for lighting to more expensive ones such as state of the art security cameras. Other examples of such technologies

may include voice-controlled speaker devices such as the Amazon Echo Bluetooth speaker that is powered by the automated person, Alexa, high tech baby monitors such as the Nanit pro, surveillance doorbell systems and smart wall plugs such as the ConnectSense Smart outlet, to name a few. All of these technologies have been developed with the purpose of simplifying and enhancing the user's experience of home. However, seldom have these technologies take into account the input of one predominant population group, older adults and even less research has been conducted to see how such technologies in addition to wellness technologies can influence the older adult's meaning of home (Ghorayeb et al., 2021).

As previously discussed, the state of wellness of an individual, although highly variable, shares common influences such as, the physical health that an individual possesses, the mental health of the individual, which in turn is highly influenced by their social interactions, and the environment in which the individual resides, such as their home (Creaney et al., 2021). With respect to older adults, specifically, their levels of wellness are further influenced by additional factors such as their levels of autonomy and empowerment, as well as their overall outlook and attitude towards life. As was previously discussed in section 2.2.2 (Meaning of Home for Older Adults), often it is within their homes that older adults perceive to possess the highest levels of autonomy and the thought of moving to institutionalized care can results in feelings of anxiety, partially due to the loss of autonomy they believe they will experience as well as the change to the community they are currently members of (Park & Ko, 2020).

In an attempt to curb these anxiety ridden transition periods and to encourage aging in place, researchers have begun developing wellness technologies that will support an older adult within their own homes. However, the current stock of technologies has been developed with little input from the population they are geared at influencing (Grigorovich et al., 2021).

For example, Milligan et al. (2011) discussed the integration of telecare, a wellness technology, into the lives of older adults. What they discovered was that we have a poor understanding of the needs and desires of older adults, with respect to technology, and an even poorer understanding how effectively these technologies are being used at home. The authors believe that the development of these technologies is a result of the 'technology push' rather than a result of engaging with the needs and experiences of older adults (Milligan et al., 2011; Mort et al., 2015). However, the authors bring up an important point in stating that if correctly developed technology such as telecare devices can be utilized by carers and family members alike to change the landscape of care away from institutions and community based arrangements to more extitutional ones such as the homes of the older adults. This can be done by not only monitoring the health of the users but by also providing them with access to the kind of care they need in order to live more independent lives. And as previously discussed, it is this ability to exert more independence and autonomy over their own lives in addition to avoiding social isolation that can truly ensure the success of ageing at home for older adults. (Milligan et al., 2011).

Further, the success of these technologies will be highly influenced by how they fit into the lifestyle, from factors such as ease of usage and accessibility to the implementation of such technologies in the older adult's home. In order for such wellness technologies to succeed we must first address and understand what influences an older adult's meaning of home and how technology may related to the meaning of home, specifically amongst older adults who have made the transition from community living to assisted living and long term care. Therefore, this calls into action and highlights the importance of research conducted within the scope of this thesis.

Chapter 3 – Research Methods & Design

My study used a mixed methods research design with a purposive sample of research participants. The study had three phases. In the first phase, the participant was interviewed in their homes to collect demographic and background information, engage in a Go-along interview, complete several short questionnaires, and receive an orientation and instructions on how to use the WellAssist™ software application. In the second phase, the participant had possession and was encouraged to use the application, as instructed. No data were collected in this phase. In the third and final phase, the participant was interviewed at the end of the 3-month trial period. The participant was asked about changes in the health since the first interview and their experience using the application. They did another Go-along interview and completed several short questionnaires.

The participants in this study were recruited through an ongoing project at Perley Health in Ottawa directed by my supervisor, Dr. Jeffrey Jutai. Perley Health operates a Senior's village with 450 long-term care beds and 139 apartments for older adults. Perley Health assisted in the recruitment of participants who were living in the independent and assisted-living apartments by publicizing a flyer in the Centre's newsletter for residents.

To be included in the study, participants had to be 65 years of age or older, able to communicate in English, and deemed capable by Perley Health of participating in an interview.

The study was advertised in the resident's newsletter, encouraging all who were interested in participating to contact the Director of Centre of Excellence and Research Operations at Perley Health. The eligibility of a resident to participate in the study was confirmed in a telephone call.

Participants were scheduled for two, 2-hour interviews that were three months apart. All interviews were audio-recorded. Prior to each interview, I was tested for COVID-19 to ensure the safety of the participant. Further, prior to the interview commencing, informed consent was obtained from each participant (Appendix 3). Each statement of the consent form was read a loud by the participants and they were asked to repeat if they understood the meaning. As each statement was read aloud participants either circled 'Yes' or 'No'. If at any point a participant circled 'No' for one of the statements found the in the informed consent form, the interview would not have proceeded.

Chapter 3.1 First Interview

During their first interviews, all participants were asked demographic information including their age, gender, occupation, and marital status (Appendix 7). In addition to their demographic information, information regarding their receiving of home care services as well as touch points with their family doctor and recent visits to the hospital was collected.

Semi-structured 'go-along' interviews that lasted approximately 30 minutes each were conducted (see script in the Appendix 7). These interviews were designed to provide a more conversational aspect to them, thus making them less structured than traditional qualitative research interviews, and more suitable for older persons with mild cognitive difficulties. Unlike a traditional, sit-down interview, a 'go-along' interview does not separate participants from their routine experiences and practices in the participants' contexts, which helps us to understand how 'home' is interpreted and further how it relates to the subjects' well-being. Further, go-along interviews have been described by researchers as an effective means of balancing the power

dynamic that may exist between a researcher and a study participant and thus encouraging a more collaborative approach between all parties (Garcia et al., 2012).

Conversations with participants were audio recorded and were focused on what was currently happening in the participant's home environment in the moment. During the 'Go-Along' portion of the interview process, participants walked me around their homes and discussed the level of importance of their possessions as well as sharing further insight into the organization of their homes and lives. It should be noted that 2 of the studies' participants lived in the assisted living wing of Perley Health. These apartments are usually much smaller than those of residents who living outside of the assisted wing. If participants were unsure what to discuss, they were prompted through cues, such as asking them about the importance of certain furniture pieces, photos, and other inanimate objects. Often this would spark a conversation and participants would share stories behind their possessions.

Immediately following the 'Go-Along' interview, participants completed a series of questionnaires, whose aim was to examine their life experiences with technologies as well as assess their levels' of loneliness. The questionnaires were the UCLA Loneliness Scale and the Attitudes Towards Technology Questionnaire (ATTQ; Hughes et al., 2004) (see Appendix 6). The UCLA Loneliness Scale is a well utilized research tool that engages the cognitive discrepancy theory of loneliness. This theory postulates that loneliness occurs when a gap exists between the quantity and quality of connections we have and want (Hughes et al., 2004). Developed in the 1970's and again revised in the 1990's, the scale draws inspiration from 2 older scales. A combination of 25 questions were selected from the scales and tested amongst 39 students. After testing the tool was further refined to 20 items which aimed to measure both loneliness and social isolation. However,

one of the limitations of the original scale is that it was developed in attempt to measure levels of loneliness and social isolation of students living in the United States (Hughes et al., 2004; Liu et al., 2020). Thus, it may not have been necessarily suitable for alternative populations such as that of older adults. As a result of this criticism, the scale was shortened in 2004 and tested on, over 2000 older adults. The amended version was found to be a reliable and valid measure of loneliness in older adults (Hughes et al., 2004; Liu et al., 2020). The 3-item scale measures three dimensions of loneliness; relational connectedness, social connectedness, and self-perceived isolation. The three items are scored as Hardly Ever (1), Some of the Time (2) or Often (3). The score of each item are in turn summed up to give a possible range from 3-9. Individuals who score an average of 3-5 are considered as "not lonely" and not those who score 6-9 are considered as "lonely" (Hughes et al., 2004; Liu et al., 2020).

The Attitudes Toward Technology Scale (Anderberg et al., 2019) is a 6-item purpose-built questionnaire that aims to examine the attitudes older adults have towards new digital technologies. The questionnaire is structured in a 5-point Likert type fashion wherein participants were asked question such as "I think it's fun with new technological gadgets" and answered on a scale of 1-5 with 1 representing fully disagree, 3 neither agree nor disagree and 5 being fully agree (Anderberg et al., 2019). In order to obtain the total score, the sum of all 6-items is obtained. Higher scores amongst participants indicate higher levels of technonophilia. Cronbach alpha coefficient was calculated to measure internal consistency and provided favourable results (Anderberg et al., 2019).

Chapter 3.1.1 WellAssist™ Software Application

Once both portions of the first interview were completed participants were introduced to the technology, Well Assist™, developed by the Routinify company The Well Assist™ is a wellness technology capable of promoting daily routine of activities, socialization, nutrition and

medication all while monitoring frailty. The technology currently exists in the form of an application that is downloaded onto a tablet, for the purpose of this thesis Samsung Tab A's were provided by Routinfy and distributed to the participants. On the home screen of the application, participants are able to see the most up to date and current information on the time, date and temperature of their region. Within the application participants have access to features such as news podcasts from previously broadcasted news segments, a variety of music, and ability to store and view photos and videos. Further, participants are able to connect to a predetermined set of contacts through the Well Assist™. These contacts may include a healthcare provider such as their general practitioner (GP) or their personal caregiver but can also include family members and their social circle. Further, the application could be programmed according to a calendar to provide the user with reminders on medications, appointments, and other activities of daily living. In order to set the aforementioned reminders, the user or a trusted confidant such as a family member or caregiver must access the family portal through a web browser. This is one of the biggest limitations of the Well Assist™ technology. Further, the web portal is the only way through which individuals are able to connect with the users via video calls. This exists as a limitation of the technology as it assumes that either the user has access to a computer in order to access the web portal or that they have close contacts who would be able to do so. Further, constant communication is necessary with the technical support team at Well Assist™. Should a user want to add in a new contact they would have to go through the support team and provide them all necessary information. This makes the process time consuming and not user friendly. The current set up could have contributed to certain participants non-use or reduced use of the technology. In addition to the tablets, participants were provided with a wearable device that most closely resembled that of an Apple watch. This device was able to track the participants activity during

the day, their sleep patterns while also providing them with health information such as breathing techniques. This wearable device was integrated with a corresponding tablet and would transfer over health information, that patients could access on their tablet, throughout the day. Overall, the demonstration of the tablets on average took an hour with each participant. During the demonstration each participant was shown the extensive features and functionalities of the technologies, and time was left at the end in order to answer any questions.

Participants were asked to use the technology for a period of 90 days at their own discretion. Their technology usage was neither prescribed nor monitored. The rationale behind this decision is due to the pilot design nature of this study. Presently no other research look at a similar population, setting and intervention and we wanted to obtain baseline results that could be used in as a reference point for future research.

Chapter 3.2 Exit Interview

After the 90-day period passed, a second and final interview was conducted to examine the users' experience with the technology and its effects on their lives and well-being. The exit interview was audio recorded. During their exit interviews, participants were asked about any recent visits they may have had with their GP's or recent visits to the hospital/emergency room. Additionally, participants were also asked to disclose how often they used the technology with the options everyday, more than once a day, once a day, once a month or less than once a month. This helped us gauge what sort of effects the may have technology truly had on the outcomes we chose to measure. Similar to their first interviews, participants were asked questions that pertained to factors that may affect their acceptance of technology as well as the UCLA Loneliness scale. Further, participants were asked to complete an additional Go-Along interview.

The PIADS scale is a brief 26-item scale that aims to measure the perceived degree of satisfaction and overall acceptance after a period of device usage (Appendix 7) (Day & Jutai,

1996). Further, the scale is great tool that can be utilized to measure quality of life outcomes from the usage of the assistive technology. The scale itself is divided into three distinct sub-scales; ability (12 items), adaptability (6 items) and self-esteem (8 items) (Day & Jutai, 1996). Through the adaptability sub-scale, we are able to assess a user's capability to perform action, activities and face daily tasks while being assisted by the device at hand. The adaptability subscale measures the subject's device related adaptability to participate along with their willingness to cope with new experiences and challenges in addition to being able to adapt to different settings. Lastly, the self-esteem subscale collects items that give insight to the subjects' mood, self-confidence and emotions as connected to the assistive technology (Day & Jutai, 1996). All sub-scales are scored based on a 7 point Likert like system wherein they measure the subject's experience with the technology, be it positive, negative or neutral. The scale has been tested for reliability and validity and found to be both reliable and valid. At the end of the interview, participants were asked open-ended questions with respect to their overall feedback and experience with the Well Assist™ technology.

