

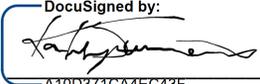
What are the benefits and barriers experienced by older adults who live alone when using smartphones regularly?

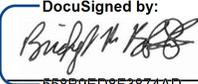
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Abstract

Digital technology is abundant in the world today; however, there are many people who do not use it comfortably. One main group that is sometimes uncomfortable with technology is older users, and this is particularly true of older people who live alone and have limited interaction with others. The goal of this project was to understand the experiences of older users who live alone when using technology on a daily basis, and to identify any barriers that may impact this group's usage, willingness, or motivation to understand and use technology. A diary study was conducted where ten participants answered daily questions through text message about their experiences using their smartphone for the duration of two weeks. The results showed that these older users knew the basic functionality of their smartphones; however, they felt pressure to learn more about their phones, mostly to avoid feeling like a burden to their families. Living alone places a unique burden on older adults because they felt that there was no immediate help available for their issues, leading to feelings of frustration and reduced motivation to continue trying to learn about smartphones.

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Chapter 1: Introduction

Background

Although modern technology is widespread in today's environment, many older users live alone and remain inexperienced. According to the Pew Research Center (2020), there are over 70 million Americans over the age of 60 in the United States. Of these adults, 27% live alone, compared to only 16% who live alone in 130 other countries. Therefore, it is essential to consider the daily experiences of older adults who live alone when using smartphones and to identify any limitations to this group's utilization, desire, or incentive to learn and apply smartphone technology in their daily lives. The importance of better understanding this age group is illustrated by the fact that older users who live alone and have little connection with others are more vulnerable to loneliness, accidents, and anxiety.

This study will analyze the thoughts and feelings that influence older users' motivation and attitudes toward the use of smartphones. This is significant because this demographic represents one-quarter of the population who are struggling to learn and understand technology. Millions of individuals are connected to others through smartphone technology. People who live alone in particular require such connections so that they do not feel entirely alienated from civilization. Many people have been further isolated because of the emergence of COVID-19. It is critical to comprehend the emotional consequences of such solitude. This study attempts to answer the following research questions:

1. How can technology like smartphones help this demographic?
2. What is the daily experience of older adults who live alone with regards to using their smartphones?
3. What are their daily obstacles? Are they physical, mental, or a combination of the two?
4. What strategies are used by this group when dealing with a technological problem or barrier?

Chapter 2: Literature Review

It is common knowledge that as we age, our physical strength, vision, dexterity, and hearing are diminished (Brennan, 2021). Research has also shown that our cognitive processing speed is reduced, as is our ability to block out interference in processing sensory information (Hardwick, 2022). In addition to these common challenges, older adults also face fewer tangible barriers to technology that depend on their levels of experience with technology. Unfortunately, the level of access and comfort that older adults have with communications technology has important implications for their health and mental well-being.

Level of Experience with Technology

One of the main themes found while researching the relationship between older adults and communications technology was a lack of experience. In order to incorporate technology into the lives of older adults, their experience level with using technology or its related devices needs to be accounted for. According to a study done by Baran and Alpaydin (2020), research showed that because the older users did not have experience using technology early in their lives, they do not feel comfortable using it later on in their lives either, and may choose not to use it all together. Access to the internet and social media is considerably more widespread for young people and plays a vital role in their online social life. As a result, it has been noted that people aged 60 and up are more "deliberate, shy, and cautious" than younger users (Baran & Alpayden, 2020). One study, with a sample of 23 people aged 60 and up, explored the role of technology in their lives, as well as their methods, and goals, effective use of technology, and technical and

generational challenges encountered with the use of new tech (Baran & Alpayden, 2020). The study discovered that older users engaged in a new socialization process by using social media platforms, which they perceived as "necessities of the present" and "holding on to life" (Baran & Alpayden, 2020). This study found differences based on age. The focus of this study was to collect the motivations for utilizing the internet, smartphones, and social media applications, the necessity for advice while using new items, and the users' experiences with self-reliance in addressing difficulties. The researchers concluded that older adults were often introduced to these technologies through social media platforms, which were relatively easy to use. Success in using social media then led to increased desire and confidence to learn other digital skills.

