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Research Article

Anticipated Satisfaction of Technologies in the Homes and Lives of Older Adults to Prolong Independence

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Abstract

Introduction: As the population of older adults grows and solutions are needed to care for them as they age, gerontechnology provides an opportunity to assist older adults as they age and keep them active in society.

Method: In this initial study, quantitative data was collected from a sample of 31 participants to explore the level of satisfaction older adults feel they would experience from integrating various gerontechnologies into their lives. Participants responded to demographic questions regarding age, education, ethnicity, living situation, and ability level. Participants also reported their anticipated satisfaction level for various gerontechnologies with the intent to prolong their current independence levels.

Results: Varying levels of anticipated satisfaction were reported by participants, with the Apple Watch, Life Alert, and induction cooktops being among those with the highest anticipated satisfaction rating. Of the wearable technologies, the Apple Watch had the highest anticipated satisfaction rating, and of the home-integrated technologies, the induction cooktop had the highest anticipated satisfaction rating.

Conclusion: Findings showed that simply participating in this study exposed participants to various technologies that can serve older adults as they age. Findings also suggest that most older adults find that they would be satisfied to some degree by integrating technology into their lives to assist them in aging in place. Further analysis of the data and analysis of qualitative data may reveal richer and more meaningful findings.

Keywords: Aging in place; Gerontechnology; Independence; Technology

Abbreviations: IADL: Instrumental Activities of Daily Living; ADL: Activities of Daily Living; TAM: Technology Acceptance Model

Introduction

Prior to the global pandemic, the number of people aged 60 years and older was 1 billion and reaching 1.4 billion in 2020 [1]. While the number of deaths initially due to the pandemic was devastating for this demographic the world has addressed health concerns due to COVID, and older adults will continue to thrive and live longer. The prediction of global population growth, especially among older adults, has been well established. With better healthcare including vaccines, healthier lifestyles, and an ever-increasing use of technology to assist with daily life, people are experiencing increased longevity, allowing this demographic population to continue to increase [2,3]. Cheng et al. [4], used a decomposition methodology to analyze data from the Global Burden of Disease Study 2017 to determine the number of deaths and population size for each year from 1990 to 2017 and concluded that, overall, the elderly population is growing globally but varies based on the

wealth of the country or region [4]. Their purpose of publishing this data was to encourage governmental institutions worldwide to prioritize the health care of a growing elderly population, including those from lower income levels.

This 2020 study was conducted prior to the global COVID pandemic, which has greatly impacted the mortality rate among senior citizens globally. Leão, Severo, Barros, and The Public Health Research Group published a research letter in the Journal of American Geriatrics Society [5], that linked a greater risk of contracting COVID to living and working in settings with high occupancy rates, such as long-term health care facilities [5]. Elderly populations, being very aware of the dangers, chose to stay home along with health care workers rather than risk illness and possible death. In addition, many who were still working but close to retirement chose to take early retirement to protect their health [3]. Because of this, aging at home may have become even more desirable as they found they were able to self-advocate for their needs and were remarkably resilient living on their own [6]. Often, older adults that need some assistance find only facilities that include services they do not need and, in fact, are seen as intrusive or confining in their personal life. Kramer C, Pfaffenbach's [7], findings in their extensive study of retirement age citizens in Germany indicated that a large proportion planned on aging in place [7].

With populations such as the Baby Boomer generation (those born after WWII, between 1946 and 1964) living longer, it is important to examine how and where to care for them as they age and continue to play an active role in a growing society. As Baby Boomers (common term used in US, Europe, and Australia) rapidly reach the current retirement age of 65, many have chosen to continue to work or return to work after retirement and remain active in society for a variety of reasons. According to Pew Researchers, aside from financial reasons, older adults have a desire to continue working as a sense of usefulness, a means to remain socially connected beyond retirement, and to maintain mental stimulation [8]. Particularly in developed or developing economic countries, many older adults will want to stay active both mentally and physically to promote a greater quality of life as they age. Furthermore, Landau from US News & World Report found that some Boomers perceive the idea of retirement as lacking challenge, unaffordable, and even boring [8]. Although older adults oftentimes have a desire to remain engaged in the workforce, they can face ageism in society even before they need to consider their ability to live alone. For example, older adults can often be seen as less desirable than younger candidates for employment, despite having more knowledge than a younger applicant [2]. Despite the discrimination older adults might face in workplace and society, they can contribute rather positively to society; therefore, there should be more emphasis on ensuring their inclusion. Older populations can provide companies with higher productivity due to their past training as well as their loyalty and reliability [2]. Furthermore, older adults in the workplace are capable of serving as mentors whose knowledge and experience can be passed on to younger employees.