Quantitative data were statistically analyzed using SPSS. I (the interviewer) reviewed each transcript. Qualitative data were generated through manual coding and categorization of each case (transcript). Through this process a codebook was developed, similar to a 'data dictionary' in which each code was categorized with a label and a brief description, and a data exemplar (Saldaña, 2009). The coding was reviewed and discussed at regularly scheduled with my supervisor. Once a case was coded, the codes were examined and organized them into categories, in order to generate the main themes of the data. Data interpretation was centered on synthesizing findings from across the participants. This work occurred during the final stages of the project, once data from all

participants had been analyzed. The commonalities and differences across cases were examined in order to generate the main, overarching themes.

Chapter 4 – Data Analysis and Results

Chapter 4.1: Demographic Information

A total of 15 older adults participated in the study (8 females and 7 males). The mean age of the sample was 77.5 years (SD=8.1) and the age range was from 67 years to 94 years. English was the primary language spoken by the participants (n=13; 87%) and French for the others (n=2; 13%). Most of the participants (73%) had received either a high school diploma or university degree (Table 2).

Table 2. Education Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	College Diploma	2	13.3	13.3	13.3
	Grade 10	2	13.3	13.3	26.7
	Grade 9	1	6.7	6.7	33.3
	High School	5	33.3	33.3	66.7
	Master's Degree	1	6.7	6.7	73.3
	Undergrad	3	20.0	20.0	93.3
	University ABD	1	6.7	6.7	100.0
	Total	15	100.0	100.0	

All participants were living alone although 3 of them (20%) were married (Table 3).

Table 3. Marital Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Divorced	3	20.0	20.0	20.0
	Married	3	20.0	20.0	40.0
	Single	1	6.7	6.7	46.7
	Widow	2	13.3	13.3	60.0
	Widowed	6	40.0	40.0	100.0
	Total	15	100.0	100.0	

40% were receiving home-care services (Table 4).

Table 4. Home-Care Services

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	9	60.0	60.0	60.0
	Yes	6	40.0	40.0	100.0
	Total	15	100.0	100.0	

Roughly half of the sample (53%) had had a primary care (physician) appointment within the month preceding their first home visit by the researchers (Table 5). One participant had had an emergency visit to the hospital that resulted in an overnight stay.

Table 5. Primary Care Appointment within the Past Month

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	7	46.7	46.7	46.7
	Yes	8	53.3	53.3	100.0
	Total	15	100.0	100.0	

Half of the sample (53%) were residing in an independent-living apartment at the time of study; the remaining participants were evenly split between assisted living and community home residences (Table 6). With respect to how this compared to other studies that have looked the use of wellness technologies for older adults, very few have looked at the perspective of older adults who resided in residential facilities, be they independent living apartments or assisted living facilities. Thus our study is unique in this regard (Creaney et al., 2021; Grigorovich et al., 2021; Grinter et al., 2010)

Table 6. Type of Residence at Time of Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Apartment	8	53.3	53.3	53.3
	Assisted Living	4	26.7	26.7	80.0
	Community Home	3	20.0	20.0	100.0
	Total	15	100.0	100.0	

Of the 15 participants who completed their first interview, 12 (80%) went on to complete

The next series of tables (7 through 13) present a picture of technology use by this sample of participants.

Table 7 shows the numbers of participants who used/did not use a smartphone and who did/did not report difficulty using the device.

Table 7. Smartphone * Difficulty using Smartphone (Crosstabulation)

Count

		Difficulty			Total
		Don't know	No	Yes	
Smartphone	No	5	0	0	5
	Yes	0	9	1	10
Total		5	9	1	15

Table 8 shows the numbers of participants who used/did not use a tablet/iPad and who did/did not report difficulty using the device.

Table 8. Tablet * Difficulty using Tablet (Crosstabulation)

Count

		Difficulty			Total
		Don't know	No	Yes	
Tablet	No	7	0	0	7
	Yes	0	7	1	8
Total		7	7	1	15

Table 9 shows the numbers of participants who used/did not use a laptop and who did/did not report difficulty using the device.

Table 9. Laptop * Difficulty using Laptop (Crosstabulation)

Count

		Difficulty			Total
		Don't know	No	Yes	
Laptop	No	8	0	0	8
	Yes	0	6	1	7
Total		8	6	1	15

Table 10 shows the numbers of participants who used/did not use a laptop and who did/did not report difficulty using the device.

Table 10. Desktop * Difficulty using Desktop (Crosstabulation)

Count

		Difficulty		Total
		Don't know	No	
Desktop	No	12	0	12
	Yes	0	3	3
Total		12	3	15

The most popular devices used by the participants were smartphones and most of the participants reported having no difficulty using their devices.

Frequency of internet use is depicted in Table 11.

Table 11. Frequency of internet use

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Every day	9	60.0	60.0	60.0
	More than once a day	2	13.3	13.3	73.3
	Once a day	1	6.7	6.7	80.0
	Once a month	1	6.7	6.7	86.7
	Less than once a month	1	6.7	6.7	93.3

	NA	1	6.7	6.7	100.0
	Total	15	100.0	100.0	

Most of the participants (60%) said that they used the internet every day for at least one hour per day.

Table 12 displays the number of hour per day of internet use.

Table 12. Hours per day of internet use

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1	2	13.3	13.3	13.3
	1-2	4	26.7	26.7	40.0
	2-3	3	20.0	20.0	60.0
	3-4	3	20.0	20.0	80.0
	>4	2	13.3	13.3	93.3
	NA	1	6.7	6.7	100.0
	Total	15	100.0	100.0	

Most of the participants used the internet between one and four hours per day.

As can be seen in Table 13 things to do online were social networking, email, and getting news.

Table 13. Most liked things to do online

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	13.3	13.3	13.3
	13	2	13.3	13.3	26.7
	NA	2	13.3	13.3	40.0
	1, 2,6,7,9	1	6.7	6.7	46.7

	1, 6	1	6.7	6.7	53.3
	1, 9	1	6.7	6.7	60.0
	1,2,3,6,7,8,9,10 ,13	1	6.7	6.7	66.7
	2, 6, 13	1	6.7	6.7	73.3
	2, 6, 9, 11	1	6.7	6.7	80.0
	2,4,5,6,8,11,13	1	6.7	6.7	86.7
	5, 13	1	6.7	6.7	93.3
	6	1	6.7	6.7	100.0
	Total	15	100.0	100.0	

Legend:

1=social networking (Facebook, Instagram)

2=news

3=music

4=play videos

5=playing games

6=email

7=shopping

8=internet TV

9=banking and pay bills

10=play podcasts

11=send or receive photos

12=take academic classes

13=other

In summary according to table 7-13, the technology that participants had the least difficulty using are their cell phone followed by tablets and laptop. Further, the majority of participants (60%) reported spending at least an hour a day on the internet with a smaller percentage (20%) reporting up to 4 hours of daily internet usage. Lastly, according to Table 13, social networking, emailing and being informed on the news were the top choice of online activities for a majority of our participants.

Table 14 shows the participants' ratings on the Attitudes Toward Technology Questionnaire (ATTQ). On average, the participants had neutral feelings about the benefits of technology and were uncertain about the value of keeping up with the latest technologies and their interest in doing so.

Table 14. ATTQ ratings

	N	Minimum	Maximum	Mean	Std. Deviation
Today, technological progress is so fast that it's hard to keep up.	15	1	5	4.20	1.146
I would have dared to try new technical gadgets to a greater extent if I had had more support	15	1	5	4.07	1.163
Using technology makes life easier for me.	15	1	5	3.87	1.302
I think it's fun to use new technological gadgets.	15	1	5	3.87	1.187
I am sometimes afraid of not being able to use new technical things.	15	1	5	2.47	1.885
I like to acquire the latest models or updates.	15	1	5	2.27	1.486
Valid N (listwise)	15				

Legend: 1 = fully disagree 3 = neither agree or disagree 5 = fully agree

Figure 2 displays the mean ATTQ ratings as a function of sex of the participant. There did not appear to any notable differences between females and males in attitudes toward technology.

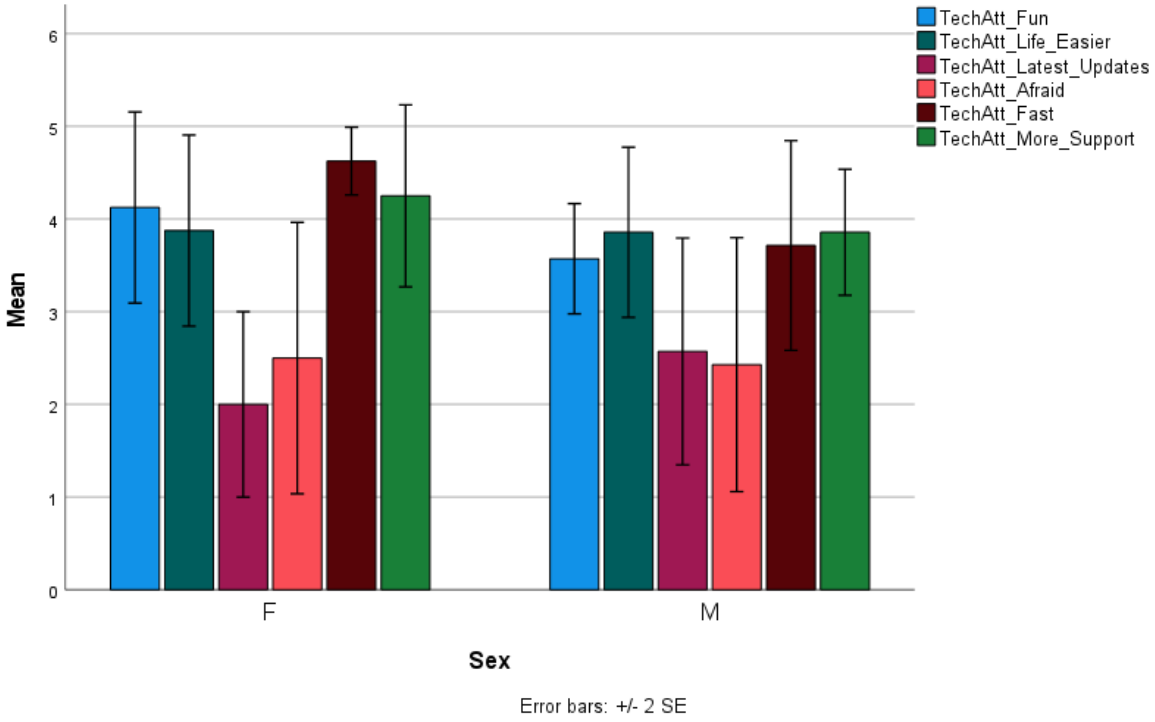


Figure 2. Mean ATTQ ratings as a function of sex

CHAPTER 4.3: LONELINESS

Table 15 shows the means scores of the loneliness scale during our first interview. According to the legend, wherein once the total UCLA Loneliness scale scored is summed and divided by 3, lower scores indicate lower levels of loneliness, the participants of our study overall had lower feelings of loneliness. However, it is important to note that when each question was looked at individually, participants showed higher levels of lacking companionship in comparison to feeling isolated or left out.

Table 15. Mean scores on the Loneliness Scale

	N	Minimum	Maximum	Mean	Std. Deviation
Lack_Companionship	15	1	3	1.67	.816
Isolated	15	1	3	1.33	.724
Left_Out	15	1	3	1.27	.594
Valid N (listwise)	15				

Legend: 1 = Hardly Ever 2 = Some of the Time 3 = Often

Note: UCLA Loneliness Scale is summed up for a total score of 9. For ease of readability and comparability to the scales range of loneliness, we have taken the total scores and divided them by 3.