A study conducted by Arief, Rissanen, and Saranto (2018) suggests that the internet use of older adults in Finland is based on a variety of demographic, social life, and health factors. They used data from the Ageing and Well-being study conducted by the University of Eastern Finland. The main focus was to determine factors that influenced internet use by older adults. The user group was split into two groups of participants in their 60s and 70s, all living in Northern Savo, with a range of occupations and stages of life. A total of 3902 questionnaires were sent to the 60s group and 1920 to the 70s group. These questionnaires had a range of variables and predictors such as gender, education, marital status, income, grandchildren, etc. The results of the study showed that education had the biggest impact on internet usage. The researchers concluded that older adults, if taught properly, can learn the skills required for using the internet. Therefore, "customizing training to better meet the needs of older people is one

of the best practices to encourage internet use" (Arief et al., 2018). Other factors that increased the likelihood that older adults would use the internet were having children, experience working in an office, financial situation, and age. Factors that did not predict internet usage were gender, having grandchildren, marital status, and living alone. This study suggests that the main two predictors are age and education for internet use in people in their 60s and 70s.

Digital Divide

Another theme that is closely linked with the level of experience is the divide between whether an older adult has access to technology or not. This can be a determining factor in whether or not they are motivated to learn technology as well. Older adults have always been the last group to become involved in new technology. However, with the rise in technology usage, they are also becoming more involved and reliant on it. According to Livingston (2019), more than 50% of older adults (those aged 65 and up) had access to the internet. 59% of these older adults reported they use the internet, and 47% had a high-speed broadband home internet connection. Additionally, in 2018, 77% of seniors owned a cell phone, according to Lee, Czaja, Moxley, Sharit, Boot, Charness, and Rogers (2018). Despite these numbers, the population of older adults is lagging behind the younger generation when it comes to technology adoption and usage (Lee et al., 2018). Almost 41% of adults over age 60 do not use the internet, and 53% do not have access to it in their homes (Lee et al., 2018). As of 2017, roughly four in ten older adults owned smartphones, and the numbers increase annually. However, smartphone ownership is "highly correlated with household income and educational attainment" (Anderson, 2017). Around 81% of

older users with a household income of \$75,000 or more claim to own smartphones. Of those making less than \$30,000 a year, only 27% own a smartphone (Anderson, 2017). Furthermore, 65% of older adults with bachelor's or higher degrees owned smartphones in 2017, compared to 45% of those with some college experience and 27% of those with only a high school education or less (Anderson, 2017). Although more and more older adults are adopting smartphone technology, the divide between the older and younger generations is still wide.

The digital divide also has important implications for the health of older adults. Many older adults may have access to the internet, but they may not possess the digital skills to use it. This is especially true for those who live alone. This lack of digital skills can lead to reduced comfort with health-related technology. Most recently, this has become a major issue due to the COVID-19 pandemic. Many offices and businesses, including health care providers, have switched to virtual appointments as a means to communicate. Navigating this unfamiliar new platform can result in frustration and eventually avoidance of the platform altogether. Thus, due to COVID-19, many older adults missed their routine check-up appointments despite the availability of virtual appointments. A study was conducted in Northern California by Mao, Tam, Xu, Osborn, Gould, Martin, and Mesias (2021) where they distributed over 700 surveys to independent living community homes, broken down into two sites. Site A consisted of older adults, who were mostly Caucasian and middle-to upper-middle class. Site B consisted of mostly non-English speakers. Only 249 of the 700 surveys were completed. The average age of the participants was 84.6 and was 77% female. In Site A, 89% of the

respondents had a bachelor's degree or above, and 99% said English was their language of choice. Of those surveyed at Site B, 43% had bachelor's degrees or more, and only 13% preferred English over the 73% who chose Mandarin as their choice. At Site A, 49% of participants felt comfortable connecting with healthcare providers using video, and 25% of participants at Site B felt comfortable with this. The main factors behind these results are as follows: For Site A, the main barriers included: 1) lack of knowledge to connect to the platform, at 24%, 2) not familiar with the technology, at 22%, and 3) trouble in hearing, at 14% (Mao et al., 2021). For Site B, the main barriers included: 1) the inability to speak English at 55%, 2) a lack of interest to see providers outside of the usual brick and mortar business at 35%, and 3) a lack of knowledge on how to connect to the platform at 35% (Mao et al., 2021). These results of daily internet usage and the lack of knowledge and frustrations that older adults go through on a daily basis. A clinical study conducted in 2021 by Wong, Wong, Chow, Wong, & Lee included 68 participants who were homebound. The intervention group was given weekly text messages with a video of self-care suggestions or reminders, as well as nurse-led patient care phone calls. The intervention group did not report significantly higher self-efficacy (their primary outcome measure) than the control group, which received only a monthly social telephone conversation with a research assistant. At three months, the intervention group reported significantly higher medication adherence and quality of life. Surprisingly, throughout the three months, both groups reported improvements in depression and both basic and instrumental daily activities, suggesting that any regular social interaction is likely to have positive health effects (Moo, 2021).

