DIGITAL AGE: A STUDY OF OLDER ADULTS' USER EXPERIENCES WITH TECHNOLOGY

by

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My family genealogy, The Quainton and American Parkers, has a dedication to which I offer a feminist corrective here:

TO

GRACE THE MATRIARCH

WHO BEGAT

BESSIE

WHO BEGAT

DORIS

WHO BEGAT

BETH

WHO BEGAT

ALLEGRA

(AND COUNTLESS OTHERS, THROUGH THEIR TEACHING, EXAMPLE, AND TIRELESS SERVICE—AS WOMEN OFTEN DO, WITHOUT RECORD OR HISTORY)

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TABLE OF CONTENTS

LIST OF TABLES 10
LIST OF FIGURES 11
ABSTRACT 13
CHAPTER 1: INTRODUCTION 14
1.1 The Red Letter 14
1.2 Outlining the Problem 16
1.3 Technical Communication's Contributions to Older Adults 18
1.4 Organization, Scope, and Purpose of the Project 19
1.5 Chapter Outline 20
CHAPTER 2: LITERATURE REVIEW 24
2.1 Age and Older Adults in Technical Communication Scholarship 25
2.2 User Experience (UX) and Human-Computer Interaction (HCI) Scholarship on Older Adults 28
2.3 Research and Advocacy around Old Age in Composition and Literacy Studies 31
2.4 Tying it All Together 34
CHAPTER 3: METHODS 37
3.1 The Impact of Feminist Research Methodology on User Experience Methods 37
3.2 Research Site: Silver Vistas in the Villages, Florida 38
3.3 IRB Approval and Gaining Access 40
3.4 Participant Recruitment and Relationship-Building 42
3.5 Data Collection Methods 44
3.5.1 Interviews 45
3.5.2 Unstructured (Naturalistic) Observations 45
3.5.3 Structured Task Analyses 45
3.6 Data Analysis of Audio and Video Recordings and Field Notes 46
3.7 Methodological Considerations 51
CHAPTER 4: ILLUSTRATIVE CASE STUDY—PARTICIPANT HOLLY 53
4.1 Participant Background 55
4.2 Holly's Motivations for Computing 57

4.3 Barriers to Holly's User Goals 62
4.3.1 Search Strategies & Queries 63
4.3.2 Plugin Installation, Potentially Unwanted Programs, & Cybersecurity 64
4.3.3 Sponsored Content & Information Literacy 65
4.4 Lessons from Holly's Case 69
CHAPTER 5: INTERVIEW RESULTS 72
5.1 Participant Backgrounds 73
5.2 Computing Purposes and Activities 75
5.2.1 Communication 77
5.2.2 Information and Reference 79
5.2.3 Banking and Finance 82
5.2.4 News and Media 83
5.2.5 Craft & Hobby 84
5.2.6 Gaming 85
5.2.7 Shopping 86
5.2.8 Health and Medicine 86
5.2.9 Church and Spirituality 88
5.3 Old Age Cohort Trends and Outliers 89
5.4 Digital Learning and Literacy Development 91
5.4.1 Necessity is the Mother of Invention 92
5.4.2 Technology Teachers: Literacy Sponsors 94
5.4.3 Attitudes toward Developing Computer Skills and Knowledge 97
5.5 Deterrents, Problems, and Roadblocks 101
5.5.1 Ergonomics and Material Concerns 101
5.5.2 Obtrusiveness 104
5.5.3 Identification and Language 107
5.5.4 Technology Non-Users: The Case of Miss Enid 109
5.6 Conclusions 113
CHAPTER 6: OBSERVATION RESULTS 114
6.1 Participant Backgrounds 115

6.2 Contextual Technology Inquiry: How Were Participants Using their Devices on a Day-to-Day Basis? 116
6.2.1 Jumping-off Points: Email Clients, Browser Homepages, and Facebook Feeds 117
6.2.2 Shopping Successes and Setbacks: The Cases of Peggy Sue, Holly, and Rose 119
6.2.3 From Analog to Digital Designs (and Back Again): The Case of Rose 123
6.2.4 Widowers on the Web: The Case of Gerald and Hank 125
6.2.5 On the Generational-Technological Cusp: The Case of Judy 128
6.2.6 Network Speed and Connectivity Issues 129
6.3 Testing Older Adults' Digital Knowledge: An Overview of Task Analysis Results 131
6.3.1 Task Performance: What did the Vistans Know how to Do? What Didn't They? 133
6.3.2 Not all Web Mapping Services are Created Equal 137
6.3.4 Gauging Information Literacy through Seeking Authoritative Answers to Tax Questions 141
6.4 Forms of Technology Knowledge in Action 144
6.4.1 Declarative versus Procedural Knowledge 145
6.4.2 Antecedents and Analogues: One Way to Bridge the Declarative/Procedural Divide 147
6.5 Conclusions 151
CHAPTER 7: CONCLUSIONS 152
7.1 Study Limitations 152
7.2 The Impact of COVID-19 on Older Adults and Technology 154
7.3 Implications for Design 155
7.4 Implications for Education and Pedagogy/Andragogy 157
7.5 Toward the Future: Technology that Supports Aging in Place 158
APPENDIX A: INTERVIEW QUESTIONS 161
APPENDIX B: OBSERVATION PROTOCOL 162
APPENDIX C: INTERVIEW CODES AND SAMPLE CODED TRANSCRIPT 164
REFERENCES 173

LIST OF TABLES

Table 1: Interview Participants and Demographics 74
Table 2: Participant Digital Activity Breakdown 76
Table 3: Researcher Indefinite Article Collocations with “Computer” 108
Table 4: Participant Indefinite Article Collocations with “Computer” 108
Table 5: Researcher Possessive Determiner Collocations with “Computer” 108
Table 6: Participant Possessive Determiner Collocations with “Computer” 108
Table 7: Observation Participant Breakdown 116
Table 8: Naturalistic Observation Activity Breakdown 117
Table 9: Task Analysis Performance Breakdown 132

LIST OF FIGURES

Figure 1: Intersecting theoretical frame for the present study, combining work from technical and professional communication (TPC), composition and literacy studies, and human-computer interaction (HCI) and user experience (UX) 25

Figure 2: The guest bathroom in a participant's apartment at Silver Vistas, with safety rails around the toilet and a mobility bar attached to the wall. 38

Figure 3: The hallway leading to the dining area in the Silver Vistas retirement community, with "walker parking" surrounding the entrance. 39

Figure 4: Emergency alert cord in a Silver Vistas resident's bathroom 39

Figure 5: An image of participant Rose petting Silver Vistas Community Director Dianne's dog, a stout beagle 41

Figure 6: Documentation written for Peggy Sue, detailing how to send a Facebook message. ... 44

Figure 7: A representation of Holly's search strategy 64

Figure 8: Obtrusive → intrusive manifestations of technology (adapted from Hensel et al., 2006) 107

Figure 9: Rose at Enid's Optelec machine, using the device to magnify the printed text of the study recruitment script. 110

Figure 10: The Missouri Star Quilt Company shopping interface that Rose demonstrated, with her favorite brand selected 122

Figure 11: Rose demonstrating the Husqvarna Viking 4D Embroidery System interface, using an applique label for a quilt for charity that she had designed previously (identifying information obscured to protect Rose's identity) 124

Figure 12: Rose's demonstration of how she created photo collages using Microsoft's discontinued Picture It! photo editing software 125

Figure 13: Documentation written for Gerald, who wanted to know how to create an email list for the two grief groups that he managed at his church, as well as how to magnify text in his internet browser 126