According to the authors of the UCLA Loneliness scale, participants who score in the range of 2-5 (1-1.67) are not lonely. Whereas participants that score in the range of 6-9 (2-3) are considered to be lonely.

Figure 3 shows the mean loneliness scores as a function of sex of the participant. There did not appear to any notable differences between females and males. Male participants were less likely to report feeling left out and isolated.

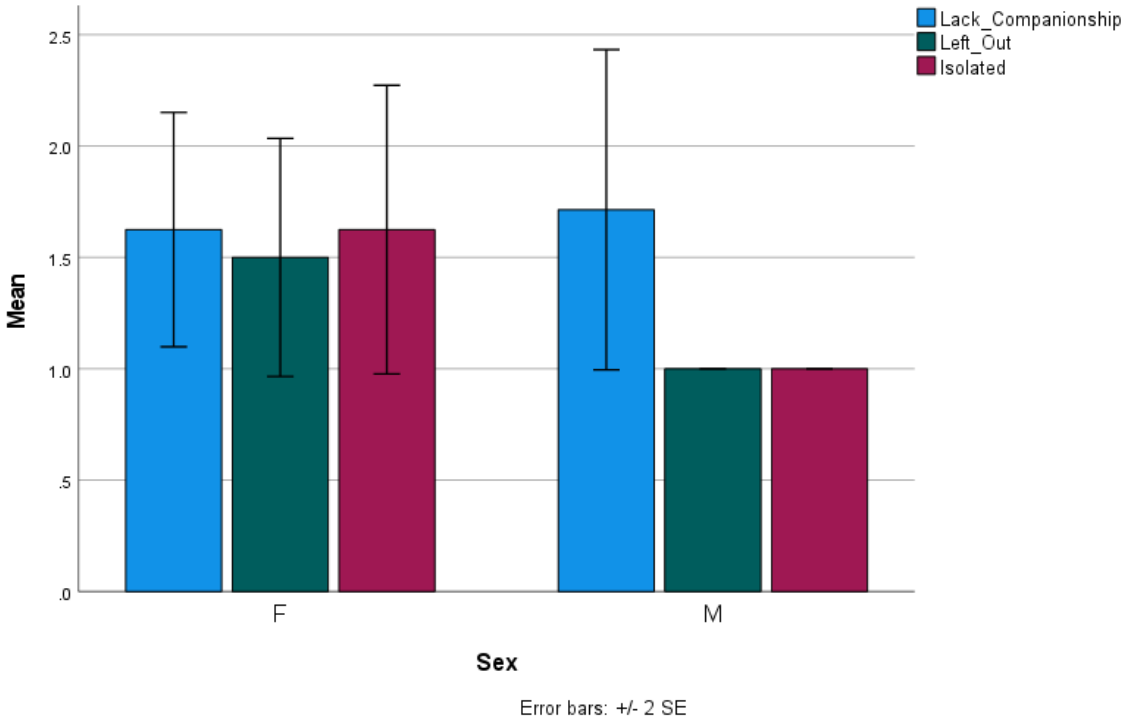


Figure 3. Mean Loneliness scores as a function of sex

Research Question #1: "Does technology influence experiences of loneliness in older adults?"

Three approaches to data analysis addressed this question. The first approach examined the relationship between technology use and loneliness using data from the first interview (i.e. sample n=5).

Table 16: Bivariate correlations between ATTQ and Loneliness Scale

		Lack_Companionship	Left_Out	Isolated	TechAtt_Fun	TechAtt_Life_Easier	TechAtt_Latest_Updates	TechAtt_Afrai	TechAtt_Fast	TechAtt_Support
Lack of Companionship	Peasrson Correlation									
	Sig (2-Tailed)									
Left Out	Pearson Correlation	.344	--							
	Sig (2-Tailed)	.209								
Isolated	Pearson Correlation	.322	.776**	--						
	Sig (2-Tailed)	.241	<.001							
TechAtt_Fun	Pearson Correlation	-.196	-.351	-.360	--					
	Sig (2-Tailed)	.483	.199	.187						
TechAtt_Life_Easier	Pearson Correlation	-.314	-.320	-.253	.727**	--				

	Sig (2-Tailed)	.255	.244	.364	.002					
TechAtt_Life_Updates	Pearson Correlation	.373	-.167	-.022	.467	.499	--			
	Sig (2 Tailed)	.171	.551	.938	.079	.058				
TechAtt_Afraid	Perason Correlation	.062	.392	.454	-.353	-.409	-.405	--		
	Sig (2 Tailed)	.827	.149	.089	.196	.130	.135			
TechAtt_Fast	Pearson Correlation	.076	.126	.172	-.346	-.316	-.537*	.251		
	Sig (2 Tailed)	.787	.655	.539	.206	.251	.039	.368	--	
TechAtt_Support	Pearson Correlation	.326	-.028	.396	-.304	-.371	.154	.180	.418	--
	Sig (2 Tailed)	.236	.922	.144	.271	.173	.583	.520	.121	

**. Correlation is significant at the 0.01 level (2 tailed)
*. Correlation is significant at the 0.05 level (2 tailed)

Table 16 shows the bivariate (Pearson) correlations between scores on the ATTQ and the Loneliness scales. In general, the pattern of correlations was unsurprising. Participants who had higher loneliness scores tended to report that technology was less fun, did not make life easier, and that they were less likely to acquire the latest models or updates (negative correlations). They tended to report being afraid to use technology, that it was hard to keep up with new technology, and that they might have tried new devices if they had more support (positive correlations).

The second approach to addressing Research Question #1 examined the relationship between technology experience (use of WellAssist™) and loneliness using data from the

participants who completed both a first and a second (exit) interview (i.e. sample n=12). As can be seen in Table 17, on average the participants reported feeling significantly less lonely at the end of the study than they did at the beginning.

Table 17. Paired Samples t-test Loneliness scores

Mean score on the Loneliness Scale (range = 1-3; Total UCLA score/3)

	N	Mean	Std. Deviation	Std. Error Mean
LonelPre	12	1.5000	.61134	.17648
LonelPost	12	1.2778	.50918	.14699

One-Sided T Test

Test Value = 0							
			Significance			95% Confidence Interval of the Difference	
	t	df	One-Sided p	Two-Sided p	Mean Difference	Lower	Upper
LonelPre	8.500	11	<.001	<.001	1.50000	1.1116	1.8884
LonelPost	8.693	11	<.001	<.001	1.27778	.9543	1.6013

Mean scores at the end of the trial period were significantly higher than scores at the beginning.

Table 18 shows the paired samples t-test scores of the UCLA Loneliness scale with respect to the scales individual questions. As previously discussed, the UCLA Loneliness scale aims to measure three dimensions of loneliness; relational connectedness, social connectedness and self-perceived isolation. Although according to the results of Table 17 a change in loneliness pre and post intervention, by taking a look at each question through a micro lens we are able to understand what dimensions of loneliness wellness technologies such as the WellAssist™ can have most effect on. Specifically, according to Table 18, it seems that the change in overall Loneliness score can be largely attributed to the response in Lack of Companionship.

Table 18. Paired Samples t-test Loneliness scores – Individual Question

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Lack_Companionship	1.83	12	.835	.241
	Exit_Lack_Companionship	1.42	12	.669	.193
Pair 2	Left_Out	1.33	12	.651	.188
	Exit_Left_Out	1.17	12	.389	.112
Pair 3	Isolated	1.33	12	.778	.225
	Exit_Isolated	1.25	12	.622	.179

Paired Samples Test

		Paired Differences					t	df	Significance	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			One-Sided p	Two-Sided p
Pair 1	Lack_Companionship - Exit_Lack_Companionship	.417	.793	.229	-.087	.920	1.820	11	.048	.096
Pair 2	Left_Out - Exit_Left_Out	.167	.718	.207	-.289	.623	.804	11	.219	.438
Pair 3	Isolated - Exit_Isolated	.083	.289	.083	-.100	.267	1.000	11	.169	.339

We also examined the changes in Loneliness scores as a function of the use of the WellAssist™ device for social connectedness (Figure 4). As can be seen in the figure, the sole participant who used WellAssist™ for video calls with family and friends tended to report more

loneliness at the start of the study and show a larger drop in loneliness scores at the end of the study.

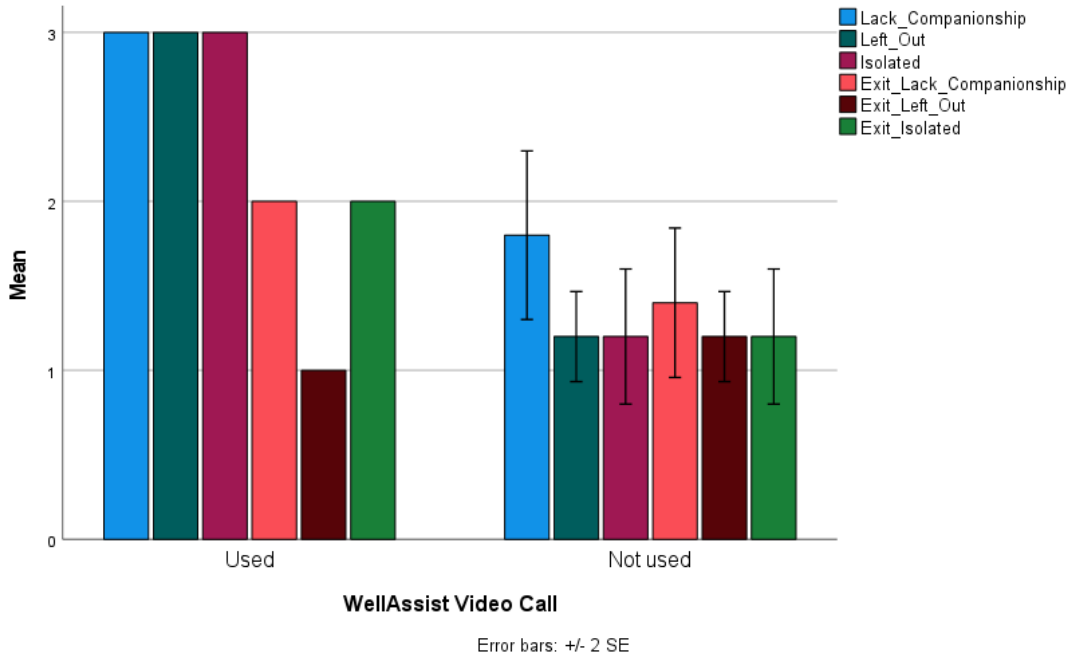


Figure 4. Change in Loneliness scores associated with using WellAssist^{TM} for video call.

One participant in particular showed significant improvement with respect to their levels of loneliness (Pre – 3, Post – 1.55). This participant at the start of the study showed no interest in technology and did not believe that it could have a positive influence over their life. In fact, they were the only participant who we thematic analyzed as not only having a negative attitude towards technology but also an indifference to their overview of life. This participant had the contact emails of several family members who lived a significant distance away loaded up onto the WellAssist^{TM} and would utilize it to speak and video call with family members such as their grandchildren and great grandchildren on a regular basis. During their exit interview this participant went on to mention that they had not seen some of these family members in years and had only interacted with them over phone calls and seen pictures from time to time. They also mentioned that they had become quite comfortable with utilizing the WellAssist^{TM} and had even purchased a tablet pen in

order to navigate through the technology more easily. Overall, the participant had a good experience utilizing the WellAssist™ and when probed as to whether or not they would consider using such a technology again said; "I can't say I'm eager, but I might think about it." This is an improvement with respect to attitude towards technology for this participant and as referenced by Zambianchi and Carelli's (2018) study, a more positive outlook on technology can be correlated with improved psychological and social well-being, under which the domain of loneliness falls (Zambianchi & Carelli, 2018).