The Relationship between Health & Isolation

Researchers have also identified important social factors that are common amongst people ages 60 and above who live alone. According to Ausubal (2020) a Pew Research Center study stated that around 27% of adults ages 60 and above live alone in the United States, equivalent to roughly 14 million individuals. The majority of these older adults are living with some symptoms of mental or physical disabilities. Older adults are less able to adapt to change quickly, making the constant evolution of modern technology challenging. Older adults are also less able screen out interfering stimuli, which can make it hard for them to use much of the internet. (Hardwick, 2022). Social isolation is also a major factor in the quality of life for older users. Due to its link with cognitive decline, depression, and other mental health difficulties, social isolation has been highlighted as a danger among older people living alone (Forkan, Branch, Jayaraman, & Ferretto, 2020). A study by Sar, Gokturk, Tura, and Kazaz (2012) was conducted to see if using the internet to cope with loneliness will help older individuals. A total of 569 older adults were enrolled in the study based on the relationship model. The findings revealed that older individuals who live alone and do not use the internet experience greater degrees of loneliness than those who use the internet. Those who use the internet stay more connected with their social networks, so that a rise in internet usage leads to a decrease in loneliness. In general, it might be said that using the internet is one of the most essential strategies for coping with loneliness for older adults. Another study by Berner, Rennemark, Jogr eus, Anderberg, Sk oldunger, Wahlberg, Elmst ahl, & Berglund (2015) wanted to see if there were any differences in older adults who lived in

rural Sweden vs Urban Sweden in terms of internet and technology usage. A total of 7181 people, ages 59 to 100, were included in the study. The main factors explored were the effects of internet use on age, gender, education, household income, education level, cognition, living alone vs. with someone else, and urban vs. rural living. The main takeaways were that those older adults who were living in rural areas used the internet at a lower rate than those older adults in larger cities. Age and education also affected internet usage. The study also showed that having good cognitive health and living with someone was important in reducing feelings of social isolation (Berner et al, 2015). Social isolation seems to hurt both mental and physical health and can often be the cause of depression and anxiety.

Chapter 3: Methodology

Research Method

In order to understand the benefits and barriers faced by older individuals who live alone when using a smartphone, a diary study was conducted. A diary study is a research method that collects qualitative data about a user's behaviors, habits, thoughts, and experiences over a stretched time period. A diary study is a solid way to record the full range of emotions and day-to-day experiences felt by older adult smartphone users while “collecting longitudinal information” (Lallemand, 2012). Diary studies differ from other methods of research such as surveys because they are designed to last over a duration of time, whereas surveys do not. Also, they are not usually assigned to a prompt or scenario but rather a tool to collect general thoughts and experiences. Diary studies also users to record their thoughts and experiences in the moment as it happens and much more in depth, although they do take more time than other methods of user research, the information gained about user behaviors, experiences and thought process is valuable.

Diary Study Questions

The study was conducted to gain insight into any barriers that the older adults who live alone face when using technology, as well as to identify if living alone affects their attitude towards technology and its usage. Participants were recruited using friends and family networks. Participants provided demographic and contact information prior to the start of the study and signed a consent form. The study was limited to both men and women over the age of 60 who had access to a computer, the internet, and a phone with text/SMS capabilities. All races and ethnic backgrounds were welcomed as long as they

lived alone. A total of ten participants volunteered to be a part of this study. The duration of the study was two weeks in which participants were sent daily SMS text messages with questions regarding their experiences for that day.

The questions included:

- 1) Please tell us about your experience using your phone today.
- 2) Do you feel confident when using it? Why do you think that? Please share your feelings with us.
- 3) Have you interacted with anyone via your smartphone today? How often do you talk to others on your smartphone? Please tell us about what you use to interact with others on your phone and with whom?
- 4) How long have you been using this device?
- 5) Do you have any physical or health-related problems that make it difficult to operate these devices? If so, what are they?
- 6) Have you encountered any issues with your smartphone today? If so, what were they?
- 7) How many hours would you say you used your smartphone for today?
- 8) Information is out there! Where do you get your information about current events? Please tell us how you found the information on your smartphone. Do you trust validity?
- 9) What are your thoughts/confidence level on using online shopping platforms?
- 10) Is there anything that makes you excited when using your phone?
- 11) Is there anything that makes you feel worried when using your phone?