In addition to their paid work, older adults contribute to society through civic and community engagement and volunteering [9]. Though ageism is still prevalent in society, it is important that older adults' involvement in society and the perceptions of aging be re-evaluated to recognize the positive impacts older adults can make if given the option to be included. Additionally, with the technology advances in recent years, many Baby Boomers have the ability and time to figure out how to use the newest technologies that are introduced in society. Google partnered with marketing research firm Known to understand the digital and technology awareness among Baby Boomers and found that 82 to 86 percent of seniors are on their smart phone or online around six hours a day. Many use technology to manage finances and improve their health and wellness, showing that this demographic is already using technology in their daily lives [10].

Grimmer K, et al. [11], conducted a study using focus groups of individuals 65 years of age and older to learn what experiences older people had in planning for and living in an aging-in-place scenario in their home and community [11]. Participants identified relatively simple, low-cost, and effective supports to enable them to adapt to change while retaining independence and resilience. The findings highlighted how successful aging-in-place requires integrated, responsive, and accessible primary health and community services. Beyond the basic services, the community can develop homes that incorporate technology that will allow for greater monitoring of the wellbeing of the older population without them being placed in a full-scale nursing home.

With such great access to today's technology, older adults may be able to utilize various aspects of gerontechnology, which are technological products or services that can assist them with their daily living to help prolong their ability to live independently [12]. Though assisted living facilities can offer resources and assistance to older adults, many health risks have been associated with the isolation many older adults face as they age and retire or move out of their homes into care facilities. Increased risk of morbidity and mortality, infection, heart disease, depression, and decline in cognitive health are all health risks linked to social isolation that many elderly adults face [13]. This data demonstrates the importance of providing better care for older adults to promote a longer and healthier life, which can prolong their involvement in society. Encouraging the longevity of older adults' ability to independently live also means they can continue to positively contribute to society in various ways. Through today's expansive access to technology and its many capabilities, it is possible that the issues that older adults face as they age could be further addressed and even prevented to help facilitate a safer, healthier, and more impactful way of life for them without creating additional discomfort in their lives.

Assessment of Independence

Despite the physical decline and need for assistance that many older adults face as they age, many prefer to continue living in their own homes because they find moving into a care facility or institution unappealing [14]. This does not come as a surprise, as many assisted

living facilities can be associated with a loss of independence and increase in isolation and can often feel institutional as opposed to home-like [15]. However, the reality of living independently relies on the impact such a decision could have on the safety of an older adult and their ability to properly care for themselves. As older adults age, their ability to continue living independently may change based on the daily functions they are able (or unable) to carry out. These daily functions are called Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL). IADLs are tasks such as shopping, cooking, and managing finances and are usually lost before ADLs, which are tasks such as bathing, eating, and using the toilet [16]. Older adults' abilities to carry out these tasks can help to determine their independence level and the level of care they need [16]. The Lawton Instrumental Activities of Daily Living Scale is an assessment tool that can be used with older adults to determine whether they would be able to care for their own well-being and safety while living on their own and measures various aspects of everyday life that are necessary to do so [16]. Some of the instrumental activities of daily living that are assessed by the Lawton Instrumental Activities of Daily Living Scale include tasks such as managing finances, preparing food, doing laundry, and arranging for transportation. The assessment can provide insight into the level of independence and safety that exists in a person's life [16]. While caregivers and professionals can certainly perform an assessment on older adults in person to determine their ability levels, the technology that exists today can also serve as a method of assessing individuals' abilities, even as they change over time, in addition to providing a way to prevent the loss of functional abilities that contribute to safe independent living.

Objectives

The purpose of this study was to examine the anticipated satisfaction of gerontechnology by independently living older adults over the age of 65 who have the potential to use technology either now or in the future to help them maintain their independence. The quantitative method study specifically aimed to examine technology that could be integrated rather unobtrusively into the lives and living spaces of older adults and the level of satisfaction older adults would anticipate with the integration of these technologies. This was conducted through in-person surveys and video interviews of small focus groups in person or via Zoom. The main question that the research sought to answer was: What forms of gerontechnology integrated into the lives of older adults will be perceived to be the most helpful in maintaining their independence as they age?