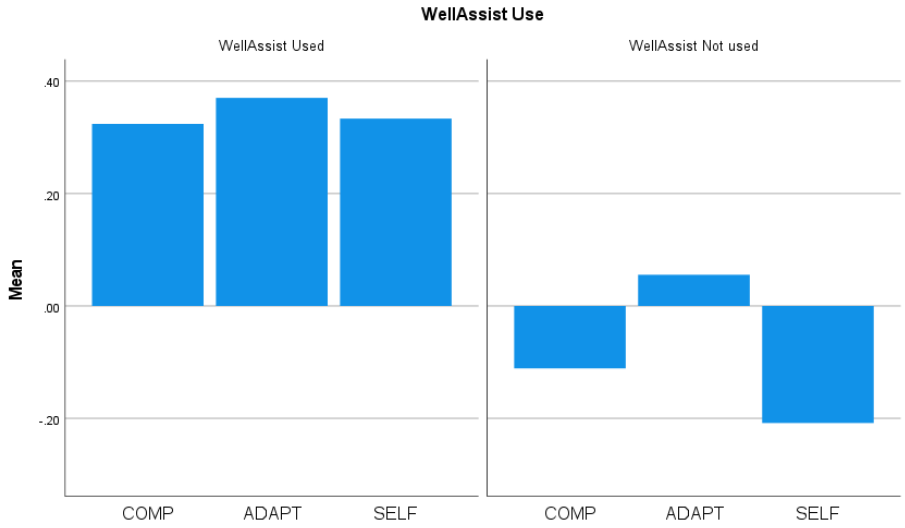
Chapter 4.4: PIADS Analysis

The third approach examined scores from the Psychosocial Impact of Assistive Device Scale (PIADS) as a function of use/non-use of Well Assist™ . Specifically, the three subscales of the PIADS were analyzed; independence, well-being and quality of life. Independence was derived by adding the values corresponding to items 1, 3, 4, 6, 8, 11, 13, 14, 16, 17, and 18, subtracting the value corresponding to item 5 and dividing the total by 12. Well being was derived by adding the values corresponding to items 15, 22, 23, 24, 25, and 26 and dividing the total by 6. Lastly, quality of life was derived adding the values corresponding to items 2, 7, 9, 12, 19, and 20, subtracting the values corresponding to items 10 and 21 and dividing the total by 8 (Jutai & Day, 2002).

Figure 5 suggests that participants who used WellAssist™ were more likely to report a positive impact on well-being than those who did not use it, as measured by the PIADS scale. The group difference was most pronounced for the Self-esteem subscale, which measures feelings of emotional health and happiness (Jutai & Day, 2002) These differences were not statistically significant due to the small sample size. The results suggest that the participants on average had only slightly positive expectations of how the WellAssist™ technology would affect their experience of home. It should be noted, however, that we did not measure the use of the

WellAssist™ during the 90-day trial period. We noted from the exit interviews that some participants reported very little use of the device.

Figure 5. PIADS mean subscale scores as a function of WellAssist™ use.



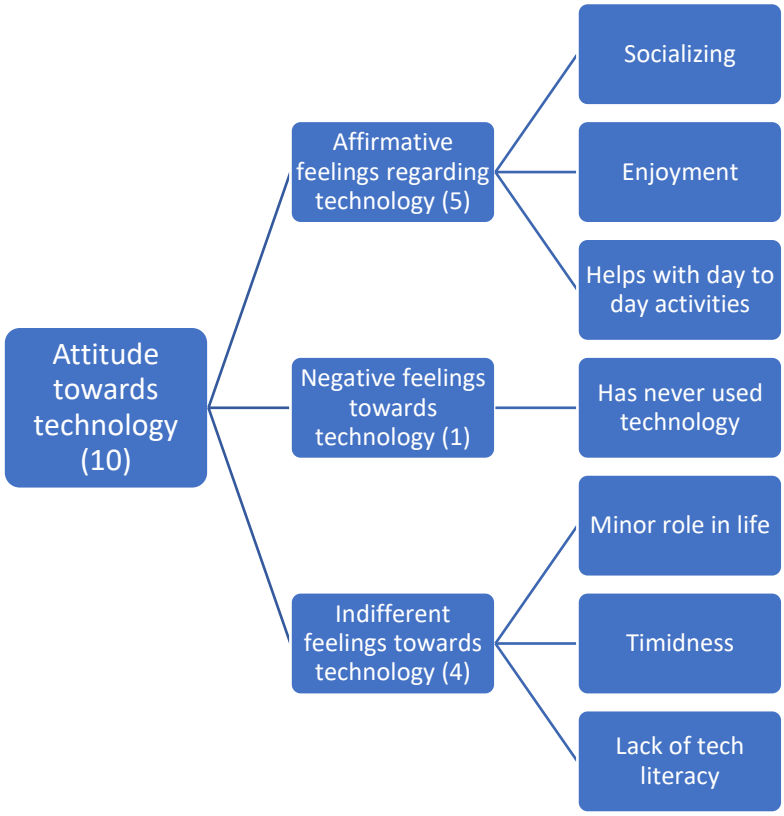
Taken together, these results suggest that the experience of using the WellAssist™ was associated with a decrease in feelings of loneliness. That the change was not merely associated with the passage of time was supported by the PIADS findings, which suggested that the WellAssist™ made a positive impact on perceived well-being for those participants who used it.

Chapter 4.5: Go-Along Interviews

Research Question #2: "How does loneliness affect an older adult's experience of home?

A thematic analysis of the interview transcripts of the first and second interviews was performed in order to gage whether or not trends with respect to the meaning of home and loneliness existed amongst older adults. A summary of the most prominent themes and sub-themes is summarized in Figures 6 and 7. Figure 6 depicts the thematic analysis of our participants attitudes towards technology while Figure 7 depicts the thematic analysis of the participants overview on life.

Figure 6: Thematic Analysis of Attitudes Towards Technology



Most participants either had neutral or affirmative feelings towards technology. The participant's attitude towards technology was thematic analyzed and categorized as being either affirmative, indifferent, or negative. Each category was further sub-categorized into the most commonly occurring themes. For example, amongst the 5 participants who categorized as having affirmative feelings regarding technology, the most sub-themes that occurred was their usage of technology for socialization, enjoyment and it's positive impact on their day to day activities.

Affirmative Feelings Regarding Technology

Socializing

Overall, socializing appeared to be the most common theme with respect to technology usage. All participants who discussed feeling comfortable with technology use also mentioned how they used their various devices (iPhone, laptops, iPads) in order to socialize with friends and family. One participant (SP04) who immigrated to Canada several decades ago said the following;

"I'm still in touch with high school friends. We had a Zoom reunion, the whole school, just last week."

This was in response to a conversation myself and particpant SP04 had on whether or no Canada had felt like home to them. They mentioned still being in touch with friends from their high school in the United Kingdom and how they were grateful for technology for enabling such communication. Participant SP04 also mentioned that they used Zoom to connect with family that lives in Ottawa. Due to the increasingly cold weather in Ottawa and the COVID-19 pandemic, participant (SP04) was unable to socialize with their family in a way that maintain social distancing thus they regularly got together over Zoom.

Another participant (SP10) when asked about the technology they use in their day to day lives mentioned the following;

"My computer over there... and I have an iPad over there... I've been on amateur radio, I belong to two clubs in town here. Three, really. And we used to meet in person at various places in town, have a breakfast meeting or get together frequently. And now everything is done by Zoom."

This theme emphasizes the use of technology as a way to adapt to the new normal for socializing, in place due to the COVID-19 pandemic.

Enjoyment

With respect to enjoyment and technology usage, this too was a theme that commonly occurred amongst our pool of participants. During a tour of their home one participant showed

me their living stations that each served a person, one of which was for enjoyment. The particpant mentioned the following;

"Participant: And my computer where I read about news, weather, I do Netflix and I do another one called tou.tv which is a French version of Netflix. And this is all here.
Interviewer: Okay. Do you enjoy Netflix?
Participant: I love… I love a diversion. This is my television centre where I watch sports mainly and important political events."

Helps with day to day activities

Amongst participants who showed overall affirmative feelings towards technology, an additional sub-theme that emerged was how tehcnology helps wth day to day acitivties. When asked about the usage of tehcnology in their life, once participant stated the following;

"Social media, very important. That's how I keep up with my family. And also, business related research, okay, for healthcare, management of my personal affairs or my employees."

This participant in particular has a severe disability and frequently receives care from a number of privately hired PSWs. (S)he participant uses technology to ensure that his employees are properly taken care of, his appointments are appropriately scheduled and that they are well informed on any upcoming research with respect to their health condition.

Indifferent Feelings Towards Technology

Minor Role in Life

Although less commonly observed amongst our participants, one theme that did arise as a result of our analysis was technology playing a minor role in the partipant's lives. One participant (SP02) in particular when approched with a conversation on what role technology played in their lives and whether they enjoyed using technology said;

"I'm not crazy about it"

Timidness

Another theme reported by participants who were indifferent to technolgy was the fact that they often felt overwhlemed and intimidated by the technology being presented to them, in addition to certain levels of mistrust and s skepticism. One particpant (SP05) in particular refrenced the following;

> "Oh, well, the only difficulty is that it's trust. I'm very disinclined to trust because I've… you know, because, I guess… I guess I'm way wiser than I would like to be, I guess. There's… there's truth in 'ignorance is bliss."

Lack of Technological Literacy

Commonly observed with participants who had indifferent feelings towards technology was their lack of technological literaracy. In particular one participant (SP14) referenced the following;

"You see, some people are afraid of using things like this. And I'm not very good on it."

From this, and quotes similar to it, we gathered that some older adults lack the technological literacy necessary to incorporate technology into their lives and had they had proper instructions, they might have had a different perspective.

Negative Feelings Towards Technology

The least common theme when it came to the topic of feelings towards technology, were negative feelings on the matter. In fact, only one participant (SP06) reported having such feelings. When asked on about the role that technology played in their life they suggested the following;

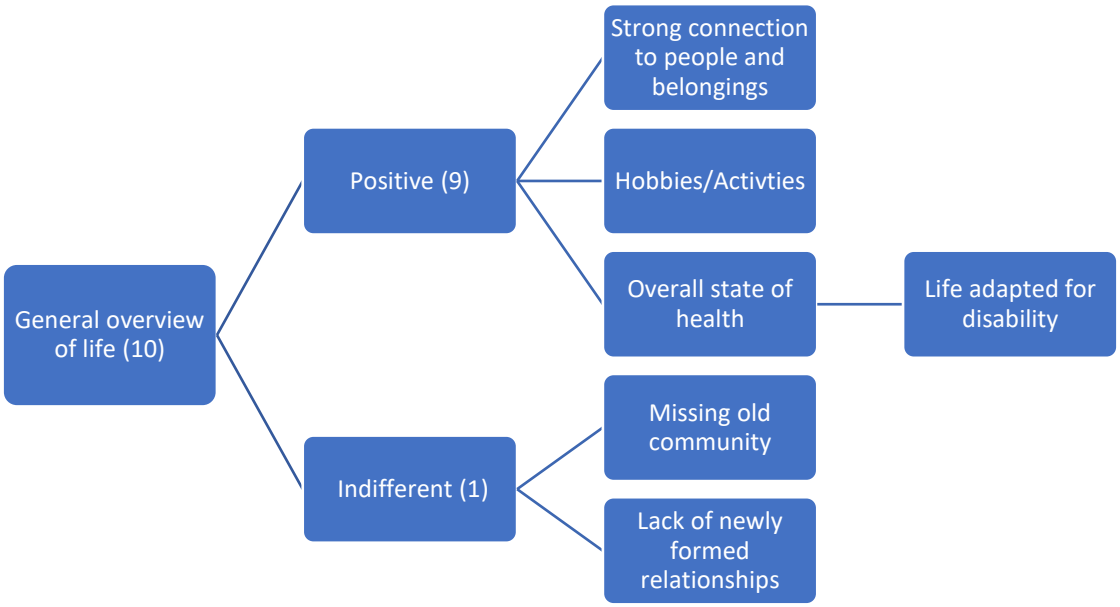
"I'm not very good at this stuff because I've never really been interested in it."