- 12) What is your most used app on your smartphone? And what do you use it for?
- 13) What is your least used app? And why?
- 14) If you could change one thing about your smartphone, what would it be and why?
- 15) Besides your smartphone, do you use any other tech? If so why, and if not why?
- 16) Was there anything you wished to accomplish today on your device? If so, was it accomplished, if not why?
- 17) What is your favorite feature of your smartphone? Why?
- 18) What is your least favorite feature about your smartphone? Why?
- 19) What did you like about your experience today? Why?
- 20) What did you dislike or find difficulty in doing today? Why?
- 21) Has your device caused you any difficulty throughout this study? If so, what?
- 22) What did you find easiest to do on your phone?
- 23) What did you find hardest to do on your phone?
- 24) What is something you wish someone would show you how to do on your phone? Talk to me about a frustration you had today when using your phone?

The specific method of data collection was a diary study, in which 10 participants were sent two of these questions via SMS every day. The questions aimed to capture the user's level of experience, social life, health conditions, feelings towards technology, etc. As well as other important demographic information. Periodic check-ins were scheduled with the participants throughout the two-week window to ensure that they were on task and were able to follow the instructions. This was needed as some participants would forget to respond or would give single response answers to questions. In total the average

number of questions answered by all 10 participants was around 21 of 24 questions. All participants were able to complete the two-week study. After completing the study, an exit interview was conducted. The purpose of this interview was to gain a deeper understanding of their overall experience with technology in their day-to-day lives.

Demographic Information

Participant#	Age	Gender	Highest Education	Retired vs Working
1	66	Male	Masters	Retired
2	63	Male	Bachelors	Working
3	62	Female	Masters	Working
4	63	Male	Bachelors	Working
5	64	Male	High School	Retired
6	62	Female	Bachelors	Retired
7	63	Female	High School	Retired
8	60	Male	High School	Working
9	64	Female	Bachelors	Working
10	70	Male	High School	Working

Figure 1. Shows important demographic information of participants regarding their age, gender, highest level of education and whether they are retired or working.

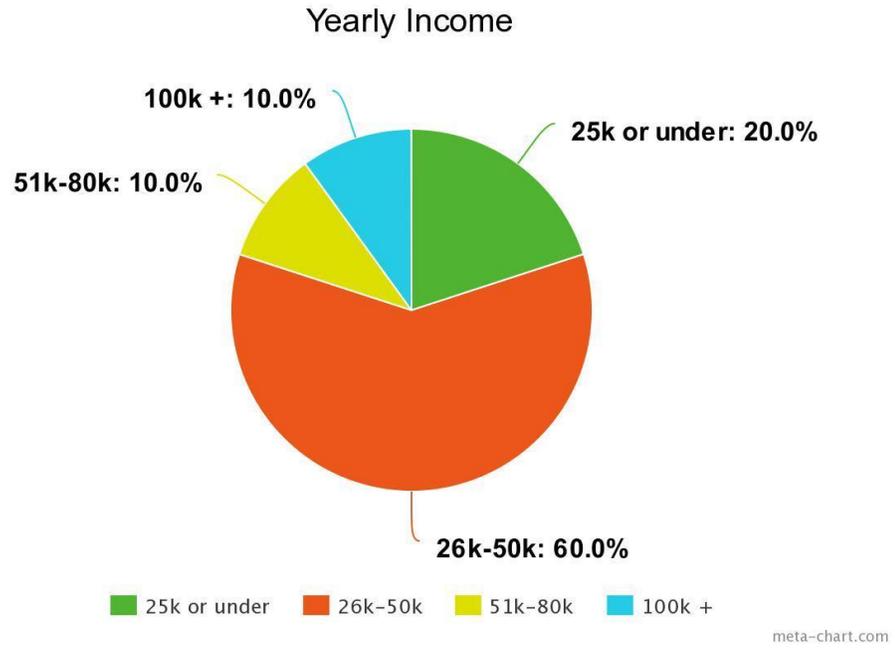


Figure 2. Shows the yearly income of participants.