Figure 14: AOL.com landing page (pictured on the researcher's Google Chrome browser) on March 20, 2021 135

Figure 15: Holly typing the Silver Vistas street address into mapsanddirections.com 138

Figure 16: mapsanddirections.com requesting authorization to install a plugin on Holly's Mozilla Firefox browser 138

Figure 17: Peggy Sue's navigation on WebMD, as she tried to complete Task 5 142

Figure 19: “What Google sees” versus “What I see” graphic (made by Dani Donovan, @danidonovan on Twitter) 156

Figure 18: Original Google Suite icons (top) versus 2020 Google Suite icon redesign (bottom) 156

ABSTRACT

Older adults aged 60+ represent the fastest growing segment of the US population, yet they are rarely seen as users of technology. Members of this age cohort often struggle with the material and conceptual requirements of computing—such as clicking small targets or remembering usernames and passwords for account logins—leading them to adopt technologies like smartphones and social media at much lower rates than their younger counterparts. Digital devices and interfaces are not typically designed with older adult users in mind, even though all users are always aging, and the "silver economy" represents a powerful, and often untapped, market for technological innovations. The little existing research in this area often conflates age with disability, framing elders according to a deficit model. While it is certainly important to consider the impacts that aging bodies have on technology use, they are not the sole factor shaping usage for older age cohorts. Moreover, if we reduce elder users to their "impairments," we risk stereotyping them in ways that curtail design possibilities, as well as these users' possibilities for full participation in digital life. For this reason, studies of technology users aged 60+ and their communities are necessary to shed light on the multifaceted needs of older age cohorts, and the interventions into technology design, documentation, and education that can help them reach their digital goals.

To build an understanding of the unique technology use of a group of the oldest Americans (aged 75+), as well as to assess their needs and desires for digital engagement, I conducted interviews and observations with computer users in a senior living community. Data collection revealed a great diversity of computing purposes and activities, ranging from social functions such as email and messaging, to managing finance and medicine, to art and design applications, and beyond. Moreover, participants' accounts of how and where they developed their computing skills shed light on their motivations for engaging with technology, as well as their fears of technology's intrusiveness. Analysis of participants' performance on a series of digital tasks yielded insights into physical and cognitive factors, as well as a clear divide in forms of knowledge and mental models that older adults draw upon when attempting to engage with technology. To conclude, I provide recommendations for technology design and education, as well as future research to account for age as a factor mediating user experience.

CHAPTER 1: INTRODUCTION

1.1 The Red Letter

"Dear Sirs: I am seeing red."

In March of 2015, I was visiting my grandmother in the retirement community where she lived in central Florida, when an 83-year-old woman approached me and asked if I could help her with a problem that she had. "You're a writer, right?" She asked. "Can you help me edit this letter that I wrote?" The text of the letter (printed in red ink, to signify the woman's frustration with her situation) read:

> *"To YAHOO, 701 First Avenue, Sunnyvale, CA 94089.*
>
> *Dear Sirs: I am seeing RED. After 3 days of trying to change my e-mail with your organization with no success I am appealing to Corporate to solve my problem: I recently moved to a senior independent living apartment from my home. I no longer am able to use my former email (grandmarose31@comcast.net) as they do not service this place for free. My new email is grandmarose31@aol.com. I have a very 'DUMB' phone that does not accept text messages as I have had problems with bad calls So as a result your security won't allow me to make the necessary change in my e-mail. At 83 years old, I am quite able to talk with a representative which is now impossible. Of all the doctors, lawyers, companies, hospitals, and etc. you are the only company that is so unreachable by 'DUMB' phone. Please help me to resolve this problem as soon as possible as I would like to participate in your services before I die. Computers are fine but sometimes a person that 'talks' is important.*
>
> *Sincerely,*
> *Rose Jenkins*[1]
> *PS I am on FACEBOOK if security really wants photo ID"*

Rose had been locked out of her Yahoo! account for too many failed login attempts. By her generation's standards, Rose was incredibly computer-savvy—her expertise with email, desktop publishing and photo editing software, social media, Kindle tablets, and video chat made her an important source of go-to tech support for other elders in her senior apartment community—but she hit a seemingly insurmountable roadblock when Yahoo! required her to

[1] Rose's name (and email addresses), as with all others used in the write-ups of this research, is a pseudonym. I let participants select their own pseudonyms for this project—some elected to, while others did not (so I generated an alias for them). Rose chose her pseudonym after Mama Rose, Ethel Merman's character from the Broadway musical, *Gypsy*.

unlock her account with a code sent by text. It is widely known that older adults aged 65+ are the age cohort least likely to use smartphones or the internet, and that this phenomenon increases significantly with each decade of age (Poushter, 2017), but as a technologically proficient older adult user, Rose's situation is still puzzling. Why didn't she seek out another option, like text-based web chat with a customer service representative, to regain access to her account? Moreover, why didn't Yahoo! offer a phone call option to reset a locked account? Why did Rose want to send a letter to resolve this problem? Why didn't she, or others her age in her community, want a phone that could text message? These were all problems that required research.

The differences in technology adoption and use between younger and older adults are shaped by several complex, interconnected factors. While biomedical technology increasingly prolongs the lifespan of American adults, elders still lag in their adoption of other digital tools and interfaces. These technology use patterns have been attributed to elders' physical challenges, skeptical attitudes, and learning or support difficulties when attempting to try new tech (Smith, 2014). Rose's situation sheds light on another issue that affects technology designers and technical communicators who create interfaces used by different age cohorts, though: that of cultural and generational differences. Design is cultural, and the affordances and limitations of an interface reflect specific, situated cultural assumptions about what users can or cannot, should or should not do (Selfe & Selfe, 1994). In Rose's case, the assumptions are that 1) most or all users will have access to SMS to receive numerical codes to unlock their account, and 2) those who are unable to or do not want to receive SMS will be able to or are comfortable messaging a support representative through an in-browser text chat. Rose, who grew up in the golden age of telephony, finds speaking with a representative more personal (and thus more comfortable and safer) than exchanging account details with an "invisible" person she can neither see nor hear—hence the letter of complaint. This is an issue of cultural and generational user experience.

Scenarios like these will become more and more common in decades to come. The "graying of America" is a well-documented phenomenon (Anderson & Hussey, 2000; Bloom et al., 2011; Gavrilov & Heuveline, 2003; Mather, 2016; Olshanksy et al., 2009), with older adults expected to outnumber children by 2035 (Vespa, 2018). Because the growth of the older adult population is set to outpace that of younger generations, and because this age cohort is the one

with the lowest current rate of technological adoption, it should be a critical area of research for technical communicators: but there has been little previous inquiry into writing and design for older adults. While some work has been done in human-computer interaction (HCI) and user-experience design (UX) to unpack the differences in technology use and habits that mark older generations, there have not been localized or phenomenological studies that examine the technology use of individual users, or that highlight their reflections about their own technology use and analyze that data for patterns of insights. Moreover, this early work was largely quantitative in nature, and tended to flatten the contextual factors influencing the needs and experiences of users—including the unique environments that older adults operate in. Rose's senior living apartment facility—which is located in The Villages (FL), the United States' fastest growing retirement community—presents an excellent site for researching older adults interacting with their computers (and other devices, like, tablets, smartphones, feature phones, and virtual assistants) in their own homes. This type of contextual inquiry can enhance understandings of the oldest users' technology adoption, habits, desires, motivations, problems, barriers, and usage.