Technology Types

Technology is constantly growing and evolving. Over the years, there have been several technologies, known as gerontechnology, that have been adapted to better serve older populations. There have been three different levels, or generations, of technology that have evolved in how they assist older adults. First-generation technologies consist of wearable technology that allows the user to press a button to call for assistance in the event of an emergency [17]. Though useful, this technology can serve as a reminder to older adults that they rely on technology to maintain their independence and requires them to take action, which is not always possible if they are completely incapacitated.

Second-generation technologies go beyond the capabilities of first-generation technology by incorporating electrical components that allow for monitoring, detection, and response of potential emergencies [17]. This can include monitors in a home that detect problems and contact authorities when needed. While second-generation technologies certainly provide much more assistance and safety to users through advanced capabilities, they can pose a threat to the privacy of users by being too invasive.

Third-generation technologies are the most recent development in gerontechnology and encompass the abilities of both first- and second-generation technologies in a less invasive way in addition to being more focused on prevention as opposed to response [17]. This means that third-generation technology is still able to detect problems and respond, when necessary, but the focus is on eliminating the need to reach that step. For example, technology that monitors users can indicate changes in health early on and bring attention to these problems so that adjustments to the user's care can be made before an emergency would arise [17]. Because these technologies are not always quite as obvious as first- and second-generation technologies, they might feel less invasive to users and can help reduce the embarrassment users might feel from needing extra assistance with their day-to-day lives [17]. A lowered perception of embarrassment could potentially increase use of such technology and help to further facilitate quality care for older adults needing assistance.

Understanding the different generations of gerontechnology can be important when it comes to integrating technology into senior living. By understanding what each generation of gerontechnology consists of, design solutions surrounding the incorporation of technology can be evaluated to better serve residents and their needs. With many levels of technology and various applications, designers can work to seamlessly integrate them into spaces to promote resident safety, prolonged independence, reduced stigmatization, and increased acceptance of technology.

Wearable & Home Integrated Gerontechnologies

Gerontechnology has expansive capabilities when it comes to how it can be integrated into older adults' lives and how it can assist them with ease. It is important to look not only at the ease older adults might have when using specific gerontechnologies, but also how smoothly they can be integrated into their lives. Ensuring gerontechnology is integrated in a manner that is not extremely obtrusive is important because it allows for users to feel comfortable and safe without the embarrassment or stigma that can come from needing assistance [18]. There are several market-ready technologies that exist today that can help achieve this goal and include technology that is both wearable and capable of being integrated into one's home.

When looking at what gerontechnologies can be integrated into older adults' lives and the best way to do so, it is important to consider some of the issues older adults have with tasks in their

everyday lives and those that might impact the maintenance of their independence. A study by Fausset CB, et al. [19], found that most older adults struggle with tasks related to cleaning, such as vacuuming and laundry, in addition to outdoor tasks such as maintaining the lawn [19]. With this in mind, it is important that the gerontechnologies selected for the lives of older adults are considerate of the struggles and deficiencies that older adults actually experience. This can help to ensure that older adults are receiving long-term, quality assistance that can truly benefit them and their needs. So, communities that offer services for interior cleaning and exterior maintenance is a must.

Wearable Gerontechnology: Wearable gerontechnologies provide individuals with a great level of monitoring and assistance without compromising discretion or comfort. Wearable devices such as the Smartex Wearable Wellness System (Figure 1) incorporate the use of sensors into textile designs so individuals can wear an item of clothing and receive feedback on body functions, such as body temperature, respiratory function, posture, and more, to detect potential issues [20]. This wearable gerontechnology is an example of how assistive technologies to support older adults can function well enough to reduce the worry individuals and their families might have but does not interfere with one's life or cause embarrassment from its use. Though wearable gerontechnology can certainly take the form of clothing, it can also present itself as an accessory, as seen in the case of the Apple Watch (Figure 2). The popular Apple Watch is an electronic accessory that is often seen as stylish and fun and, due to its popularity, is very easily accessible for those that might want to utilize the watch's functions. Some of the features of the user-friendly Apple Watch Series 6 are health features such as fall detection, emergency call prompting, connection to glucose monitoring, diet tracking, meditation, breathing reminders, dangerous noise level warning, heart rate monitoring, among others [21]. This is an example of a technology that was designed with the general population in mind, but when further examined, it makes a great case for a gerontechnology that promotes the health and well-being of older adults looking to prolong their independence. Though just a couple of examples, these wearable gerontechnologies demonstrate how unobtrusive the use of technology can be while providing a great deal of added assistance to the lives of older adults.