Chapter 4: Results

All ten participants experienced benefits from using their smartphones, although the benefits valued most highly were different for older adults who were still working vs. older adults who were retired. Nearly all of the participants also experienced barriers to using their smartphones.

Benefits & Usage

The two most common reasons the participants owned a smartphone were for either entertainment or to stay connected with family. Among the participants the most used app was the phone app. Of the ten participants, six of them used the phone app every day to talk to either friends or to family.

“Staying connected with my family is the main reason for this phone. I can even see them sometimes through the phone so it doesn't feel like I'm missing out.”

(Participant 2)

“Majority of my time goes towards actual phone calls. I'll call family members or friends if I'm feeling lonely, but if not then I'll typically just go on about my day. Today I haven't interacted with anyone as of yet “(Participant 7)

“Living alone certainly makes me want to reach out more to people. I feel more social when I have no one to speak to. Maybe that's just loneliness, but I definitely think the smartphone that I have right now has made me more outgoing.”

(Participant 4)

The human need for interactions is apparent as many participants stated that they look forward to socializing with others. Participant 6 stated that she felt so happy when talking

on the phone to family and friends. It also has the opposite effect when her call was not received. She stated how she would start to feel “depressed” when days would go by, and she was not able to call someone. Another popular method of communication used was WhatsApp. Four of the ten participants used WhatsApp daily and preferred to send messages on there as opposed to the built-in text message app.

“I have family all over the world. WhatsApp makes it free to call or text them. Before that, I would have to buy a calling card” (Participant 2)

“Reconnecting with my family overseas, this tech is amazing.” (Participant 3)

Five of the participants have family overseas and they all claim that WhatsApp is the only reason they can stay in contact with ease. Overall, the participants highly enjoyed the communication features of the phone, but another benefit they reported was the entertainment aspect.

“If I wanted to just call people I would have just kept my old phone, but this gizmo has everything, I can watch videos on here and take pictures of my grandkids too!” (Participant 9)

Participant 9 was convinced that he could not live without his smartphone anymore. He was not alone in his feelings either; four other participants felt similarly.

“When no one is available to speak, I can just watch videos online, time passes by so quickly that I forget I was feeling alone.” (Participant 3)

“YouTube is what I use most, that and Facebook to watch videos. My grandchildren send me tick tocks, I'm not sure I know what they're doing, but I do enjoy watching them have fun.” (Participant 6)

YouTube and Facebook were the entertainment apps most used by the participants, with all ten participants using at least one of the two. The usage of these apps was also determined by the amount of downtime the participant had. Retired participants expressed how they used their phones as a way to pass time and stay entertained. Compared to working participants, the retired participants enjoyed entertainment and social media apps much more.

“Living alone can be very boring. If I use my phone to watch shows and videos, time passes by quickly.” (Participant 5)

“Having all this free time, I might as well watch Facebook videos.”
(Participant 7)

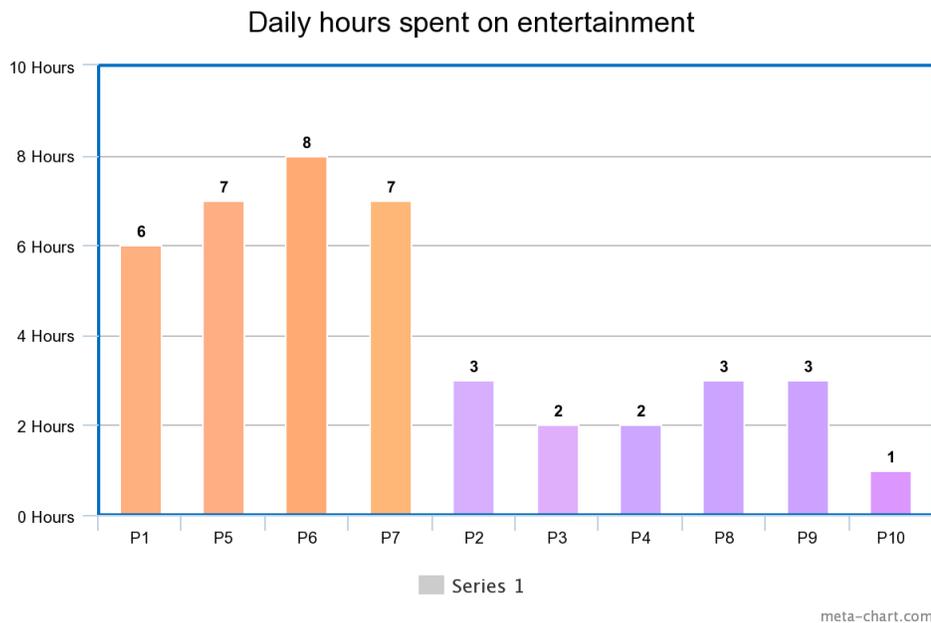


Figure 2. Shows the usage of entertainment and social media apps amongst Retired (orange) vs Working (purple) participants.