1.2 Outlining the Problem

The United States' shifting population pyramid poses unique problems and opportunities, for both technical communication scholars and practitioners. Older adults[2]—defined most broadly as those aged 50 or above—are the fastest growing segment of the American population. One out of nine Americans is 65 or older, and these numbers are projected to steadily increase as the nation's fifty million Baby Boomers reach retirement age over the coming decades (Pirkl, 2009). However, this phenomenon is not only limited to the US: "by 2020, it is expected that over one billion senior citizens will be alive on the planet" (Sibley, 2008).

[2] "Senior citizens" or "retirees" are perhaps more common terms used to describe this group in American media and society, however both terms are fraught with connotations that stereotype the identities and experiences of this incredibly diverse population. "Retirees" in particular is problematic because of the increasing numbers of older adults who must continue to work for pay in order to support themselves and/or their families. Terms like "elderly" and "aged" are widely considered passé for their ableist and ageist connotations. For these reasons, I choose to use the terms "older adults" or "elders." See Avers et al., 2011 for additional commentary on terminology.

Digital technology provides many potential opportunities for older adults—to improve health outcomes, promote "aging in place" to enable elders to stay in their own homes longer, increase safety and security, foster lifelong learning, combat social isolation, and more. However, ageist assumptions dominate popular socio-cultural and media discourse about older adults and their technology use (Bowen, 2011, 2012). These assumptions include stereotypical notions of "technologically illiterate grandparents" or "stubborn old folks" who refuse to use digital devices because of ignorance or luddism. Such "ageist views have typically held that older people are poor, frail, and resistant to change" (Cutler, 2005, p. 67). These assumptions and stereotypes lead technology designers and developers to exclude older adults from their design and testing processes, because they do not view elders as a part of their target user population—or do not consider these age cohorts as technology users at all (Mannheim et al., 2019). This widens the "digital divide" between older and younger generations by denying elders a seat at the digital table. The exclusion of older adults from technology design and indeed from digital life has dire consequences for their access to knowledge, programs, services, and experiences that can greatly benefit them.

The international crisis of the COVID-19 pandemic has both highlighted this generational-digital divide and perpetuated it. When the spread of the novel Coronavirus led governments to impose quarantine and social distancing mandates in March of 2020, older adults—the population facing the highest mortality rate from COVID-19—were encouraged to stay home and limit face-to-face interaction whenever possible, to reduce their risk. Stay-at-home orders forced many older adults, who were hesitant to use new technologies in the past, to engage in digital practices they would have otherwise opted out of: telemedicine appointments, video chatting, virtual parties and religious services, and online shopping to order essential household items for delivery. However, older adults needed access to up-to-date devices that could stream video, as well as stable and reliable high-speed internet connections, to participate in these activities, and could find themselves entirely cut off if they didn't have the requisite infrastructure, or if they chose not to engage with digital events (Seifert, 2020). Moreover, false information about the pandemic, as well as difficulty accessing online services and resources, posed additional problems for adults aged 80+ (Xie et al., 2020). Older adults' access to information and services can be facilitated by technology or communication design that attends to their unique user needs; or hindered by the same if it envisions a single, "ageless" user.

The current social, cultural, and historical moment calls for interventions into technology design, documentation, and education with older age cohorts in mind. In a rapidly "graying" nation and world, communicators and designers should attend to age, and the many material and cultural dimensions that accompany it, when creating user experiences. Those who research and teach technical communication should also be cognizant of the shifting needs and habits of user populations, particularly when presented with such an exigency as the imminent retirement of the country's largest generational segment. Hence, I undertook a project that combined qualitative interview data, broad observational insights, and specific, task-oriented analysis of older adults' interactions with computer and internet technologies, to contribute to the global discourse on age and technology, as well as to spark conversation around age and aging within the discipline of technical and professional communication (TPC).

1.3 Technical Communication's Contributions to Older Adults

Indeed, age is rapidly emerging as a salient "element of identity…marker of difference…articulation of culture…[and] resonant category of analysis" (Port & Swinnen, 2014), alongside other intersecting facets already highlighted in social and cultural scholarship, like race, class, gender, and sexuality. The social justice turn in technical and professional communication (TPC) (Agboka, 2014; Walton et al., 2019) has foregrounded culture and difference as a growing area of focus of disciplinary research, engaging with how the act of communicating technical or scientific information is not value-neutral, and can be used for activist ends to address structural oppression. As Jones (2016) outlines, various approaches have been adopted in TPC to engage with concepts of oppression and social justice, including decolonial epistemologies, critical race theory, feminist rhetorics and methodologies, and community-based research. However, little work in the field has explicitly referenced aging or age studies.

The available literature on age and aging in TPC is largely limited to position statements or manifestos on the need to address age within the discipline, or the role that technical communicators could take in communication and design for older adults (Crow, 2002; Lippincott, 2004). These calls for action have not been followed up with research, data, or targeted interventions within TPC. Two other articles outline considerations for designing for older adult users, but do so largely from a deficit perspective that conflates age with disability

(Chisnell et al., 2006; O'Hara, 2004). All of these articles were published between 2002–2006, in a pre-Web 2.0 age. Given the advances in design and convergence in media over the past two decades, new research and guidelines are needed to address the social web, mobile applications, voice technologies, the Internet of Things, and more.

This previous work in TPC lays the groundwork for studies of older adults' interactions with designed communication, as well as programs and services created by technical communicators aimed at increasing elders' knowledge of and access to technology; however, it needs updates to account for technological advancements, as well as shifting population demographics. To further the critical work done by this previous generation of TPC scholars and practitioners, I designed the present study to establish a baseline understanding of the technology usage of older adults in a particular community, chosen because of its rich resources and high access to both digital technology and technical support.

1.4 Organization, Scope, and Purpose of the Project

This study involved two rounds of data collection with a community of older adults living in The Villages, Florida. The Villages, a master-planned age-restricted community in central Florida, is a noteworthy site for research because of its status as the United States' fastest growing city, thanks to its steady influx of retirees since its founding in the mid-1980s. Since 2010, the population has more than doubled from 51,000 to over 114,000 residents (Rocco, 2015). The Villages residents involved in this study lived in an independent living apartment facility designed for members of the oldest segments of the older adult population; the community had many features to aid the mobility and ease of navigation for adults aged 75+, and staff were on hand 24 hours a day to assist them if they needed.

Data collection for the study took place over two week-long visits in 2016 and 2018. During the first visit, I conducted semi-structured interviews with 16 community residents, aged 70–92, about their computer and internet use. The participants' responses provided insights into how they learned to use new technologies, as well as their typical online activities, but less about which specific design features helped or hindered their digital goals. Consequently, I returned to the community two years later to conduct observations of seven participants interacting with their computers and other devices in their homes. These observations had two parts: the first an

unstructured or naturalistic observation, where I watched individuals demonstrate their typical daily computer use; the second a structured task analysis, where I asked them to complete a series of increasingly difficult tasks with their computer, and "think aloud" their process. The aggregated data from these two visits paint a compelling picture of a community of older adults who employ digital technologies for specific purposes, clearly articulating their desires to participate in online activities as well as the components of interfaces that confuse or frustrate them.

This project sought to answer the following research questions:

1. What does "everyday" computer and internet use look like for older adults living in a residential senior community in central Florida?
2. What are the goals and purposes for computer and internet use articulated by older adults in this community? What intrinsic and extrinsic motivations shape these goals and purposes?
3. What factors (material, infrastructural, embodied, cognitive, cultural, design, etc.) help or hinder older adults from realizing their technological goals?
4. What recommendations can be generated for a more inclusive experience architecture, given this age cohort's experiences and reflections on technology?