Figure 1: Smartex Wearable Wellness System.

Figure 2: Apple Watch Series 6.

Home-Integrated Gerontechnology: While wearable gerontechnologies are a great way for older adults to increase or prolong independence, especially when out and about, there also exists a wide variety of gerontechnologies that can easily be integrated into their homes to provide assistance. Like wearable technology, home-integrated gerontechnologies often use sensors to assist and monitor older adults. One example of a home-adapted gerontechnology is the dwellSense (Figure 3) home sensor system. This system consists of task-based sensors that monitor how well individuals perform IADLs, such as taking medicine, making coffee, and other everyday tasks [22]. Because the sensors used with dwellSense are embedded within objects such as medicine containers or coffee pots that older adults would be using on a regular basis, the technology is integrated with little disruption or interference in an individual's life. How older adults perform tasks is monitored through the sensors, and the data that is collected can be analyzed to track patterns and even allow for caregivers and family members to monitor data so they can see early indicators of accidents such as falls and adjust care plans accordingly [22]. Another example of home-integrated gerontechnology that utilizes sensors is SensFloor (Figure 4). It is a floor underlay material that monitors walking patterns, detects falls or intruders, and alerts medical staff or authorities if an accident occurs [23]. This technology promotes safety for older adults by unobtrusively monitoring users and prevents future problems by notifying caregivers and users of changes and early indicators of health issues.

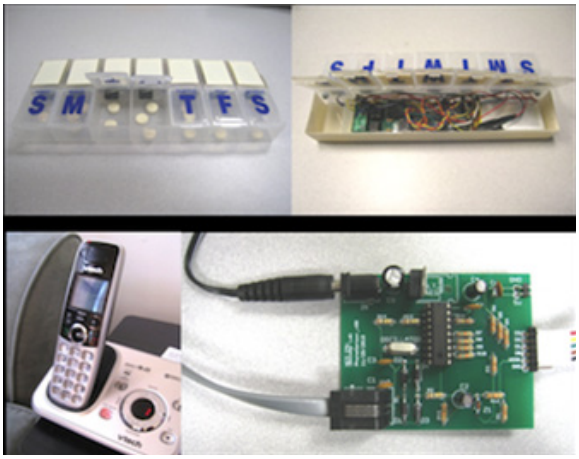

Figure 3: dwellSense.

Figure 4: SensFloor.

The integration of sensors into the home is a very unobtrusive way to provide monitoring and assistance to older adults as they age and seek to maintain their independence. However, sometimes older adults might need only slight assistance or adaptation of their daily tasks or tools, such as cooking, to help them remain safe while living independently without taking away the activities they enjoy. One technology that can be integrated with older adults in mind is an induction cooktop (Figure 5) in the kitchen. Induction cooktops use magnetic fields and the metal in users' cookware to generate heat as opposed to using electric coils or gas [24]. Since the cooktop requires cookware with iron content to generate heat, parts of the cooktop that are not in contact with such a material will

remain cool to the touch and will not produce heat. Additionally, the cooktop will automatically turn off after a short time of cookware being removed from the surface [24]. This type of cooktop is a great way to allow older adults to remain active in their kitchens without compromising their safety due to the cooling features and automatic shut off and can help older adults feel and live more independently as they age.

Figure 5: GE Appliances Induction Cooktop.

There are many existing technologies that have been adapted to provide older adults with the assistance they need to maintain their independence and feel more at ease living independently. Whether it is a wearable technology or a home-integrated technology, the gerontechnologies that exist are very capable of being integrated into older adults' lives with little disruption. The integration of gerontechnologies into the lives of older adults in an unobtrusive manner is important because it can assist older adults in maintaining their independence and remaining active in society.