The six participants who are still working use their phones significantly less for entertainment. Participant 10 who is still working at 70 years old, says life without his phone is almost impossible for his day-to-day activities.

“I have to use my phone for directions when I'm driving somewhere new for work, and to send and receive emails. That's the important stuff.”

All of the other working participants emphasized the importance of trying to use their smartphones for work more than they talked about play.

“I talked to one of my students on the phone about his appointment”

(Participant 9)

“I set my alarm for work on my phone, reply to messages and emails.”

(Participant 8)

Now that the benefits and usages have been discussed, the following part will go over the day-to-day challenges and barriers for older smartphone users.

Barriers

In order to better understand the experiences of older smartphone users, participants were encouraged to talk about both physical and mental barriers they faced when using smartphones. Starting off with physical barriers, eight participants stated that they had some sort of medical or physical pain that would irritate them, although it would not stop them from using their smartphones altogether. Amongst the most common physical barriers were blurry vision, arthritis pains, overly bright screens, dizziness, hearing loss, and memory loss. Some participants had few physical barriers.

“I do get irritated by light sometimes, especially at nighttime but not to the point where I have to stop using my phone. Today was fine” (Participant 3)

“Might get a headache if I'm on the phone too long but then it goes away.”
(Participant 7)

Only two participants stated that the pain associated with using their smartphone would cause them to stop what they were doing. Participants four and six were much more affected than the others.

“My arthritis pain can sometimes make it difficult to operate. The pain is not in my hands but my neck, it makes looking at the phone painful, and then I just want to lay down.” (Participant 4)

“My phone is a bit big so it is hard to hold it with one hand sometimes. It's something painful and difficult. Hard to take pictures with one hand” (Participant 6).

These are some of the major health issues that affected the participants. However, there were also specific barriers experienced by participants when using the smartphones that were not related to health. Most of these non-physical challenges were due to a lack of understanding of the smartphone and how to operate it. When facing such challenges, most participants would get stuck and would either not know what the problem was or how to solve the issue.

“Had issues with connecting the phone to the TV” (Participant 5)

“Could not locate a message that I had received earlier. Spent about an hour then gave up” (Participant 3)

“Trying to make a new tab in the google chrome app but I could not figure out how to go back to the previous tab.” (Participant 7)

All these experiences took more of a mental toll on the participants rather than physical. The following sections will discuss how the participants felt mentally and how the experiences of living alone affected their attitudes and behaviors.

Lack of access to help

Many participants were keenly aware of their need for more help than was easily available. Whether they bought the smartphone themselves or were given it as a gift from family, it was clear that living alone makes it more difficult for them to access the help that they would need to master their devices. One participant stated that whenever they feel stuck, they just stop and close the phone.

“I usually call my son for help when something goes wrong, but trying to navigate two things at one time is such a hassle.” (Participant 1)

“I’m starting to lose interest in this phone with each complication I face.”
(Participant 2)

It should be noted that there were also differing levels of access to help even though all the participants lived alone. Participants with strong family ties would call family members or save their question and ask it when they had visitors. However, the majority of participants stated that at least 50% of the time the person they are calling to help them is preoccupied or unavailable, decreasing the likelihood of receiving help. Amongst the participants, there were two who had no access to help from people such as

family. Both stated how they tried to Google the solution either on their computer or on the smartphone itself, without much success.

“I really do want to learn but who am I supposed to ask for immediate help?”

(Participant 5)

The participants all felt that asking someone would be much easier than trying to figure it out themselves, but when no one would come to their aid, they would either try to solve it themselves or give up. This leads to the second theme of Pride and Perception in the next section.