1.5 Chapter Outline

This dissertation crosses theoretical, methodological, and disciplinary boundaries to present the stories of a particular group of older adults and their experiences with technologies. As such, this work combines research techniques from the humanities and human-computer interaction to provide a more nuanced picture of this age cohort's interactions with technology, as well as to make a case for the importance of conducting community-based research to contribute to user experience design.

Chapter 2 supplies theory and previous research that frames the work of this dissertation. The first section, on technical and professional communication (TPC), provides the history of calls for research on older adults in the field, and articulates why this dissertation work is most clearly situated within the TPC tradition. The second section, on UX and HCI research on older adults, details the results of previous research analyzing elders' interactions with specific interfaces, as well as comparative studies that identify the differences in user behavior between younger and older age cohorts. The final section, on rhetoric and composition research in the age

studies tradition, frames the community-engaged and activist work done on elders' literacies, describing efforts to recover and re-frame older adults' technology use as literate activity.

The methods chapter (Chapter 3) first explains my guiding feminist research methodology and the considerations that emerge from this tradition. I describe the steps that I took during the research process to maximize benefit and minimize harm to the participants, providing examples of gaining access to the community and seeking the consent of its residents, reciprocal practice and gift-giving, participant observation, forming mutually beneficial researcher/participant relationships, rhetorical listening (Ratcliffe, 2005), and reflexively engaging with researcher subject position. After describing the research site and participant sample, I outline the three methods of data collection used in the study: semi-structured interviews, naturalistic (ethnographic) observations, and structured task analyses. This chapter concludes with a discussion of the methods used to analyze the audio, visual, and field note data collected during the two visits to the research site—a supervised independent living facility in Central Florida.

The first of three results chapters (Chapter 4) provides a deep dive into one specific participant's experiences and reflections across both rounds of data collection for the dissertation. 82-year-old Holly was one of only three individuals who participated in both interviews and observations for this project, and it's a noteworthy participant for her unique search habits and patterns, as well as the ways that her user behavior represented trends consistent across the study sample. Providing and analyzing the account of a single focal participant as an illustrative case before the aggregate data analysis for this dissertation is a critical methodological move for two reasons. First, it gives a sample user, or "persona" (Cooper, 1999; Friess, 2012; Miaskiewicz & Kozar, 2011) as a personalized and humanized example to point to when articulating the needs of older adults as an end-user population. Second, looking at this individual user's story and experience also helps illustrate the methods and methodology employed in the dissertation, so that readers have a fuller understanding of the context surrounding the data and its collection.

Chapter 5 presents themes from semi-structured interviews with the research participants, first through a broad assessment of codes across all 16 of the interviews, and second through individual vignettes and cases that illustrate noteworthy instances. I explore the major computing activities and goals articulated by these participants, as well as key trends and outliers across the

study sample. Because some of the interview responses from participants resemble digital literacy narratives (Alexander, 2011; Bradbury, 2014), close attention is paid to how the participants developed their technological expertise, as well as how they use technology today. Insights from this chapter sheds light on elders' motivations for adopting technologies, how they learn to use devices and interfaces, and common problems that they articulate when asked about their difficulties with technology.

Chapter 6, the final results chapter, furthers the themes of the interview results chapter by providing examples of how participants interact with their computers (and other digital technologies) in their homes, as well as providing specific examples of interface designs that help and hinder these older adults from reaching their goals. This chapter details the results of two separate observation sessions conducted with seven participants: an unstructured or "naturalistic" observation and a structured analysis, where participants completed a series of increasingly difficult tasks online. The unstructured observations were be analyzed using multimodal coding methods (Blythe, 2007) that began with the manifest content (what's happening on the surface of the technology use) before delving into the latent (motivations behind the use, as well as deeper cultural and generational influences). The structured task observations were analyzed using several different task analysis methods, providing a broad overview of the users' successes (and failures) with the tasks and the amount of time they spent completing them, before providing focal examples to illustrate common themes and noteworthy instances from the observations. This chapter concludes with reflections on the different types of knowledges that older adults engage with when using technologies in their everyday lives, as well as potential methods for bridging the gap between these forms of expertise.

Chapter 7 concludes the dissertation by providing guidelines for architecting user experiences (UX) with older adults and aging populations in mind, as well as methodological considerations for conducting user research with these groups. The interpretation of the research data yields insight into the most common digital activities of one community of "oldest old" users, as well as the barriers faced by this age cohort when attempting to interact with interfaces and devices. I consider the impact of the COVID-19 pandemic on these age cohorts and their technology use, and forecast next steps for supporting the oldest users during international disasters and beyond. The conclusion provides future directions for physical and cognitive

design, as well as interventions into education/training and documentation that can reduce friction between these users and the tasks that they are trying to complete. Some user experience literature recommends seeking to “transcend culture” with design, but I make a case here for cultural consideration and, when appropriate, localization. In keeping with the tradition of universal design (Dolmage, 2017; Hamraie, 2017), these concluding recommendations and best practices will not only improve user experiences for older adults, but for all users.

CHAPTER 2: LITERATURE REVIEW

The academic discipline that theorizes and researches older adults and their experiences is called *aging studies* or *gerontology*[3]. While aging studies research is largely conducted by medical doctors or social scientists, humanities scholars have begun to enter the conversation over the past decade to contribute valuable knowledge and research about "identity, difference, and cultural value" (Port & Swinnen, 2014) across an aging population. There is a definite dearth of scholarship on aging studies within both rhetoric & composition and technical & professional communication, with fewer than five scholars (Crow, 2002; Lippincott, 2004; O'Hara, 2004) focusing on the aging experience in both disciplines. There is a clear exigency for this work within writing studies writ large, but within technical writing in particular, given older adults' status as technology users: they have larger amounts of free time and discretionary income compared to younger users, but the gap between them and younger cohorts still persists (Norman, 2019).

This review of literature explores aging research focusing on computing, digital literacies, and experience architecture (Potts & Salvo, 2017) from across disciplinary perspectives. These pieces compose three interconnected threads that form a preliminary literature review for my proposed project exploring the user experiences of older adults: first, existing work in technical communication that articulates the need for work with older adults in the discipline (Crow, 2002; Lippincott, 2004), as well as providing recommendations for creating accessible websites for this population (Chisnell, Redish & Lee, 2006; O'Hara, 2004); second, user studies and design recommendations from human-computer interaction (HCI) and user experience (UX), which examine specific interfaces (Brajnik & Giachin, 2014; Kang & Yoon, 2008; Roberts et al., 2011) and give lists of best practices for designing for aging minds and

[3] Based on my experience in gathering and analyzing sources for this work over the past four years, I've concluded that there is a disciplinary—and perhaps also epistemological—divide between aging studies and gerontology. Gerontology, an older term with its roots in Greek, was born out of human medicine and physical/natural science; thus, it typically refers to biological or medical studies of the aging process. Aging studies, on the other hand, is more of a social scientific term that encompasses theoretical, empirical, and critical research on aging populations and the *experience* of aging (see the editorial scope position of the *Journal on Aging Studies* for more on this: http://www.journals.elsevier.com/journal-of-aging-studies/). While this is not a hard and fast distinction, I still tend to use the terms "age studies" or "aging studies" because of my critical orientation towards existing theories and attitudes about the aging process and experience.