Theoretical Framework

The research was guided by the Technology Acceptance Model (TAM) (Figure 6). This model helps provide insight into how likely an individual might be to accept a particular technology, in this case gerontechnology. Both perceived usefulness and perceived ease of use impact individuals' likeliness of accepting or rejecting a technology. Perceived usefulness is defined as the degree to which a person believes using a particular technology could enhance their life, whereas perceived ease of use is defined as the degree to which a person believes using a technology will be free of effort [25]. That is, whether a technology will be able to help them, and if so, if it is easy enough to use that it is perceived as useful. This theory demonstrates the influence that might exist on an individual's acceptance of technology that can help them age in place. In this study, anticipated satisfaction of gerontechnologies was analyzed. It can be assumed that the easier a certain gerontechnology is to use and the more helpful it is perceived to be, the more likely an individual will accept said technology. Examining participants' responses to see which technologies are perceived as most useful and easiest to use can help researchers identify what can be successfully integrated into the lives of older adults. It could also allow for researchers to identify the potential shortcomings of technologies in terms of their perceived usefulness and ease of use to improve technologies to be more acceptable by older adults.

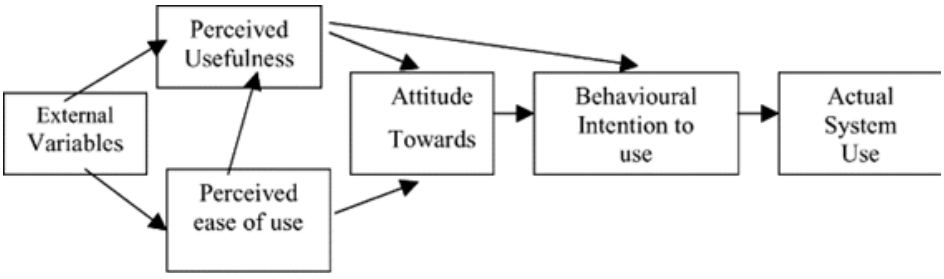

Figure 6: Technology Acceptance Model.

Method

Sample Selection

The sample for this study was comprised of independently living older adults, whether in an assisted living facility or in their own homes. Participants for the study were purposefully sampled and comprised of older adults over the age of 65 who have the potential need to incorporate various gerontechnologies into their lives now or in the future to support them as they age. From this purposeful sample, the second sampling method of a snowball sample was

selected from older adults known by the researchers who then referred the survey to others within the target population. This group of older adults is important to the study because it allowed the researchers to see what would help maintain the participants' current independence levels and prevent the loss of abilities that might lead them to needing a skilled nursing facility.

Measures

In this initial research, a study was conducted using a quantitative methods approach to collect data. Participants were given a survey packet that asked them to rate their anticipated satisfaction of various gerontechnologies if factors such as cost, setup, installation, and support were not factors deterring them from using a particular technology. This packet included printed images of various existing wearable and home-integrated gerontechnologies, along with a description of each technology. The researchers met with individuals or small groups in person or via Zoom to ask questions regarding demographics, independence level, and anticipated satisfaction of the technology. For demographics, participants were asked to report on their age, biological sex, race/ethnicity, and current living situation (i.e., living alone, living with another person, living with more than one person, etc). To measure independence level, out of eight assessment items based on the Lawton Instrumental Activities of Daily Living Scale [16], participants were asked to select three items that they find themselves most concerned about interfering with their ability to remain at their current independence level. That is, the activities they worry will most impact their ability to continue caring for themselves. Items included were ability to use the telephone, shopping, preparing food, housekeeping, doing laundry, using transportation, handling medications, and handling finances. Participants were then asked to rate their anticipated satisfaction of various gerontechnologies. Individuals reported their responses on a 5-point Likert scale from 1=not satisfied at all to 5=very satisfied. Demographics, independence level, and anticipated satisfaction of the technology were variables that were measured to help give insight into what older adults feel they need to successfully maintain their independence.

Data Analysis

Descriptive statistics such as frequency were obtained to analyze the quantitative data through the use of statistical software SPSS. The independence level each participant chose as the biggest concern for living independently in the future was measured by frequency. Data collected from participants' responses on a Likert scale were also gathered and analyzed through descriptive statistics. This information allowed researchers to analyze the characteristics of the sample in addition to the sample's anticipated satisfaction of various technologies.

Results

Table 1 reports the descriptive statistics of the sample. Of the 31 respondents, 77.4% reported being within the 75–84-year-old age range, and all were white. 26.7% of participants' highest education level was a bachelor's degree, 74.2% of participants were female, and 54.8% of participants reported living at home with someone else.