We concluded that this participant in particular had more negative feelings towards technology because in addition to never having used technology previously, they also did not

seem excited about the prospect of trying out the WellAssist™ or overly optimistic that technology could bring about some positive changes in their life.

With respect to the participants' general overview and feelings towards life, the most commonly occurring themes are summarized in Figure 7 with their respective sub categories. The large majority of participants had an overall positive outlook on their lives in particular due to their strong connections to people (family or other) and belongings, their hobbies and activities and their overall states of health. The sub-theme of overall state of health was further sub-categorized for some due to the fact that their lives were well adapted for their disability and thus participants were able to appreciate and participate in day to day life activities. A minority of participants reported having an indifferent outlook on life and this in large part due to their missing their old community as well as a lack of newly formed relationships.

Figure 7: Thematic Analysis of Participants' General Overview of Life



Positive Outlook on Life

Strong connection to people and belongings

The sub-theme of having a strong connection to people and belongings was present in almost every interview. During our Go-Along's the participants spoke on the various belongings that decorated their homes. For some it was pieces of art and art collections that they had spent years procuring while for others it was simply the memories that existed in the pictures that they had of their family and loved ones. In particular of few stand out interviews included one participant whose wife had passed away almost two year prior to the time of the interview. The participant (SP02) commented that;

"Yeah, my wife died a year, 19 months ago, and all of her stuff is exactly where it was when she lived"

This was referencing that he had left all of her jewellery and belongings exactly as she had the day she passed away. The evidence of this was obvious by way of the tracks of dust that had accumulated on their furniture.

When we further probed this participant (SP02) into their experience of home they spoke about how the familiarity with the neighbourhood was a driving factor in their choice of Perley Health Center as their home;

> "Well, I lived in this neighbourhood all of my working years. I'm very familiar with the whole neighbourhood, the shopping centres, the church, the schools. The girls were both… two daughters both raised in this neighbourhood. Both graduated from university. One from Ottawa U. And yeah, it's been home."

This is a trend seen in Dahlin-Ivanoff et al. (2007) study, wherein their participants highlighted the importance of familiarity of the neighbourhood on their experience of home (Dahlin-Ivanoff et al., 2007)

One participant (SP12) who lived outside of the Perley Health campus and in her own independent living home in a senior community noted the importance of this home to her stemmed from the fact that this was the last place she had lived with her husband who too had recently passed. When I probed her on the idea of what leaving this home would mean to her she said the following;

"Its sort of like going through, leaving it, this place, would be going through like another death, essentially"

Further this participant (SP12) is well connected to their neighbours in her community and family members, this was evident across their UCLA Loneliness scale scores (1.3/3). When further probed into their experience with their home she stated that they were very happy where they were and how they were specifically connected to their home since;

"This is my last place with my husband and we bought this so that we were looking at our retirement years. And at that time we bought it, my daughter lived over there in Sunset Lakes and we bought it so that we could be close to them and look after the baby when she was little. And, yeah, it was just a, it was, it was a dreams for the future ahead of us in our retirement years."

As previously mentioned, the theme of having strong connection to people and belongings was prominent amongst a majority of our participants.

Hobbies and Activities

With respect to hobbies and activities, this too was a theme that occurred amongst a majority of our participants. In particular, one participant (SP03) who has a severe disability, upon touring their house showed me the various collection and memorabilia they had acquired

over the years. This included refurbished tin cans that were several decades old, a collection of Canadian Tire cars, vintage movie posters and more. In addition to the memorabilia, in their bedroom this participant specifically highlighted an old carousel horse that they bought and refurbished themselves. They highlighted that this was a major interest of theirs;

> "So I'd take something old, and clean and add pieces and varnish, paint, you know, things like that. I did that quite a bit when I was doing my business. That was my hobby."

Another participant (SP04) mentioned that a part of their activities included cooking for their neighbours, specifically those who lived in the assisted living campus of Perley Health. They mentioned their interest in this specifically lies because they would like to contribute back to their community and they felt that the residents of the assisted living facilities missed out on fresh home cooked meals as their apartments were not equipped with kitchens.

> "I'm happiest in my kitchen and living here in the Perley, there are a lot of people who no longer cook for themselves. And right next door down the corridor there's an annex for people who need much… I: Assisted living, yeah. R: So I cook for them sometimes. I make soups and in the days before the lockdown I would have two or three of them for supper here. And you know, it was a change from institutional cooking. So the nurse in me is still active in a little way."

Overall State of Health

With respect to the overall state of health, many participants spoke on the importance of that being in an overall good state of health and how it trickles down into the rest of their lives with many mentioning that they appreciate having the independence to perform certain activities such as taking the bus or going out for walks unaided. However, one participant (SP04) in particular highlighted how although they have accepted their decline in health, they were diagnosed with multiple sclerosis, the autonomy of choice was important to them.

> "Yes. For me, it was important to move to downsize, and to move while I was still in control of my life. And I chose the Perley even though I was living in Quebec because my brother who also had MS was an inpatient here for 10 years. So I came to visit over a period of 10 years. I saw these buildings going up and given my background I was very interested in The personnel

and for me, this was… oh, I should add that after I retired full-time, I did consulting work for the Accreditation team in long-term care facilities, but the team, the nurses, the team had found they were deficient in nursing. So I went in and did assessment and teaching of the managers. And so I knew… I knew what I was looking at and the Perley was definitely the place I wanted to be, and all my family's here in Ottawa."

Indifferent Outlook on Life

Missing Old Community

A minority of our participant (SP06) very specifically highlighted that they missed their old community;

"I don't know. I was in Tillsonburg a long time. I miss Tillsonburg. I miss my church people but, like, right now there's no church anyway."

This was in response to asking whether or not Perley Health felt like home to them. Interestingly what was also mentioned was the community they had through their old church, rather than just their neighbours.

Lack of Newly Formed Relationships

The same participant (SP06) also mentioned that they had no formed any new relationships with their new neighbours and did not have a particular interest in doing so either. This was in response to the participant highlighting that the Perley Health did not feel like home and my probing into whether there was anything that specifically made them feel like that, they mentioned that there was nothing in particular except for;

"Some of the clients out here that you have to put up with"

When probed further the participant mentioned that many of their neighbours only spoke French and that she missed one neighbour from her old community specifically but that they were no longer able to drive into the city.

What we aimed to do with the thematic analysis of both the first and second interviews is observe and extrapolate any common themes with respect to the meaning of home that our participants presented. For example a number of our participants highlighted the fact that they are quite attached to not only their belongings and the memories associated with them, but the social connections in their lives as well. In particular we looked for themes with respect to the concept of loneliness and home, more specifically if a participant was lonely was were there view of home be and if there was a trend amongst the study group. What we found as a result of such an analysis was that there is in fact a trend; participants who reported having closer ties to their community, neighbours and family also tended to have a more positive outlook on their homes and lives. However, it is important to note that during the second Go-Along interview, most participants were reluctant to do a second Go-Along and most the analyzed answers came from when they were completing the PIADS scale.

Chapter 5: Discussion

This study aimed to investigate and develop a model of the relationship between wellness technology and experiences of home for older persons, and the role for loneliness in this relationship. This was done through the investigation of the following research questions;

i. Does technology influence experiences of loneliness in older adults?

ii. How does loneliness affect an older adult's experience of home?

Chapter: 5.1 Influence of Technology on the Experience of Loneliness In Older Adults

With respect to our first research question (i), according to our findings, technology does influence experiences of loneliness in older adults.

Fifteen participants of this study spoke on their experiences and attitudes towards technology through the ATTQ in addition to their experiences with loneliness through the UCLA Loneliness Scale as a part of their first interviews. The results from these tools were correlated against each other in order to explore a potential relationship. The pattern that emerged, according to our data, was that older adults who reported having more negative attitudes towards technology also tended to score higher on the UCLA Loneliness Scale. Thus even if participants were not lonely (UCLA Loneliness Score of 2 or above) their score trended more towards feelings of loneliness versus those who had more positive attitudes towards technology. These negative attitudes included believing that technology was less fun, did not make life easier, and that they were less likely to acquire the latest models or update. In addition to the aforementioned, older adults who reported being afraid to use technology, thinking that it was hard to keep up with new technology, and that they might have tried new devices if they had more support also tended to report higher levels of loneliness. These results do not differ from the current bodies of literature that report on the topic. A 2018 study by Zambianchi and Carelli utilized the same the same tool, the ATTQ, to assess the relevance of positive attitudes towards

internet technologies for psychological well-being and social well-being amongst older adults. The study consisted of a sample of 245 older adults in Northern Italy with a mean age of 70 years old . It is important to note that none of the participants of Zambianchi and Carelli's study lived in forms of assisted living facilities and that the majority (110) lived with a partner and that none lived alone. This is unlike our study and thus results may not be directly comparable, however they can be utilized to compare themes across the literature and inform future studies on the topic (Zambianchi & Carelli, 2018).

What emerged as a result of Zambianchi and Carelli's (2018) study was that the ATTQ is a positive predictor of psychological well-being. Of particular interest to us in the context of the presented thesis, was their analysis of the effects of a positive attitude towards technology on levels of loneliness amongst their participants. Zambianchi and Carelli (2018) found that older adults who showed higher levels of internet use, and thus by inference a more positive attitude towards technology, also showed lower levels of loneliness (Zambianchi & Carelli, 2018). Through discussion with their participants, the authors were able to gage that although an online presence did not replace and exclude face to face contact, it gave their participants a sense of community and belonging.

As a part of our further analysis of the data in order to address our first research question, we examined the changes to levels of loneliness pre- and post-intervention using the UCLA Loneliness Scale. What emerged as a result of this analysis was that participants reported having significantly higher scores of loneliness at the start of the study compared to their scores at the end of the study. In particular, when we looked at the pre and post results of each individual question of the UCLA Loneliness scale, we found that the participants answers to Lack of Companionship has shown most improvement post intervention. Thus, we can infer that

technology can in fact influence older adults' levels of loneliness and may have a particular effect on their feelings of companionship.

Due to the relative novelty on the topic of technology as a means of improving levels of loneliness amongst older adults, a large library of literature on the topic does not exist. Currently the stock includes protocols for future systematic and scoping reviews as well as a few recently published systematic reviews (Wister et al., 2021). However, it is encouraging that our results are in line with what the current stock of literature has cited, in that technology can utilized as a tool to improve levels of loneliness amongst older adults (Zambianchi & Carelli, 2018). Additionally what emerged as a pattern with respect to our pool of participants and that also aligns with the current stock of literature on the topic, is that older adults find the technological progress of today's society too fast to keep up with and they would be more eager to try new technologies if the support existed (Table 14) (Jones et al., 2015).

Further, as we have previously addressed the concept of well-being, section 2.2.2.1 of this thesis, is highly influenced by the state of loneliness an individual may feel thus we analyzed the PIADS scores of our participants during their exit interviews. As referenced in figure 5, when looking at the sub-scale of the PIADS that measures self-esteem and comparing across the other sub-scales, the biggest difference is seen amongst participants who used the WellAssist^{TM} versus those who did not. Thus, when looking at the results of the loneliness scale pre- and post-intervention coupled with the results of the PIADS scale, not only can we provide supporting evidence in that a decrease in the levels of loneliness can have an impact on well-being, but we can also provide evidence in that technology can play a role in the matter.

Chapter: 5.2 How Loneliness Can Affect an Older Adult's Experience Of Home

With respect to our second research question (ii), according to our findings, loneliness can have an impact on an older adult's feelings of home.

According to the thematic analysis of our Go-Along interviews, as referenced in Figures 6 and 7, several themes emerged that lined up with those currently referenced on the topic of an older adult's experience of home. Most prominently highlighted was the importance and influence that a strong connection to their belonging and people, be it family members or other, has on an older adult's experience of home, as was discussed in section 4.4 of this thesis. This too is in line with the themes that other literature on the topic discussed in section 2.2.2 of this thesis.