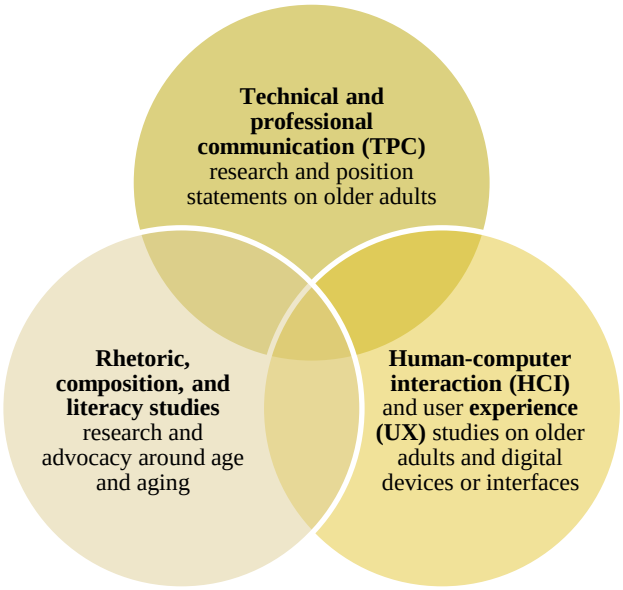


Figure 1: Intersecting theoretical frame for the present study, combining work from technical and professional communication (TPC), composition and literacy studies, and human-computer interaction (HCI) and user experience (UX)

bodies (Campbell, 2015; Chadwick-Dias, McNulty & Tullis, 2003; Finn, 2013; Johnson & Finn, 2017; Wilkinson & Gandhi, 2015); and third, a body of critical theoretical work from rhetoric and composition, which describes changes in literacies across age (Bowen, 2011; Brandt, 2001; Rumsey, 2009) and the computer and internet literacies of the elderly (Bowen, 2012; Selfe & Hawisher, 2004: McKee & Blair, 2006). The conversations across these three thematic areas ground my proposed empirical study that examines the user experiences of a population of adults aged 65+ living in a central Florida retirement community, framing a clear gap in the literature around localized studies of specific communities of older adult users that take into account the complex computing contexts, purposes, and interfaces of a world marked by Web 2.0 and media convergence (Jenkins, 2006).

2.1 Age and Older Adults in Technical Communication Scholarship

Despite the country's shifting age demographics—and, consequently, the shifting demographics of technology users—technical communication research still fails to account for age as a component of identity and a factor that affects technology adoption and use. The field typically focuses its inquiry on 1) students in undergraduate programs and 2) the communication work of academics and practitioners in their workplaces, before old age and/or retirement. In 2004, Gail Lippincott asked in the *IEEE Transactions on Professional Communication*, "Where are the Technical Communicators in Research and Design for Aging Audiences?" Since then, there has been some work from human-computer interaction and user experience (UX) addressing the needs of aging users, but very little research from technical communicators, even

though technical communication scholars and practitioners are uniquely situated to address issues of difference and access shaping the adoption of digital technologies.

Lippincott's 2004 *IEEE* article functions as both a rallying cry and a manifesto—she both emphasizes the importance of integrating age into technical communication research and outlines four key considerations guiding the work that the discipline needs to do to investigate aging. These considerations are…

1. Refining age as a "demographic variable," to understand the nuance and complexity that mark different age cohorts, as well as the intersecting facets of identity that mediate the aging experience;
2. Integrating age with other "variables of audience analysis," namely through inclusion of older adults in experience design and testing;
3. Familiarizing ourselves with multidisciplinary aging research to better address the needs of older adults; and
4. Collaborating with interdisciplinary and international colleagues to conduct aging research that is inclusive and equitable (Lippincott, 2004, pg. 157).

Lippincott's work followed a *Technical Writing and Communication* article by Angela Crow (2002), which mapped the challenges faced by older adults in "accumulating technologies and literacies," providing a focal example in "Corretta Smith," a 65-year-old Black woman in rural eastern Georgia who met with Crow at the local library to develop reading skills in hopes of beginning technology training. As a case study, Corretta Smith demonstrated how the inequalities of a generational digital divide could be compounded and magnified by classed, raced, and gendered divides as well. Taken together, Lippincott's and Crow's articles from the early 2000s form the foundation for intersectional inquiry into age in technical communication: but they have not been followed by additional studies examining elders' technology use *in situ*, or case studies examining the interfaces commonly used by members of older age cohorts.

Little work on age or aging has been published in technical communication since Lippincott's manifesto was written over ten years ago. In a report created for the AARP, usability specialists Chisnell, Redish & Lee (2006) identify and expound upon "usability and design issues common to older users" by creating heuristics, personas, and tasks for website review and rating. They offer a four-point heuristic for classifying users (age, ability, aptitude, and attitude), as well as a thorough list of considerations for visual design, interaction design,

and information hierarchy, design, and architecture. O'Hara's (2004) *Technical Communication Quarterly* article "Curb Cuts on the Information Highway" again describes "communication impairments" experienced by older users, before detailing accessibility initiatives aimed at closing the "digital divide" for older users and concluding with analyses of three websites designed specifically for elderly populations: seniornet.org, aarp.org, and seniors-site.com. O'Hara's article is noteworthy in that it is the only one available that describes cultural influences that affect internet use by the elderly, identifying ageism and "technophobia" (or luddism) as two key factors for communicators and marketers to consider.

This existing work is limited in scope and application. These three technical communication articles were written over ten years ago, before the advent of Web 2.0—thus, it fails to account for newer technologies that have impacted our digital landscapes and cultures, such as smartphones, social media, and virtual assistants. They do not detail the results of empirical studies, but rather present theoretical perspectives and decontextualized best practices or recommendations. Finally, in these pieces age is often conflated with or reduced to disability and, as a consequence, older adult populations are viewed by designers and communicators according to a deficit model. While it is certainly important to consider the impacts that aging bodies—eyes, ears, hands, fingers, minds—have on elders' technology use, declining motor and cognitive abilities are not the only factors that affect usage for older age cohorts. What's more, if we reduce elder users to their "impairments," we risk stereotyping them in ways that curtail design possibilities, as well as these users' possibilities for full participation in digital life.

Education helps enable greater participation for elders in digital activities and spheres. Technical communication scholarship focusing on community technology centers (CTCs) has also broached age as a category of analysis. Rachel Tofteland-Trampe's (2017) recent work addresses the lack of access and differing cultural systems of meaning that affect older adults' uptake of digital technologies, thus encouraging them to seek out courses or training at a CTC. Tofteland-Trampe extends and expands upon McKee & Blair's (2007) earlier work, which analyzed community literacy programs specifically designed for older adults in the early 2000s. While these studies contribute valuable knowledge for working with aged populations in an educational context, they focus primarily on the cultivation of digital skills, rather than older adults' rationale for developing those competencies, or the design features and pedagogical

practices that make them possible. None of the previous work in technical communication (or rhetoric and composition) looks explicitly at retirement communities or senior centers as sites of research, instead focusing on libraries or community enrichment programs, or recruiting participants independent of their communities altogether.

2.2 User Experience (UX) and Human-Computer Interaction (HCI) Scholarship on Older Adults

While technical communication has largely failed to take up Lippincott (2004) and Crow's (2002) calls to generate data and recommendations on older adults' technology use, computer scientists have conducted research to fill this critical gap, publishing work on older users' habits and comparative studies on the usage practices of different age cohorts. Researchers within user experience and its related fields of information design and human-computer interaction have been examining older adults' interactions with a variety of technologies for the past decade or so. These studies have primarily focused on the differences between older and younger adults' learning and use of technology, from personal media players (Kang & Yoon, 2008), to digital thermostats (Brajnik & Giachin, 2014), to GPS interfaces (Roberts et al., 2011). The majority of these studies focus largely on differentiating between the needs of adults in different age segments, rather than examining the everyday use of technology by adults of a certain age category. As a result of this research, as well as the observations of practitioners in the field, user experience leaders have begun developing "best practice" resources for designing for older users (see Campbell, 2015; Chadwick-Dias, McNulty & Tullis, 2003; Finn, 2013; Johnson & Finn, 2017; Wilkinson & Gandhi, 2015).