Table 1: Sample Characteristics.

Characteristic	Percentage
Age	
65-74 years	0%
75-84 years	100%
85+ years	0%
Male	21%
Female	79%
Ethnicity	
White	100%
African American	0%
Asian / Pacific Islander	0%
Hispanic	0%
Native American	0%
Other	0%
Education Level	
Some High School	0%
High School	50%
Trade School	7.1%
Bachelor's Degree	21.4%
Master's Degree	7.1%

PhD or Higher	7.1%
Other	7.1%
Living Situation	
Senior Living Facility	0%
Living at Home Alone	57.1%
Living at Home with Someone Else	42.9%

Table 2 reports the items participants were most worried would impact their ability to continue caring for themselves. Participants were asked to select three items they were concerned about. 77.4% of participants were concerned with their ability to use transportation, 54.8% of participants were concerned with handling finances, and 45.2% of participants were concerned with shopping.

Table 2: Items Impacting Ability to Continue Caring for Self.

Item	Percentage
Using Telephone	21.4%
Shopping	28.6%
Preparing Food	42.9%
Housekeeping	42.9%
Doing Laundry	0%
Using Transportation	64.3%
Handling Medication	50.0%
Handling Finances	50.0%

Wearable Technology

Participants reported their anticipated satisfaction level for various gerontechnologies, both wearable and home integrated. Table 3 shows findings regarding anticipated satisfaction of wearable technologies. 35.5% of participants reported they would be extremely satisfied with the Apple Watch. 19.4% of participants felt they would be extremely satisfied with Life Alert. Only 9.7% of participants reported they would be extremely satisfied with the Smartex Wearable Wellness System, and 12.9% of participants reported they would be extremely satisfied with Medical Guardian.

Table 3: Reported Anticipated Satisfaction Level for Wearable Technologies.

Anticipated Satisfaction	Percentage
Medical Guardian	
Not at all satisfied	0.0%
Somewhat satisfied	14.3%
Neutral	7.1%
Very satisfied	57.1%
Extremely satisfied	21.4%
Life Alert	
Not at all satisfied	0.0%
Somewhat satisfied	21.4%
Neutral	14.3%
Very satisfied	21.4%
Extremely satisfied	42.9%
Smartex Wearable Wellness System	
Not at all satisfied	7.1%
Somewhat satisfied	21.4%
Neutral	35.7%

Very satisfied	14.3%
Extremely satisfied	21.4%
Apple Watch Series 6	
Not at all satisfied	7.1%
Somewhat satisfied	7.1%
Neutral	14.3%
Very satisfied	35.7%
Extremely satisfied	35.7%

Home-Integrated Technologies

Table 4 shows findings regarding anticipated satisfaction of home-integrated technologies. A majority of participants only felt neutral about both SensFloor and Care-O-Bot; however, 42.9% of participants reported they would be very satisfied with Health Harmony Home Sensing, 35.5% reported they would be very satisfied with dwellSense, and 45.2% of participants reported they would be extremely satisfied with an induction cooktop.

Table 4: Reported Anticipated Satisfaction Level for Home-Integrated Technologies.

Anticipated Satisfaction	Percentage
SensFloor	
Not at all satisfied	7.1%
Somewhat satisfied	14.3%
Neutral	42.9%
Very satisfied	21.4%
Extremely satisfied	14.3%
Care-O-Bot	
Not at all satisfied	14.3%
Somewhat satisfied	21.4%
Neutral	42.9%
Very satisfied	14.3%
Extremely satisfied	7.1%
Health Harmony Home Sensing	
Not at all satisfied	0%
Somewhat satisfied	21.4%
Neutral	14.3%
Very satisfied	42.9%
Extremely satisfied	21.4%
dwellSense	
Not at all satisfied	0%
Somewhat satisfied	14.3%
Neutral	28.6%
Very satisfied	42.9%
Extremely satisfied	14.3%
Induction Cooktop	
Not at all satisfied	7.1%
Somewhat satisfied	0%
Neutral	14.3%
Very satisfied	21.4%
Extremely satisfied	57.1%

Discussion

This study has raised awareness of the various types of gerontechnologies that exist and can serve to assist older adults and help them maintain their independence as they age. The study also showed that many older adults are willing to integrate these technologies into their lives and, in general, would be satisfied to some degree.