Specifically, a majority of our participants highlighted the attachment they had to the objects they used to decorate their apartments, be it art, pictures of family and friends or collections they have procured over the years. This is similar to the participant' as Cater, D. et al. (2021)'s and Wada et al.'s (2020) studies, wherein participants of both studies highlighted the importance that having an ability to decorate their spaces within their residential homes and the positive influence it had on their feelings of homeliness (Cater et al., 2021; Wada et al., 2020).

Similarly, one participant when probed as to whether or not the Perley Health Ottawa felt like home to them, they stated that it did due in part to the fact that their family lived in the Ottawa area (quote, pg 77). Further, this participant volunteers for their community by feeding the residents of the assisted living facilities of the Perley Health Ottawa. Thus we can infer that they are well connected to their community through their contributions and its effects can be seen on the UCLA Loneliness Scale scores (1/3). The theme of what adding to the community contributes to an older adult's feeling of home is similar across the literature cited in section

2.2.2 of this thesis. Specifically, the participants of Wada et al.'s (2020) study highlighted that being able to contribute to their residential home by sweeping the floors or doing smaller chores had on their feelings of home (Wada et al., 2020).

However, perhaps the best example of how loneliness can affect an individual's experience of home would be that of the participant whose thematic analysis generated a theme of overall indifference to life, which was further sub categorized into missing old community and lack of newly formed relationships (Section 4.4). During their Go-Along interview, this participant in particular mentioned that Perley Health did not feel like home in part due to the fact that they missed the old community they once had at the previous residence and a few key neighbours. This participant in particular reported the highest feelings of loneliness amongst all of our candidates.

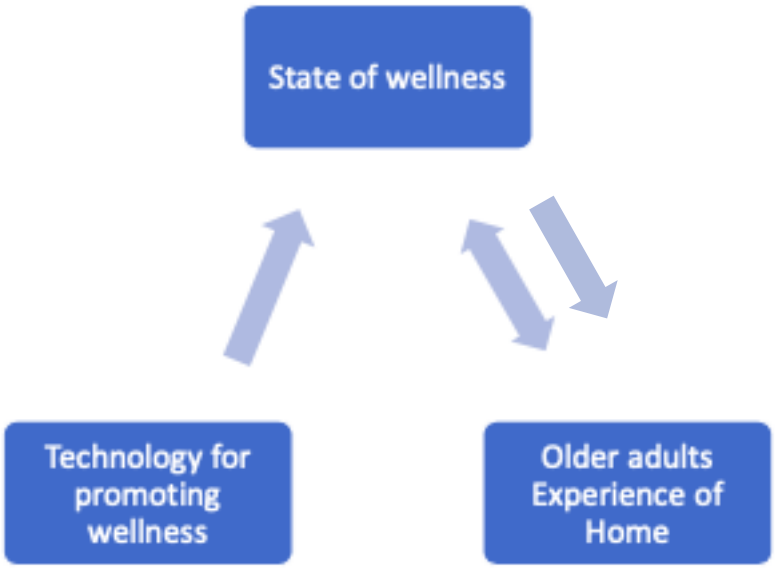


Figure 8: Relationship between wellness technologies and older adults' experience of home – Post Data Analysis.

My examination of relationships among the factors depicted in Figure 8 suggests that the older adult's experience of home is affected by their state of wellness, more specifically the levels of loneliness older adult's experience and that technology can have an indirect, positive effect on

the older adult's experience of home through decreasing their levels of loneliness. According to our findings, the model proposes that wellness technologies can have an indirect effect on the older adults experience of home through effects on their overall state of wellness. For the purpose of this thesis a direct relationship between technology that promotes wellness and the older adult's experience of home could not be determined and stipulates grounds for further research. Further, the unidirectional relationship between technology the promotes wellness and the state of wellness of an older adult, also warrants further exploration. The unidirectional nature of this relationship is supported by literature such as that of Zambianchi and Carelli's (2018). As previously mentioned, the authors found ATTQ is a positive predictor of psychological well-being. Thus, higher levels in usage of a wellness technology such as the WellAssist™ and a more positive attitude towards technology will more predictably result in improved levels of well-being (Zambianchi & Carelli, 2018). Although we found evidence suggesting that an overall improved state of wellness also promotes technology use, further research to solidify this relationship is warranted.

Conclusion

In this study, I found evidence of an indirect relationship among state of wellness, use of wellness technologies, and an older adult's experience of home. The participants of our study showed significant improvement in their levels of loneliness as a result of their use of the WellAssist™ technology, in addition to visible difference in well-being when comparing those who did use the WellAssist™ regularly and those who did not. Further, as a result of our analysis of the Go-Along interviews, we were able to deduce that loneliness does in fact have an impact on the feelings of home for older adults. Amongst our participants who cited feeling at home in their current residence, we also saw themes of community and social connection to either family that

lived close by or neighbours, in addition to lower loneliness scores. While those who cited not feeling at home also indicated that they missed their old communities and neighbours. Thus we can infer, even through an indirect route, that the use of wellness technology can have an impact on the older adults feeling of home via the route of increase in overall state of wellness, through improvement of levels of loneliness. The model was created specifically citing states of wellness rather than just singling out loneliness because we believe this could be applied to other factors that influence an individuals' state of wellness such as their levels of autonomy and independence.

Interdisciplinary Nature Of Research

An interdisciplinary approach was necessary in order to fully grasp and address all the proposed research questions. The proposed research required the collaboration of experts in the field such as my supervisor Dr. Jutai and my Thesis Advisory Committee members who cross many disciplines including specializing in biomedical engineering, management and treatment of disabilities utilizing exercise and the psychological impact on aging. It also required the collaboration and commitment of those who were instrumental in developing the WellAssist™ application, which included a team of computer scientists and health professionals who specialize in the field of geriatric health.

Limitations

With respect to the limitations of our study, one of the most prominent would be the small sample size that we used to conduct our research. This was in part influenced by the fact that this research was conducted at the height of the COVID-19 pandemic. Along the same lines, the restrictions that were associated with the COVID-19 pandemic (social distancing and minimizing direct interpersonal contact), had an impact on the interview methods imposed wherein, we as the interviewers tried to keep as much space and limit contact with the participants as much as

possible. What this may have resulted in, is less hands on support that may have had an effect on technology adoption and usage. Further, participants were not required to use all functions of the WellAssist™, nor were they prescribed certain usage periods. This may have impacted results in that, had participants been requested to use certain features of the WellAssist™ such as the video calling feature, we would have see a more significant impact to the overall levels of loneliness experienced by our group of participants.

Future Directions

In order to solidify the significance of the direct relationship between the use of wellness technologies and an older adult's experience of home, a larger scale study perhaps in the realm of a randomized control trial should be conducted. This approach was not considered as a part of this thesis due in part to the fact that this study was largely exploratory in nature and we wanted to examine whether or not such a relationship even existed. Further, the participants of our study according to their UCLA Loneliness scale results did not qualify as being lonely, as they reported scores under 2. For future studies a potential participant criterion could be a score on the UCLA Loneliness scale that would qualify them as being lonely (Score of 2 and above). This may be influential in understanding the full impact that a wellness technology such as WellAssist™ can have on levels of loneliness. Additionally, for future studies that examine a similar relationship, the presentation of prescribed technology usage may help further highlight and strength the suggested relationship. Further, additional research is necessary to understand the direct relationship between technology that promotes wellness and the older adult's experience of home in addition to further research that dives into how varying states of wellness affect technology usage and adoption in older adult.

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Appendix

Appendix 1: Recruitment Flyer

Are you interested in participating in a research study on technology and health for seniors who are living at home?

We would like to find out the views of seniors on technology that can be used to measure your health and help keep you well at home. We are interested in learning about how easy or hard it is for you to use this technology to connect with services you may need and the people who give you care when you need it. Also, we want to learn about how well you think the technology works in your home and fits your lifestyle.

If you participate, you will be asked to do 3 things:

1. Do an hour-long interview on technology and living at home. It will include you doing a couple of short questionnaires about your quality of life and the care you receive.
2. One or two weeks later, do an hour-long meeting with the researchers who will give you the technology for you to try out for two months (60 days).
3. At the end of the two-month trial time, do another hour-long interview with you about your experiences with the technology. It will include you doing a couple of short questionnaires about your quality of life and the care you receive.

The interviews and meeting will take place in your home.

You are eligible if you are:

- Living in an apartment on The Perley and Rideau Veterans' Health Centre Campus or living in the community receiving Assisted Living Services from Perley Rideau
- Able to speak and understand English.
- 65 years of age or older.
- Interested in trying a technology that measures your health at home.
- Able to provide informed consent.
- Able to answer questions about your health and lifestyle.

For more information, Please contact the Principal Investigator (Dr. Jeffrey Jutai) by:

telephone: (613) 806-8285

or

email: jjutai@uOttawa.ca

For confidentially, please do not reply directly on twitter or any other social media sites. Please use contact information above. Please note that the security of email messages is not guaranteed. Messages may be forged, forwarded, kept indefinitely, or seen by others using the internet. Do not use email to discuss sensitive information. Do not use email in an emergency since email may be delayed.

APPENDIX 2: INFORMATION LETTER (RESIDENT)

Study Title: Ageing, Technology, and Experiences of Home

Request for Participation:

This letter is intended to give you detailed information about the research study, which will be discussed with you. Please take the time to read this information carefully and to understand what is involved. In order to decide whether or not you want to be a part of this research study, you should understand what is involved and the potential risks and benefits. Once you agree to participate in the study, you will be asked to sign a consent form and to fill a short questionnaire.

You should take as much time as you need to make your decision. If you would like to discuss any aspects of the study or if you have more questions, please contact the researchers via phone call or email using the contact information below:

Principal Investigator:
Professor Jeffrey W. Jutai
University of Ottawa
Interdisciplinary School of Health Sciences
Faculty of Health Sciences
Phone: 613-806-828
Email: jeff.jutai@uottawa.ca

Co-Principal Investigator:

Professor Pascal Fallavollita
University of Ottawa
Interdisciplinary School of Health Sciences
Faculty of Health Sciences
Phone: +1 613-562-5800 ext.3986
Email: pfallavo@uottawa.ca

Purpose:

We would like to find out the views of seniors on technology that can be used to measure their health and help keep them well at home. We are interested in learning about how easy or hard it is for seniors to use this technology to connect with services they may need and the people who give them care when they need it. Also, we want to learn about how well seniors think the technology works in their home and fits their lifestyle.

The findings of this research will help us improve the design of home health care technology for seniors. It will improve our understanding of how technology changes their experience of living at home.

Invitation:

You are invited to participate in this study by attending interviews, answering some short questionnaires, and trying out a home health care technology for a couple of months. The technology is a device called WellAssist™ that can give you important information about your health, such as blood pressure, pulse rate, and body weight. It can connect you with your health service providers and people who give you care, such as family members, friends, and healthcare professionals. You will be able to use the device to communicate with whomever you wish, whenever you wish. We will not record any of these communications or include them as part of data collection for the study.

The study is funded by the Sodexo Institute for Quality of Life through the uOttawa LIFE Research Institute Research Partnership.

Procedure:

If you participate, you will be asked to do 3 things:

1. Do an hour-long interview about your views on technology and living at home. It will include you doing a couple of short questionnaires about your quality of life and the care you receive.
2. One or two weeks later, do an hour-long meeting with the researchers to introduce you to the WellAssist™ technology for you to try out for two months (60 days).
3. At the end of the two-month trial time, do another hour-long interview about your experiences with the technology. It will include you doing a couple of short questionnaires about your quality of life and the care you receive.

The interviews and meeting will take place in your home and they will be audio-recorded.

Conditions for Participation:

Your participation in this study is completely voluntary. You may refuse to participate, withdraw at any time, and decline to answer any question without negative consequences. You may notify the researcher that you wish to withdraw from the study at any point. Please note that the study is independent from the Perley and Rideau Veterans' Health Centre and that refusal to participate will have no effect on the services you receive. If you decide to withdraw, you may choose to have any data collected from you not to be used in the study and destroyed.