A handful of studies exist from human-computer interaction (HCI) and related design fields that offer insight into older adults' use of particular devices and technologies. One such study, articulated by Kang & Yoon (2007) systematically investigates the differences between young (20–29 years old) and middle-aged (46–59 years old) adults' interactions with "complicated electronic devices:" an MP3 player and "personal media player" (PMP) that combines the functions of radio, audio, and video players (Kang & Yoon, 2007, p. 425–427). While Kang & Yoon's research demonstrate that increases in age also significantly increase the frequency of errors and numbers of interaction steps (or "clicks") made by users of these devices, not all instances of "negative" or "improper" device use were influenced by the age of the user.

For example, trial-and-error behavior in an attempt to learn how to work the device, as well as general frustration levels with unwanted results, were more closely correlated with low background knowledge of the technology than with old age. Kang & Yoon's study illustrates the influence that background knowledge and previous experience has in reducing older adults' stress around and misuse of digital technology, demonstrating how appropriate and useful documentation and continued education around new technologies is crucial for older age cohorts.

Media convergence (Jenkins, 2006) can often prove confusing for older adults, according to Kang & Yoon; the combination of multiple functions into one device—such as an MP3 player that plays back music *and* video, or a smart TV that provides many apps and experiences in one (like that of a cable box, a stereo, a gaming system, and a DVD player)—can be overwhelming to older users. "The expertise of older adults declines when they are confronted with new domains of familiar tasks… older adults seem to lack mental and physical flexibility; so they cannot easily apply known operation methods to the use of a new device" (Kang & Yoon, 2007, p. 434). Industrial engineers Roberts et al. (2011) identify similar difficulties with in-dash automobile navigation and user interface systems—difficulties not only along generational lines, but also across the gender divide[4]. Women, and older women in particular, consistently performed fewer tasks in the task analysis, and rated the understanding and enjoyment of the in-dash system lower than their male counterparts. However, age did not significantly affect the number of tasks completed; and the research team identified the training that they provided to participants prior to the product test as a crucial determinant of this task completion success. Again, education on new technologies and increased familiarity with digital interfaces is a major component of not only older adults' user experience satisfaction, but *all users' satisfaction*.

Another potential way to address the differences in user experience between age cohorts during the product research and development phase is through sketches and storyboards, or other prototyping methods, according to Brajnik & Giachin (2014). Unlike other authors highlighted in this literature review, these scholars acknowledge that "factors that improve the quality of interaction for younger users are likely to overload older adults" (Brajnik & Giachin, 2014, p. 564). Designers may be acting at cross-purposes when attempting to create interfaces that cater

[4] It is not my intention to reinforce a reductive gender binary here; I recognize gender as a diverse spectrum, but the research team of Roberts et al. (2011) identify gender along a male/female binary for the purposes of this paper, likely due to participants' self-identification.

to a wide range of ages but can gauge user ease of navigation and satisfaction through a sketch or storyboard evaluation that focuses on specific design factors. This approximates the experience for user research participants, and it can also be enacted early enough in the design and development process that major reworking of the prototype can be done without great monetary or time costs.

In satisfying the ultimate aim of creating a more holistic user experience design framework for not just older adults, but all categories of users, Brajnik & Giachin outline the many different dimensions of user experience that designers must attend to. From affective elements like emotion, to socio-cultural dimensions of persuasion and acceptability, to cognitive factors, to aesthetic preferences (Brajnik & Giachin, 2014, 553–554), these researchers offer a concise yet comprehensive review of not only the considerations that ought to go into interaction design, but also the barriers that may arise when attempting to satisfy these aims (Brajnik & Giachin, 2014, 554).

While the studies conducted by user experience researchers and computer scientists that foreground age and aging have provided useful data, initiating conversations about best practices for designing for this population, the work here is often uncontextualized or dehumanized—it fails to take into account users as holistic, multifaceted *people*. This research involves *subjects* from whom data is collected, not *participants* who are actively engaged in research. Researcher subjectivity is not acknowledged, much less reflected upon in these studies. Personhood and aspects of identity are removed from this work, giving the data quantitative rigor, but removing generative details of context and story. One clear benefit of doing work with older adults is its narrative quality: UX researchers Sanders & Stappers (2012) note in their book *Convivial Toolbox* that researchers should "plan on sessions with the elderly to take up twice as long as sessions with younger people," (pg. 104) because of elders' wealth of experience and ample free time for sharing. Because of this lack of compelling illustrations of trends detailed in research data—as well as its removal of the human element in user experience—human-computer interaction work can benefit from triangulation through localized, phenomenological inquiry.

2.3 Research and Advocacy around Old Age in Composition and Literacy Studies

Unlike technical communication, rhetoric and composition does have scholars with substantial bodies of work devoted to examining age and its effects on reading, writing, and communicating. A handful of scholars have published critical age scholarship (Bowen, 2011, 2012; Crow, 2006; McKee & Blair, 2006; Rumsey, 2009; Rumsey et al., 2012; Swacha, 2017; Teems, 2016, 2018), largely from community-engaged and activist perspectives. A few of these researchers (Bowen, Rumsey, and Teems) have formed an informal working group investigating the intersections of writing and (old) age, publishing a special issue of *Literacy in Composition Studies* (LiCS) on "Composing a Further Life" in 2018[5]. However, there is no position statement from the College Conference on Composition and Communication (or any of its SIGS) on older adults or the development of literacy throughout the life course, nor is there any information about age or intergenerational learning available on such sites as the Bedford or Rebecca Moore Howard bibliographies[6]—in spite of the massive exigency surrounding the rapidly aging population both in the United States and in other nations. It is clear that this is an emerging area of research in the discipline, with many opportunities for research and growth.

Scholars in rhetoric and composition who have examined aging have primarily done so from a literacy studies tradition. Suzanne Kesler Rumsey's "heritage literacies" framework (2009) theorizes older adults' "adoption, adaptation, or alienation" of digital literacies, according to the norms of their communities and cultures. Literacy scholar Lauren Marshall Bowen (2011; 2012) speaks back to western culture's hidden "curriculum of aging," which sets assumptions, grounded largely in ideas of deficit and decay, for what it means to grow old in our society. This work is largely critical in nature, "talking back" to preexisting assumptions of educational and workplace literacies and expanding the notion of literacy development throughout the life course.

Bowen cautions against stereotyping aging populations in her 2011 *College Composition and Communication* article. Studies of the literacies of older adults, she explains, must examine the literate lives of these individuals from multiple angles and perspectives, including not only psychological and cognitive aspects of literacy, but also affective and emotional experiences that

[5] Available at http://licsjournal.org/OJS/index.php/LiCS/issue/view/15

[6] Available at http://bb.bedfordstmartins.com/ and http://www.rebeccamoorehoward.com/bibliographies, respectively

either help or hinder literacy development (Bowen, 2011, p. 589). Because of the complicated nature of aging and the multifaceted nature of *literacies* (beyond a print/digital binary), Bowen ultimately cautions literacy scholars against simply adding age as an additional variable into their scholarship, or approaching older adults with the same frameworks and methodologies as one would other research participants. Instead, it is necessary to "…frame literacy studies as an exploration of literacy across the life course, including schooled literacies, workplace literacies, and the literacies developing beyond a full-time, wage-earning phase of life" (Bowen, 2011, p. 603).