There was an interesting sub-theme around needing help. Some participants were frustrated not only by their device, but by the family pressure that had “forced” them to have and use the device. According to around half of the participants, they claim that the only reason they have such devices was due to familial pressures, most commonly from their children or grandchildren. Some participants felt that they did not need a smartphone, with its attendant complications:

“I don't use half of the features on this thing, if it was up to me I'd just keep my normal flip phone.” (Participant 2)

“My son bought me this phone, It was so expensive and for what? I use the call button, that's it.” (Participant 8)

Pride & Perception

Seven of the ten participants expressed some reluctance to ask for help. Even those who had help at their disposal such as through calling a family member for help showed some unwillingness to ask them. In order to figure out more about this concern

and to understand their perspective, an exit interview was conducted to gain insights on why some participants were hesitant.

“One or two times asking for help is okay, but I have so many questions, I don't want my children to get annoyed with me.” (Participant 7)

“I'm 66 years old and have a College degree. My 7 year old grandson once told me ‘Papa why don't you know how to use your phone?’ and I felt embarrassed , because he was right.” (Participant 1)

Participant 1 also talked about how he did not want to be perceived as someone who did not know what he was doing and that sometimes he would refuse help from others because he wanted to solve the problem himself. Nearly all participants felt that the constant need for help would make others perceive them as “annoying” or burdensome.

“What's the difference between WhatsApp and text? My son has told me before but it's still alien to me, but I don't want to ask him again” (Participant 10)

Whether it was asking for help or simply using the phone, participants were concerned about how they were viewed by others. Sometimes this concern about others' perceptions was linked to physical challenges in using the phone. For example, participant nine stated:

“Reading messages can be very difficult with my poor sight. Another health problem I have is my poor hearing. Can't really make out what people are saying over the phone.”

She revealed that due to these barriers she does not enjoy answering phone calls when she is out in public because she does not want people to think she is being loud. The

perception of “what will other people think” caused a lot of the participants to feel shy or unwilling to ask for help or to use their smartphone.

Anxiety

Anxiety manifested itself in a variety of ways for the participants while using their smartphones. Anxiety proved to be one of the key threads bringing the participants together. They stated a desire to learn but not be condemned for their lack of knowledge in general. The fear of being left alone to deal with a problem caused a lot of anxiety:

“I needed to order something online but the app wouldn't load. My son happened to be over that day and I asked him and he did it in less than a minute and they never explain what they're doing. If he wasn't here I would just cancel it and give up.” (Participant 8)

“I tried sending an email from my phone but I could not cc or bcc anyone. The names would not show up and then I had to do it on my computer instead.”
(Participant 2)

The anxiety was a result of having to learn how to navigate their devices alone and without help. There was also pressure felt to learn everything about the smartphone which caused more anxiety. The accumulation of experiences where they felt subpar or inadequate reduced their confidence in their ability to learn and thus their desire to learn.

Summary of Issues Experienced

Going into this study, I assumed that the most significant obstacle to older users would be some form of health-related or physical impairment. However, after finishing

the diary study, it is evident that the lack of immediate access to assistance was the most significant barrier for older users. This had an impact not just on their motivation to study, but also on their emotions, mental stress, and anxiety. Older users, in particular, encountered higher mental hurdles. What astonished me the most was how much pressure older users put on themselves to learn about their smartphones. They are afraid of being viewed as irritating and burdensome if they seek assistance. Another surprising finding was that retired individuals used their phones at a far higher rate than their working peers. They spent the majority of their time on social media or entertainment applications such as YouTube, Facebook, and WhatsApp. Taking all of this information into account, we should think about making apps more user-friendly and inclusive, particularly for this group. Currently, there are programs like OATS available that teach older adults digital literacy and GetSetUp, which teaches adults technology in small interactive groups (Graham, 2021). There are many virtual courses such as these but not enough instant helplines available. This may be an opportunity for businesses to provide live access to technical support as a subscription service. If smartphones and technology are genuinely for everyone, they should consciously cater to this underrepresented demographic. Technology companies need to explore this market since older users are willing to use technology; all they need is sufficient assistance and exposure.

Chapter 5: Conclusion

Summary

This diary study made it possible to get an in-depth view of how older adults think and feel and what their daily experiences are as smartphone users. Insight into how this population feels while using smartphones is an important gateway into improving their experiences with devices that continue to encompass our lives now and will in the future as technological advancements continue to occur each day.