Risk/ Benefits:

There are no known risks from participating in this research.

You may indirectly benefit from participating in this study by being able to share your experiences with others about how technology affects your health and lifestyle. You can also help others like you by sharing your experiences so that healthcare providers can learn how to improve services related to home health care technology.

Confidentiality:

All information obtained during the study will be treated confidentially. You will be assigned a code number (a pseudonym) that will be used in the data files. A list linking the code number with your name will be kept in a secured place, separate from your data files. Documents that include your name and contact information, including the signed consent form and the screening form will be kept in a secured locked office at the researchers' institutions. If the results of the study are published, your name will not be used. All information obtained in this study will be used for research purposes only.

Dissemination of Findings:

You may request a copy of the study results at the end of the study by contacting the researcher. If you would like to receive a copy of the study report, you may indicate by making a checkmark here:

_____

Rights of Participants:

You may choose not to participate or refuse to answer any question. By accepting to take part in this study, you do not waive any of your legal rights, nor do you release the investigators, the sponsor, or the institution where this research study is being conducted from their civil and professional responsibilities.

This study has been approved by the Research Ethics Board (REB) at the University of Ottawa. The REB is responsible for ensuring that participants are informed of the risks associated with the research and that participants are free to decide if participation is right for them.

Contact Persons:

If you would like to discuss any aspect of the study, please feel free to contact:

1. Principal Investigator: Professor Jeffrey W. Jutai at (613) 806-8285 or email: jjutai@uottawa.ca
2. Co-Principal Investigator: Professor Pascal Fallavollita at (613) 562-5800 ext.3986 or email: pfallavo@uottawa.ca

If you have any questions regarding the ethical conduct of this study, you may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5, Tel.: (613) 562-5387, Email: ethics@uottawa.ca).

Thank you.

Appendix 3: Consent Form (Resident)

Study Title: Ageing, Technology, and Experiences of Home

Understanding of my rights in research

Please circle YES or NO		
I read the letter about this study.	YES	NO
I decided that I want to be in this study.	YES	NO
I know that I do not need to be in this study if I do not want to.	YES	NO
I will participate in this study. Each of the three sessions will last 60 minutes.	YES	NO
I can stop my participation when I want.	YES	NO
It is okay for the researchers to use my answers when they tell people about their research.	YES	NO
I know that the researchers will not tell anybody my name.	YES	NO
It is okay for the researchers to ask me again if I want to continue participating in the study.	YES	NO

Participant:

I had an opportunity to discuss this study, and any questions that I have asked were answered to my satisfaction. I voluntarily consent to participate in the study "Ageing, Technology, and Experiences of Home". I understand that this study is independent from The Perley and Rideau Veterans' Health Centre and that refusal to participate will have no effect on the services I receive at the Centre. I understand that I will receive a signed copy of this form.

_____ _____ _____

_____ _____ _____

Participant's Name (Print) Participant's Signature Date

By marking my initials here, _____, I agree to allow the researchers to contact me at a later time if they would like me to clarify any information.

Person obtaining consent:

I have discussed this study in detail with the participant. I believe the participant understands what is involved in this study.

_____ _____ _____
Researcher's Name (Print) Researcher's Signature Date

If you have any questions regarding the ethical conduct of this study, you may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5, Tel.: (613) 562-5387, Email: ethics@uottawa.ca).

APPENDIX 4: TELEPHONE SCRIPT (RESIDENT)

Hello, my name is _____, and I am the coordinator of our research project called, "Ageing, Technology, and Experiences of Home". Thank you for agreeing to speak with me about participating in this project.
I need to ask you some questions in order to see if you are eligible to participate.

Do I have your consent to proceed? YES or NO.
If the answer is NO, I will thank him/her and end the conversation.
If the answer is YES, I will proceed with the following questions:

1) Are you able to speak and understand English?
   Yes□ No□

2) Are you 65 years of age or older?
   Yes□ No□

3) Are you able to provide informed consent?
   Yes□ No□

4) Are you living at the Perley and Rideau Veterans' Health Centre Apartments or living in the community and receiving Assisted Living Services from Perley Rideau?
   Yes□ No□

If the answer to any of the above questions is NO, I will thank him/her and end the conversation.

If the answer is YES, I will proceed to booking an appointment with them.

Booking an appointment

1) Is there a day and time of the week of (determine week) that is usually better for you?
2) Is there a location of meeting that works better for you?
3) If you need to cancel or if you will be late, call me at [613-806-8285]. Please leave a message if I don't answer.
4) Thank you very much for answering my questions today. I will see you on (date, time, and location).

End Conversation.

Verbal consent for study participation □YES →*Complete following items* □NO

Reminder phone call □YES □NO

Name of participant: _____

Participant's telephone number: _____

Preferred time to be reached: _____

Name of person obtaining verbal consent: _____

Date: _____

APPENDIX 5: INFORMATION LETTER (STAFF MEMBER)

Study Title: Ageing, Technology, and Experiences of Home

Request for Participation:

This letter is intended to give you detailed information about the research study, which will be discussed with you. Please take the time to read this information carefully and to understand what is involved. In order to decide whether or not you want to be a part of this research study, you should understand what is involved and the potential risks and benefits. Once you agree to participate in the study, you will be asked to sign a consent form and to fill a short questionnaire.

You should take as much time as you need to make your decision. If you would like to discuss any aspects of the study or if you have more questions, please contact the researchers via phone call or email using the contact information below:

Principal Investigator:
Professor Jeffrey W. Jutai
University of Ottawa
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Purpose:

We would like to find out the views of seniors on technology that can be used to measure their health and help keep them well at home. We are interested in learning about how easy or hard it is for seniors to use this technology to connect with services they may need and the people who give them care when they need it. Also, we want to learn about how well seniors think the technology works in their home and fits their lifestyle. The study is funded by the Sodexo Institute for Quality of Life through the uOttawa LIFE Research Institute Research Partnership.

The findings of this research will help us improve the design of home health care technology for seniors. It will improve our understanding of how technology changes their experience of living at home.

Invitation:

You are invited to participate in this study by attending an interview that will take place after we have finished collecting information from the resident to whom you provide care. The resident will have tried out a home health care technology for a couple of months. The technology is a device called WellAssist™ that can give important information about a person's health, such as blood pressure, pulse rate, and body weight. It can connect the user with their health service providers and people who provide care, such as family members, friends, and healthcare professionals.

Procedure:

If you participate, you will be asked to do a short (15-minute) interview about the kinds of help and support that this resident needs at home, and about your opinion of the WellAssist™ technology. The interview will take place at your convenience by telephone or video call and it will be audio-recorded.

Conditions for Participation:

Your participation in this study is completely voluntary. You may refuse to participate, withdraw at any time, and decline to answer any question without negative consequences. You may notify the researcher that you wish to withdraw from the study at any point. Please note that the study is independent from the Perley and Rideau Veterans' Health Centre and that refusal to participate will have no effect on your employment at the Centre. If you decide to withdraw, you may choose to have any data collected from you not to be used in the study and destroyed.

Risk/ Benefits:

There are no known risks from participating in this research.

You may indirectly benefit from participating in this study by being able to share your experiences with others about how technology affects health care for elderly residents. You can also help others like you by sharing your experiences so that healthcare providers can learn how to improve services related to home health care technology.

Confidentiality:

All information obtained during the study will be treated confidentially. You will be assigned a code number (a pseudonym) that will be used in the data files. A list linking the code number with your name will be kept in a secured place, separate from your data files. Documents that include your name and contact information, including the signed consent form and the screening form will be kept in a secured locked office at the researchers' institutions. If the results of the study are published, your name will not be used. All information obtained in this study will be used for research purposes only.

Dissemination of Findings:

You may request a copy of the study results at the end of the study by contacting the researcher. If you would like to receive a copy of the study report, you may indicate by making a checkmark here:

_____

Rights of Participants:

You may choose not to participate or refuse to answer any question. By accepting to take part in this study, you do not waive any of your legal rights, nor do you release the investigators, the sponsor, or the institution where this research study is being conducted from their civil and professional responsibilities.

This study has been approved by the Research Ethics Board (REB) at the University of Ottawa. The REB is responsible for ensuring that participants are informed of the risks associated with the research and that participants are free to decide if participation is right for them.

Contact Persons:

If you would like to discuss any aspect of the study, please feel free to contact:

1. Principal Investigator: Professor Jeffrey W. Jutai at (613) 806-8285 or email: jjutai@uottawa.ca
2. Co-Principal Investigator: Professor Pascal Fallavollita at (613) 562-5800 ext.3986 or email: pfallavo@uottawa.ca

If you have any questions regarding the ethical conduct of this study, you may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5, Tel.: (613) 562-5387, Email: ethics@uottawa.ca).

Thank you.

Appendix 6: Consent Form (Staff member)

Study Title: Ageing, Technology, and Experiences of Home

Understanding of my rights in research

Please circle YES or NO		
I read the letter about this study.	YES	NO
I decided that I want to be in this study.	YES	NO
I know that I do not need to be in this study if I do not want to.	YES	NO

I will participate in this study. Each of the three sessions will last 60 minutes.	YES	NO
I can stop my participation when I want.	YES	NO
It is okay for the researchers to use my answers when they tell people about their research.	YES	NO
I know that the researchers will not tell anybody my name.	YES	NO
It is okay for the researchers to ask me again if I want to continue participating in the study.	YES	NO

Participant:

I understand that, if I am present during a research interview with the resident, I will respect the confidentiality of the resident's information that is shared during the interview, and I will not communicate this information to the Perley Rideau Centre without the explicit permission of the resident.

I had an opportunity to discuss this study, and any questions that I have asked were answered to my satisfaction. I voluntarily consent to participate in the study "Ageing, Technology, and Experiences of Home". I understand that this study is independent from The Perley and Rideau Veterans' Health Centre and that refusal to participate will have no effect on my employment at the Centre. I understand that I will receive a signed copy of this form.

_____	_____	_____
Participant's Name (Print)	Participant's Signature	Date

By marking my initials here, _____, I agree to allow the researchers to contact me at a later time if they would like me to clarify any information.

Person obtaining consent:

I have discussed this study in detail with the participant. I believe the participant understands what is involved in this study.

_____	_____	_____
Researcher's Name (Print)	Researcher's Signature	Date

If you have any questions regarding the ethical conduct of this study, you may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5, Tel.: (613) 562-5387, Email: ethics@uottawa.

Appendix 7: Interview Forms

FIRST INTERVIEW WITH PARTICIPANT

Sociodemographics of Perley Residents

Participant code: _____

1. What was your main occupation? _____

2. What is your education level?

Please check appropriate response:

_____ High School Graduation

_____ College Diploma

_____ Undergraduate Degree

_____ Master's Degree

_____ PhD

_____ Other: _____

3. What is your marital status?

_____ Common-law

_____ Divorced

_____ Married

_____ Single

_____ Widowed

_____ Other: _____

4. What is your gender?

_____ Male

_____ Female

_____ Other (specify): _____

5. What is your age in years? _____

6. Country of birth _____

7. If you were not born in Canada, how long (in years) have you lived here? _____

8. What is the primary language that you communicate with your family and friends?

_____

9. Do you receive home care services?

Yes/No (circle one)

If yes, please tell me the services you receive:

_____

10. In the past month, have you done any of the following (check all that apply):

_____ Had appointment with family physician/primary care provider

_____ Gone to the emergency department

_____ Stayed overnight in hospital

The Go-Along Interview*

The researcher will accompany the participant on a walk through their residence. The researcher will give as little direction as possible with regard to what they would like the participant to talk about. If the participant insists on instructions, the researcher will ask them to comment on whatever came to mind while looking at and moving through their home and also to share with the researcher what feelings and thoughts they usually experienced in each location. On occasion, the researcher may point to a feature in the home that was difficult to overlook and ask the participant what they thought of, or felt about, this particular object in order to demonstrate what kind of information the researcher was looking for.