Bowen's work on the continued development of elders' literac*ies* has challenged my ageist assumptions about the literate practices of this particular population. Her assertion that literacies develop not only across a youth, but across an entire lifetime, has helped me to frame a project that specifically explores the development of technological knowledge later in life. Bowen also examines older adults' technological literacies more closely in a later *College English* article (2012), which examines how the literature of AARP (the American Association for Retired Persons) reinforces or subverts a "curriculum of aging"—the collection of rhetorics imposing the cultural ideologies of old age. Bowen's case study describes what "technologies for seniors" are, as articulated by the largest and most powerful organization for older adults. These technologies are primarily "gerontechnologies" designed to assist or repair seniors' failing bodies. Bowen's analysis of AARP's print and digital educational and promotional materials yields a disproportionate emphasis on technologies of health and bodily repair, and few attempts to engage older adults in digital literacy development—a dearth that Bowen posits could be filled by a revaluing of the literate practices of older adults, and a reassessment of what we mean by "technological literacy."

Bowen's study provides several gaps that can be filled by an empirical analysis of older adults' technology use. What are "technologies for seniors," as articulated by older adults themselves? Why do they adopt some technologies (and digital literacies) and not others? How do they use and "hack" them? How do these tools reinforce or subvert the curriculum of aging for the older adults who employ them?

Kathryn Swacha (2017) extends this critique of popular ageism by examining one of the areas most important to older adults: health and medicine. Chronic conditions and comorbidities

increase with old age, leading to perceptions of aging bodies and minds as "unproductive," "uncreative," "undesirable," "feeble," and "ineffectual." Negative perceptions of aging, Swacha explains, curtail older adults' agency and, thus, their "rhetorical activity" (pg. 70). Recognizing these socio-cultural discourses that shape literate activity—and actively resisting them—is critical to re-framing the conversation in this critical historical moment where old age is becoming an increasingly salient and *kairotic* marker of difference. While Swacha focuses her research on the public health metaphors for aging, re-framing what constitutes "productive" or "creative" agency can extend and add value to a variety of fields, including civics, culture, and technology. Just as elders are often viewed as bio-medically "deficient"—unable to control their bodies, and in need of interventions to "fix" or "manage" their health—so too are they often viewed as technologically "deficient," as Bowen (2011, 2012) notes. Affirming older adults' use of technologies and participation in online spaces as valuable and important helps afford it significance as legitimate literate activity. Thus, old age is not a time where technological literacies fade away, but rather a stage where technology use continues to morph and adjust to suit an individual's unique needs and purposes.

An additional framework for the continued development of literacies throughout the life course, approached from an historical perspective, is the "accumulation of literacy," described by Deborah Brandt (2001) in the third chapter of her book, *Literacy in American Lives*. Brandt chronicles the development and diversification of reading and writing skills of an American family, from the birth of their matriarch to a family of Norwegian immigrants at the turn of the 20th century, who wrote briefly as a stenographer and bookkeeper in the Midwest before returning to her roots as a farm-worker; to her son, who wrote for "civic and political participation" as an army officer in the second World War; to his son, who while initially averse to writing, eventually engaged in different types of literacy development when earning a degree in marketing and taking on a job as a courier. The chapter concludes with reflections on the great-grandchild engaging in sophisticated rhetorical education and critical thinking by participating in the Future Problem Solving Program, which teaches students how to write six-step plans for addressing technological, political, economic, and environmental problems (Brandt, 2001, p. 100).While Brandt describes the "echoes" of the child's great-grandmother inherent in his writing, she does not address the ways in which his learning or literate activities speak back to those of his elders. The accumulation of literacy, as she explains it, appears a very

linear process, with earlier generations influencing or teaching later ones, with no apparent recursive activity or learning.

Suzanne Kesler Rumsey's *Composition and Communication* article provides a bridge between these ideas of intergenerational learning and older adults' literate lives, by describing multimodal literacy practices passed down through generations of Amish women in northern Indiana. Literacy practices, she explains, pass back and forth through generations of a community or culture: “the old inform the new, the new impact the old” (Rumsey, 2009, p. 577). This development and practice of “heritage literacy,” which takes place outside of traditional scholarly learning settings, involves three potential actions: adoption or wholesale acceptance and approval of literacy practices, adaptation or reinterpretation of literacy practices, or alienation or total rejection of particular literacy practices. Rumsey specifically looks at how women within a particular family have adopted, adapted, or alienated themselves from “schooled” literacy practices, and how members of her own family have adopted and adapted the Amish multimodal literacy practice of quilting.

While less related to *digital literacies* and more towards *intergenerational literacy practices*, Rumsey's heritage literacy framework nevertheless provides robust terminology and scaffolding for my project. The concepts of adoption, adaptation and alienation are key to my understanding of the reasons why older adults use or elect not to use particular social media tools. Heritage literacies affirms adoption, adaptation, *and* alienation *all* as legitimate forms of literate practice, grounded in cultural logics that researchers need to identify in order to understand reading, writing, communication, and design in communities. Rumsey’s framework follows a strong tradition of advocacy work in writing studies—advocacy that pairs well with the user advocacy of technical communication and usability studies. By linking this respect for users and valuation of their usage practices with an understanding of information architecture and interface design, we can better understand older adults’ experiences with technologies and accurately depict their user journeys.

2.4 Tying it All Together

Technical and professional communication (TPC), as a diverse disciplinary assemblage, yield extensive theoretical and empirical literature on the computer and internet use of both

students and working professionals. However, the discipline provides very little on the continued digital literacy development and deployment of individuals after they leave the workforce and enter retirement. The scholarly domain of human-computer interaction (HCI) and its workplace counterpart, user experience design (UX), have both conducted research on this age cohort as a user group, outlining concerns that they identify when designing with age in mind. However, this work often conflates age with disability, or fails to take into account user stories or communities when reporting research results. Finally, rhetoric, composition, and literacy studies have advocated for an understanding of literacy development and deployment as continuous throughout the life-course (Dippre & Phillips, 2020), but this work typically focuses on the "how" of technological literacy development, detailing the processes by which older adults learn to use computers or the internet, rather than the "why." Moreover, the work in these areas is often dated, failing to take into account web 2.0 developments or the retirement of a new generation of users who gained at least some familiarity with computing in the workforce in the 1980s and 1990s. It is clear that older adults are adopting the internet for many converging purposes, but what are those purposes, and how do older adults seek to achieve them through leading wired lives? In what ways do these tools reinforce or subvert ageist narratives and stereotypes for the older adults who employ them? Why are some older adults using particular technologies, and not others?

With the imminent retirement of the Baby Boomer generation and older adults' newfound status as the fastest growing segment of the population both in the United States and across the globe, increasing attention must be paid to the digital communication practices of this group. Neither technical communication nor user experience design appear to have conducted studies localized to specific communities of older adults, despite the opportunities that such communities pose to understand computer usage "in the wild." Retirement or senior living communities remain apparently untouched by researchers as a resource for understanding the usage and wired lives of older populations, as well as the resources that older adults draw on within their own communities for technological learning and troubleshooting.

Thus, this dissertation illustrates the results of a site study that examines the computer and internet use of older adults in context, combining semi-structured interviews, unstructured observations, and task analyses with think-aloud protocols for a more complete picture of the technological motivations and frustrations of a particular community of elders. It fills the gaps in

the existing literature by directly citing experiences of older adult users, providing qualitative data and examples to substantiate claims made about this population. Ultimately, presenting older adults' experiences in their own words is an act of techno-feminist research: amplifying the lived experiences of the individuals and community under study, to work towards the betterment of their lives and full participation in online life (if they so choose it).