The study results disclosed that most participants used their smartphones for entertainment and to stay connected with their families. Loneliness is common amongst those who live alone. Participants revealed that smartphone technology allows them to watch TV shows, videos etc., to pass time and avoid boredom. Participants revealed that even though they live alone, they can feel more like part of a bigger family unit by connecting with family via their smartphones. It was interesting to note that the majority of participants knew how to use their smartphone to varying degrees, and were using it daily; however, a lack of understanding of all the features and uses of the smartphone was observed. The full potential of the device was not being utilized by this population. The main physical ailments that served as barriers included blurry vision, arthritis pain, overly bright screens causing irritation, dizziness, hearing loss, and memory issues. Physical ailments may create small annoyances, but most participants stated that these were not stop-all barriers. However, not knowing how to navigate the smartphone was a more difficult hurdle for the participants to cross. When they could not figure out how to

do something on the phone, this failure took a mental toll on them and discouraged them from using the smartphone.

Another factor that played a key role in derailing their confidence was the lack of access to or the unavailability of someone to help them when they needed help with the smartphone. It was interesting to note that the participants did not shy away from learning more about the device. They were motivated and ready to acquire more knowledge on the device as long as they had resources available. However, they also did not want to burden their helper. Their pride and self-respect were important to them. Another crucial point to record is that they do not want to always rely on others for assistance; rather, they want to reach some level of self-sufficiency. Finally, it was clear that repeated difficulties, and the embarrassment of needing frequent help, often led to feelings of anxiety, which can undermine motivation to learn.

Overall, this demographic was found to be using smartphones at a higher rate than originally anticipated. Their physical ailments were not a substantial barrier in their ability to use the smartphone. Feelings of insufficient knowledge and inability to work through phone-related processes caused feelings of anxiety and sometimes embarrassment amongst them. They were willing to seek help; however, it was important for them to feel valued. They were inclined to learn modern technology and did not shy away from it as much as some earlier studies suggested might be possible. This diary study highlighted that the main barrier to smartphone usage for older adults that live alone is not having someone readily available to help them when they need help with their smartphones.

Limitations

It is worth noting that the study had a small sample size, exploring the experiences of only ten participants. More research is needed to support the findings. A larger sample size may allow for a more in-depth examination of these topics. Another limitation was that all the participants were currently living in the United States, but seven of the ten participants came to the U.S. from other countries. As a result, their experiences may not accurately reflect the experiences of this demographic who were born in the US.

Another limitation was the convenience sampling of the participants. A convenience sample is a “sample drawn without any underlying probability-based selection method” (Price, 2013). The majority of participants were either my family or family friends. Ideally, a random sample should have been used to ensure “every member of the population has some chance (probability) of being selected into the sample” (Price, 2013).

There were also other limitations to using only family and friends. While the research permitted participants to remain anonymous, because the participants knew me personally, they may have felt pressure to withhold certain information in order to avoid causing concern or worry. They may have been affected by a concern about the information from the study that could spread to the extended family, despite the promise of confidentiality.

There are also older smartphone users outside of the United States. These people should also be included in a larger investigation. It is also necessary to be aware of various cultures. For example, in many regions of Asia, it is exceedingly rare for older adults to live alone. A comparative research study that cross analyzes the variations in barriers of smartphone usage across cultures, as well as among individuals who do not live alone would help to better understand the important distinctions and how to solve these challenges.

Implications for Future Work

The main question of this thesis was to investigate the benefits and barriers experienced by older adults who live alone when using smartphones regularly. The conclusion suggests that although there are some benefits to using smartphones, the barriers experienced by this demographic remain significant and can make it difficult for older adults to fully enjoy the smartphone. The majority of the barriers are not physical, rather they are emotional and social, and are tightly linked with the participants' feelings of motivation and self-efficacy. Understanding the psychology of such sentiments will necessitate additional research. I would encourage major tech companies to take the capabilities and priorities of this demographic more seriously.

The data gathered in this study can serve as a good basis for future academic researchers to investigate this issue further with larger samples. There are several lessons to contemplate, as well as numerous research questions that remain to be explored. More studies might be conducted on the psychology of motivation experienced by older adults when utilizing technology. This information may also be used by families and people in

the public who have older adults in their lives to better understand the everyday hardships of those close to them. Society should pay greater attention to the talent goals, and capabilities of this group.

While there are certain advantages to using smartphones, the restrictions encountered make it difficult for older users to fully appreciate them. The bulk of the barriers are emotional and related to the individuals' perceptions of motivation and achievement. They have a lot to offer and are big fans of these gadgets. With a little time and knowledge, new methods, and ways to design products that truly eliminate the barriers of using smartphones.

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