* Kusenbach, M.,2003. Street phenomenology: the go- along as ethnographic research tool. Ethnography4(3),455–485.

Is there anything else you'd like to tell us about you and your experience of home?

Factors that affect use and acceptance of new technology by older people*

11. Self-rated physical exercise

    How would you describe your level of physical activity?

    1=not active 2=moderately active 3=very active

12. Self-rated physical mobility

    How easily can you go up a staircase? 1=without difficulty 2=with difficulty 3=cannot do it

13. Security feeling during day

    How secure do you feel during the daytime?

    1=very insecure 2=moderately secure 3-very secure

14. Security feeling during night

    How secure do you feel during the nighttime?

    1=very insecure 2=moderately secure 3-very secure

15. In the last 12 months have you used following devices?

	Yes (without difficulty)	Yes (with difficulty)	No	I don't know
Smartphone				
Computer tablet (iPad)				
Laptop computer				
Desktop computer				

If you answered 'yes' to having used any of the devices listed from question 15, answer questions 16-18. If you answered 'no' to having used all the devices listed in question 15, skip questions 16-18 and go to question 19.

16. How often do you use the Internet?

    1=every day

2=more than once a day

3=once a day

4=once a month

5=less than once a month

17. On average, how many hours per day do you spend on the Internet?

1=less than 1 hour a day

2=1-2 hours

3=2-3 hours

4=3-4 hours

5=more than 4 hours a day

18. What do you like doing most online?

1=social networking (Facebook, Instagram)

2=news

3=music

4=play videos

5=playing games

6=email

7=shopping

8=internet TV

9=banking and pay bills

10=play podcasts

11=send or receive photos

12=take academic classes

13=other (please specify) _____

19. Attitudes Toward Technology Questionnaire**

	fully disagree		neither agree or disagree		fully agree
I think it's fun to use new technological gadgets.	1	2	3	4	5
Using technology makes life easier for me.	1	2	3	4	5
I like to acquire the latest models or updates.	1	2	3	4	5
I am sometimes afraid of not being able to use new technical things.	1	2	3	4	5
Today, technological progress is so fast that it's hard to keep up.	1	2	3	4	5
I would have dared to try new technical gadgets to a greater extent if I had had more support and help than I have today.	1	2	3	4	5

*Tacken, Mart & Marcellini, Fiorella & Mollenkopf, Heidrun & Ruoppila, Isto & Széman, Zsuzsa. (2005). Use and acceptance of new technology by older people: Findings of the international MOBILATE survey 'Enhancing mobility in later life'. Gerontechnology. 3. 126-137. 10.4017/gt.2005.03.03.002.00.

**Anderberg P, Eivazzadeh S, Berglund JS. A Novel Instrument for Measuring Older People's Attitudes Toward Technology (TechPH): Development and Validation. J Med Internet Res 2019;21(5):e13951

DOI: 10.2196/13951

Loneliness*

The next questions are about how you feel about different aspects of your life. For each one, tell me how often you feel that way.

Question	Hardly Ever	Some of the Time	Often
1.How often do you feel that you lack companionship?	1	2	3
2. How often do you feel left out?	1	2	3
3. How often do you feel isolated from others?	1	2	3

* Hughes, Mary E., Linda J. Waite, Louise C. Hawkley, and John T. Cacioppo. 2004. "A Short Scale for Measuring Loneliness in Large Surveys: Results from Two Population-Based Studies." Research on Aging 26:655-72.

Conclusion of the Interview

Is there anything else you'd like to tell us about you and your experience of home?

SECOND (FINAL) INTERVIEW WITH PARTICIPANT

Participant code: _____

1. In the past month, have you done any of the following (check all that apply):

_____ Had appointment with family physician/primary care provider

_____ Gone to the emergency department

_____ Stayed overnight in hospital

2. How often did you use the Well Assist technology?

1=every day

2=more than once a day

3=once a day

4=once a month

5=less than once a month

The Go-Along Interview*

The researcher will accompany the participant on a walk through their residence. The researcher will give as little direction as possible with regard to what they would like the participant to talk about. If the participant insists on instructions, the researcher will ask them to comment on whatever came to mind while looking at and moving through their home and also to share with the researcher what feelings and thoughts they usually experienced in each location. On occasion, the researcher may point to a feature in the home that was difficult to overlook and ask the participant what they thought of, or felt about, this particular object in order to demonstrate what kind of information the researcher was looking for.

*Kusenbach, M., 2003. Street phenomenology: the go- along as ethnographic research tool. Ethnography 4(3),455–485.

Is there anything else you'd like to tell us about you and your experience of home?

Factors that affect use and acceptance of new technology by older people*

1. Self-rated physical exercise

   How would you describe your level of physical activity?

   1=not active 2=moderately active 3=very active

2. Self-rated physical mobility

   How easily can you go up a staircase? 1=without difficulty 2=with difficulty 3=cannot do it

3. Security feeling during day

   How secure do you feel during the daytime?

   1=very insecure 2=moderately secure 3-very secure

4. Security feeling during night

   How secure do you feel during the nighttime?

   1=very insecure 2=moderately secure 3-very secure

5. In the last 3 months have you used following devices?

	Yes (without difficulty)	Yes (with difficulty)	No	I don't know
Smartphone				
Computer tablet (iPad)				
Laptop computer				
Desktop computer				

If you answered 'yes' to having used any of the devices listed from question 5, answer questions 6-8. If you answered 'no' to having used all the devices listed in question 5, skip questions 6-8 and go to questions about Loneliness.

6. How often do you use the Internet?

1=every day

2=more than once a day

3=once a day

4=once a month

5=less than once a month

7. On average, how many hours per day do you spend on the Internet?

1=less than 1 hour a day

2=1-2 hours

3=2-3 hours

4=3-4 hours

5=more than 4 hours a day

8. What do you like doing most online?

1=social networking (Facebook, Instagram)

2=news

3=music

4=play videos

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7=shopping

8=internet TV

9=banking and pay bills

10=play podcasts

11=send or receive photos

12=take academic classes

13=other (please specify) _____

Loneliness*

The next questions are about how you feel about different aspects of your life. For each one, tell me how often you feel that way.

Question	Hardly Ever	Some of the Time	Often
1.How often do you feel that you lack companionship?	1	2	3
2. How often do you feel left out?	1	2	3
3. How often do you feel isolated from others?	1	2	3

* Hughes, Mary E., Linda J. Waite, Louise C. Hawkley, and John T. Cacioppo. 2004. "A Short Scale for Measuring Loneliness in Large Surveys: Results from Two Population-Based Studies." Research on Aging 26:655-72.

Psychosocial Impact of Assistive Devices Scale (PIADS)*

Now I am going to read out a list of words and phrases.

For each word or phrase, I want you to tell me if your WellAssist device has made any difference in your life.

If you tell me that your WellAssist has made a difference, I will then ask you to tell me if it has made things better or worse for you.

There are no right or wrong answers. Please be as honest as you can when replying.

Do you understand what I am asking you to do?

Do you have any questions before we begin?

Let's begin with the first word or phrase.

Competence

<Refer to PIADS glossary if participant has trouble with the meaning of the word or phrase. No item can be left unanswered. Use 0 (zero) if the participant cannot decide if there has been an impact.>

Has WellAssist made you feel more or less competent?

<If participant says "no", code as 0 (zero) and move onto next item.>

<If participant says "yes, more", then follow up by asking which of the following best describes this impact:

"Would you say that WellAssist has made this

Very Much Better for You (code as +3),

Just a Little Bit Better for You (code as +1),

or Somewhere in Between (code as +2)."

<If participant says "yes, less", then follow up by asking which of the following best describes this impact:

"Would you say that WellAssist has made this

Very Much Worse for You (code as -3),

Just a Little Bit Worse for You (code as -1),

or Somewhere in Between (code as -2)."

<Repeat this procedure for the rest of the items on the scale.>

	Decreases	-3	-2	-1	0	1	2	3	Increases
1)	competence	☐	☐	☐	☐	☐	☐	☐	
2)	happiness	☐	☐	☐	☐	☐	☐	☐	
3)	independence	☐	☐	☐	☐	☐	☐	☐	
4)	adequacy	☐	☐	☐	☐	☐	☐	☐	
5)	confusion	☐	☐	☐	☐	☐	☐	☐	
6)	efficiency	☐	☐	☐	☐	☐	☐	☐	
7)	self-esteem	☐	☐	☐	☐	☐	☐	☐	
8)	productivity	☐	☐	☐	☐	☐	☐	☐	
9)	security	☐	☐	☐	☐	☐	☐	☐	
10)	frustration	☐	☐	☐	☐	☐	☐	☐	
11)	usefulness	☐	☐	☐	☐	☐	☐	☐	
12)	self-confidence	☐	☐	☐	☐	☐	☐	☐	
13)	expertise	☐	☐	☐	☐	☐	☐	☐	
14)	skillfulness	☐	☐	☐	☐	☐	☐	☐	
15)	well-being	☐	☐	☐	☐	☐	☐	☐	
16)	capability	☐	☐	☐	☐	☐	☐	☐	
17)	quality of life	☐	☐	☐	☐	☐	☐	☐	
18)	performance	☐	☐	☐	☐	☐	☐	☐	
19)	sense of power	☐	☐	☐	☐	☐	☐	☐	
20)	sense of control	☐	☐	☐	☐	☐	☐	☐	
21)	embarrassment	☐	☐	☐	☐	☐	☐	☐	
22)	willingness to take chances	☐	☐	☐	☐	☐	☐	☐	
23)	ability to participate	☐	☐	☐	☐	☐	☐	☐	
24)	eagerness to try new things	☐	☐	☐	☐	☐	☐	☐	
25)	ability to adapt to the activities of daily living	☐	☐	☐	☐	☐	☐	☐	
26)	ability to take advantage of opportunities	☐	☐	☐	☐	☐	☐	☐	

* Day H, Jutai J. Measuring the psychosocial impact of assistive devices: The PIADS. Can J Rehabil 1996; 9: 159–168.

Glossary of PIADS Items

Ability to Adapt to the Activities of Daily Living (item 25) Ability to cope with change; ability to make basic tasks more manageable

Ability to Participate (item 23) Ability to join in activities with other people

Ability to take advantage of opportunities (item 26) Ability to act quickly and confidently when there is a chance to improve something in your life

Adequacy (item 4) Capable of handling life situations, and handling little crises

Capability (item 16) Feeling more capable; able to cope

Competence (item 1) Ability to do well the important things you need to do in life

Confusion (item 5) Unable to think clearly, act decisively

Eagerness to Try New Things (item 24) Feeling adventuresome and open to new experiences

Efficiency (item 6) Effective management of day to day tasks

Embarrassment (item 21) Feeling awkward or ashamed

Expertise (item 13) Knowledge in a particular area or occupation

Frustration (item 10) Being upset about lack of progress in achieving your desires; feeling disappointed

Happiness (item 2) Gladness, pleasure; satisfaction with life

Independence (item 3) Not dependent on, or not always needing help from, someone or something

Performance (item 18) Able to demonstrate your skills

Productivity (item 8) Able to get more things done in a day

Quality of Life (item 17) How good your life is

Security (item 9) Feeling safe rather than feeling vulnerable or insecure

Self-Confidence (item 12) Self-reliance; trust in yourself and your abilities

Self-Esteem (item 7) How you feel about yourself, and like yourself as a person

Sense of Control (item 20) Sense of being able to do what you want in your environment

Sense of Power (item 19) Sense of inner strength; feeling that you have significant influence over your life

Skillfulness (item 14) Able to show your expertise; perform tasks well

Usefulness (item 11) Helpful to yourself and others; can get things done

Well-being (item 15) Feeling well; optimistic about your life and future

Willingness to Take Chances (item 22) Willing to take some risks; willing to take on new challenges

Conclusion of the Interview

What things do you like about WellAssist?

What things don't you like about WellAssist?

Is there anything else you'd like to tell us about your experience with WellAssist?