The results of this study show that, of the wearable technologies, most participants felt they would be most satisfied with the Apple Watch. Older adults who want to live independently may be more interested in the technology their adult children and grandchildren are using, such as the Apple Watch. As noted in one focus group, these family members can help the older adult set up and use the device. One such participant uses the watch to manage her diabetes and her son set it up for her and taught her how to use it. Though Medical Guardian is almost identical in features and application as Life Alert, fewer participants reported they would be extremely satisfied with Medical Guardian and more reported expecting to be extremely satisfied with Life Alert. It is possible that the familiarity of Life Alert persuaded participants to report higher anticipated satisfaction than Medical Guardian despite similarities between the products. Future research should further investigate the differences between these similar technologies and the reasons that participants tend to rate one higher than the other. These findings show an overall positive response towards wearable response technologies, with a less positive response towards wearable preventative technologies. One of the drawbacks to the Life Alert or Medical Guardian is that the older adult has to push a button to alert the managing company of an emergency. This can be problematic if someone is unconscious or suddenly can't move. As in one focus group who completed the survey, a neighbor within their community had a heart attack and passed out. Living alone, no one became concerned until the next day and discussion ensued that described how the SensFloor would have possibly saved her life, or at least she would have been found sooner by the management company, not forcing neighbors to get into her home and find her not alive. As for the Smartex Wearable Wellness System Cami that is worn under clothing to constantly monitor health, it was seen as neutral in perceived satisfaction, but this could be because they didn't currently need monitoring. It could be possible that this would seem desirable in place of having a heart detector attached to them to find irregularities over several days since they could wear it under clothing and could leave their home.

Of the home-integrated technologies, the gerontechnology that most participants felt they would be extremely satisfied with was the induction cooktop. However, many participants reported they would feel more neutral towards technologies like dwellSense, SensFloor, or the Care-O-Bot. These findings suggest older adults may be more accepting to more visible, yet less invasive technologies in their homes. Future research should investigate these patterns further and examine particular features that might impact their anticipated satisfaction levels, as it could just be a lack of knowledge of such technologies for these participants whose age was 75+.

Limitations

Sample Size: There were a few limitations to this study, the biggest one being that of a limited sample size. As a pilot study, the sample size for this study was small. The limited sample size was, in part, due to the COVID-19 pandemic. With physical limitations due to the pandemic, researchers had to adapt to gather data in small, socially distanced interview groups or in an online video interview. This limited the number of participants that could be gathered and surveyed from the snowball sample within the given time frame. Because of a smaller sample size, the data that was analyzed does not accurately represent the population in question, especially in terms of age, gender, and ethnicity. With future research and more participants in the study, the data collected may produce more meaningful results and better represent the population. Additionally, the age of the participants was older than other studies done. Future aging adults will have been living with more technology in general over the course of their lives and would possibly find some of the technology that was rejected by this group as being more desirable.

Technology: A second limitation to this study was the adaptation to researching through the use of technology, such as virtual interviews and presentations. The COVID-19 pandemic prevented researchers from meeting with participants face-to-face, so virtual meetings became a major part of distributing surveys and conducting interviews. While this was not a major limitation in the study, it did potentially limit who was able to participate in the study, especially the interview portion. The use of video interviews also caused technological issues that prevented connecting researchers and participants, slowing the research process at times.

Group Interviews: A third limitation to this study is that the survey completion and video interviews were often conducted with multiple people at a time. With participants often living in the same household (such as spouses), the interviews were often conducted simultaneously due to time constraints and convenience. The responses of participants may have been affected due to another person responding to the same questions at the same time. It is also possible that participants withheld elaborating on their opinions because of the presence of another interviewee.

Future Implications for Research

Future research should work to gather a larger sample size to more accurately represent the population. A broader, more diverse sample may reveal new findings or help to clarify existing findings. Inclusion of findings from qualitative data could also help to reveal richer, more meaningful data that was not captured within the surveys. Future research might also aim to analyze the relationships between items that individuals found concerning in maintaining their independence and what technologies they would be most likely to anticipate high satisfaction from. The research could also look at how social aspects impact individuals' likeliness to accept various technologies. That is, does having a more active social circle or support group lessen the anticipated satisfaction of integrating various technologies? Additionally, future researchers should utilize the findings from this study as a guide to develop more

meaningful and clearer questions within surveys and interviews to be able to produce richer data.

Conclusion

This study highlighted the concerns some older adults face as they age while trying to maintain their independence levels to remain active in society. The technologies presented to them raised awareness about various gerontechnologies that exist and are capable of providing them support as they age. The results of the study also indicate that many older adults are willing to integrate gerontechnology into their lives to at least some extent to assist them as they age. The findings clarify the aspects of technology that older adults like and dislike in addition to what they believe can assist them as they age independently. With more research and a larger, more diverse sample, more data could be examined to further clarify findings and explain the different satisfaction levels older adults anticipate with using various gerontechnologies. This understanding could be incorporated in homes and assisted living facilities for future housing of older adults in our communities.

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Conflict of Interest

Authors declare no conflict of interest.

References

1. World Health Organization (2022) Ageing and health.
2. David E. Bloom, Axel Boersch-Supan, Patrick McGee, Atsushi Seike (2011) Population aging: Facts, challenges, and responses. Program on the Global Demography of Aging.
3. Richard Fry (2021) Amid the pandemic, a rising share of older U.S. adults are now retired. Pew Research Center.
4. Cheng X, Yang Y, Schwebel DC, Liu Z, Li L, et al. (2020) Population ageing and mortality during 1990-2017: A global decomposition analysis. PLoS Med 17(6): e1003138.
5. Leão T, Severo M, Barros H, The Public Health Research Group (2021) COVID-19 transmission and case fatality in long-term care facilities during the epidemic first wave. J Am Geriatr Soc 69(12): 3399-3401.
6. Zahra Ebrahimi (2021) The elderly and the COVID pandemic: Early findings on the impact on health, mental well-being, and financial situation. EBRI Issue Brief; Washington DC 533: 13.
7. Kramer C, Pfaffenbach C (2016) Should I stay or should I go? Housing preferences upon retirement in Germany. Journal of Housing and the Built Environment 31(2): 239-256.
8. Carmine P. Gibaldi (2013) The changing trends of retirement: Baby boomers leading the charge. Review of Business 34(1): 50-57.
9. The Gerontological Society of America (2019) Higher education and aging: The age-friendly movement – building a case for age friendly inclusivity. What's Hot, A Newsletter of The Gerontological Society of America.
10. Postmedia Network (2023) Welcome the rise of tech use by baby boomers.
11. Karen Grimmer, Debra Kay, Jan Foot, Khushnum Pastakia (2015) Consumer views about aging-in-place. Clin Interv Aging 10: 1803-1811.
12. Ke Chen, Alan Hoi Shou Chan (2014) Gerontechnology acceptance by elderly Hong Kong Chinese: A senior technology acceptance model (STAM). Ergonomics 57(5): 635-652.
13. Erin York Cornwell & Linda J Waite (2009) Social disconnectedness, perceived isolation, and health among older adults. J Health Soc Behav 50(1): 31-48.
14. Damien Stones, Judith Gullifer (2014) 'At home it's just so much easier to be yourself': Older adults' perceptions of ageing in place. Ageing & Society 36(3): 449-481.
15. Steven J Flositz (2011) Aging with independence and interaction: An assisted living community. USF Tampa Graduate Theses and Dissertations 50(1): 31-48.
16. Carla Graf (2008) The Lawton Instrumental Activities of Daily Living scale. American Journal of Nursing 108(4): 52-62.
17. Blackman S, Malto C, Bobrovitskiy C, Waldoch A, Fang ML, et al. (2015) Ambient assisted living technologies for aging well: A scoping review. Journal of Intelligent Systems, 25(1): 55-69.
18. Röcker C (2013) User-centered design of intelligent environments: Requirements for designing successful ambient assisted living systems. 24th International Conference, Central European Conference on Information and Intelligent Systems. pp. 4-12.
19. Fausset CB, Kelly AJ, Rogers WA, Fisk AD (2011) Challenges to aging in place: Understanding home maintenance difficulties. J Hous Elderly 25(2): 125-141.
20. Smartex (2015) WWS.
21. Apple (2020) Apple Watch Series 6. Apple.
22. Matthew Lee (2012) What is dwellSense? dwellSense.
23. Future-Shape (2017) SensFloor.
24. GE Appliances (2020) Induction Cooking.
25. Fred D Davis (1989) Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly 13(3): 319-340.