CHAPTER 3: METHODS

This project employs both interview and observation methods, undergirded by feminist research methodology (Blair, Gajjala & Tulley, 2008; Koerber, 2000; Lay, 2002; Ramazanoğlu & Holland, 2002; Reinharz, 1992), to seek a deeper understanding of older adults' user experiences, and the major barriers that they face when completing their typical digital tasks. Consequently, I completed two site visits to a retirement community to recruit participants[7], build relationships, gather data, and give back to those who have helped me with my research. This section first offers an overview of my data collection process, before explaining my plans for analysis.

3.1 The Impact of Feminist Research Methodology on User Experience Methods

Feminist research and usability studies both take an activist stance that seeks to amplify perspectives, journeys, and lives. In her foundational text on feminist research methodology, Reinharz (1992) explains that feminist research is differentiated from other types of inquiry through ten distinct tenets, including that it "involves an ongoing criticism of nonfeminist scholarship," "aims to create social change," "strives to represent human diversity," and "attempts to develop special relations with the people studied" (p. 240).

These features of feminist research are frequently visible within TPC studies, especially those that engage feminist critiques of technology. Though Mary Lay (2002) attests that "gender is the primary variable" in feminist research within the field, I would contend that, in an intersectional (Crenshaw, 1990) age when we recognize that lives are imbricated in a matrix of power and domination that does not merely fall along gendered lines (Collins, 2008), all liberation is interdependent. Research does not have to explore gender or gendered lives in order to be feminist, but it must be informed by feminist theory and aim to produce knowledge that begins its inquiry from marginal lives and seeks to transform those lives in some way

[7] Note the use of the term "participant" here and throughout this dissertation, instead of "subject." I use "participant" deliberately in my work to reflect a feminist methodological tradition of affirming the agency of individuals and populations involved in research studies, particularly those from historically marginalized populations (women, racial and ethnic minorities, persons with disabilities, LGBTQQIA persons, etc.).

(Ramazanoğlu & Holland, 2002). Thus, I argue that seeking to understand users and involve them interactively in inquiry, scholarship, design, and teaching is an inherently feminist act.

I took a deliberate feminist stance in this research, as I do in all projects that I undertake. As Grabill (2012) notes, stance precedes methods, and in many cases dictates the methods that a researcher chooses. My stance as a feminist scholar-advocate grounds my decisions to conduct research in a retirement community, to engage in work to dismantle ageism and technological determinism, and to give back to participants through building resources to help them reach their digital goals. All of these decisions reflect my commitments to community-based research and feminist action.

3.2 Research Site: Silver Vistas in the Villages, Florida

The site for this research is the Silver Vistas (a pseudonym[8] designed to give participants additional protection of anonymity and confidentiality), a supervised independent living apartment facility in The Villages, Florida. The Villages, a master-planned retirement community in central Florida, is a noteworthy site for research because of its status as the United States' fastest growing city—thanks to its steady influx of retirees since it was founded in the mid-1980s. Since 2010, the population has more than doubled, from 51,000 to over 114,000 residents (Rocco, 2015). The Villages is age-restricted, with residents typically aged 55+ and having a median age of 67.4 years (Dunne, 2018), but Silver Vistas presents unique opportunities and challenges given the advanced age of its residents. As one of few supervised living apartment facilities in the Villages—giving residents the opportunity to live independently without having to keep up a home, along with amenities like meal service and 24-hour security—Silver Vistas offers Villagers of more advanced age

Figure 2: The guest bathroom in a participant's apartment at Silver Vistas, with safety rails around the toilet and a mobility bar attached to the wall.

[8] Partial credit for this pseudonym goes to Dr. Michael Salvo, who continually referred to my research site as "The Village Del Boca Vista" in our conversations between 2015–2021, in reference to the retirement condo complex where Jerry's parents lived in *Seinfeld* (1989–1998).

an opportunity to stay in the community, while still receiving the support that they need to live semi-independently. The residences in Silver Vistas were designed with the needs of the "oldest old" in mind, with elevators to aid mobility and wheelchair access throughout the facility, as well as features like ample seating throughout common areas, twist-free faucets and lever door handles, and safety rails (see Figure 1 for an example of these features in an apartment bathroom). The community was also located next door to a memory care and assisted living facility, providing residents the opportunity to move to a more supervised environment when needed. One research participant, Gerald, lived in Silver Vistas while his wife, who was diagnosed with late-stage Alzheimer's and dementia, lived in memory care next door.

As such, Silver Vistas residents mostly belong to the "old" (age 75–84) and "oldest old" (age 85+) age cohorts[9] (Ortman et al., 2014); the participants in this study ranged from 70–92, with an average age of 82.2. I recruited participants with a range of experiences with digital tools and interfaces, from self-described "techies" to individuals who had never used a computer, either because they wouldn't (they had no desire or need to learn) or couldn't (they had a disability that prevented them from doing so).

Figure 3: The hallway leading to the dining area in the Silver Vistas retirement community, with "walker parking" surrounding the entrance.

Figure 4: Emergency alert cord in a Silver Vistas resident's bathroom

[9] Age researchers typically divide older adults into segmented age cohorts or sub-groups. The names of these groups vary (young old/middle old/very old, young-old/middle-old/oldest-old, young old/old/old-old, etc.), as well as the age segments (some indicating the start of "old age" at 60, while others start at 65; some also make distinctions between "oldest-old" individuals of 80–85 and older and "centenarians" of over 100 years in age). For the purposes of this study, I divide older adults into "young old" (65–74), "old" (75–84), and "oldest old" (85+) cohorts.

Moreover, the advanced age of Silver Vistas residents provided a unique opportunity to study the technology use of a community of older adults with a wide range of age-related physical and cognitive conditions and comorbidities. Many residents used walkers or canes for mobility (see Figure 2 for an image of the "walker parking" in front of the Vistas' dining area at mealtime). Because of the increased fall risk for older adults over the age of 65, many Silver Vistans wore personal medical alarm buttons (similar to Life Alert) around their wrist or neck, and each bathroom in the community's apartment residences was equipped with a cord to pull in case of emergency, which would notify front desk personnel and paramedics (see Figure 3). Participants also experienced the types of vision and hearing loss that become increasingly common in old age. All of these conditions influenced the Vistans' technology adoption and use, as outlined in Chapters 4–6. Additionally, Chapter 5 provides the story of one participant, Enid, who was unable to use a computer because of low vision.

3.3 IRB Approval and Gaining Access

Rhetoric and composition scholars have often noted that institutional review boards (IRBs) are ill-prepared to understand or provide appropriates guidance and safeguards for the research that we do. Heidi McKee (2003) notes that "blindly adhering" to the IRB or engaging in mere "compliance," as the CCCC guidelines for ethical research (2015) recommend, does not make space for the type of situated, transformative research that we value as humanists. As McKee notes, IRBs are designed to protect researchers and the institutions that they work for—and their questions can have value in that they help us to practice justifying our research choices and practices—but they can also derail our process.

The first stage of data collection for this study (the interview stage) was deemed exempt pursuant to Federal Regulations 45CFR46 (2) "tests, surveys, interviews, or observation" by Arizona State University's IRB (Study 00003938).The IRB exempted the interview stage of the study because it incorporated audio-recorded reflections that were similar to oral histories or literacy narratives: both well-established, low-risk methods in humanities research. IRBs are generally familiar with oral history type studies and see them as posing low-to-no risk to human subjects (White, 2017).

The second stage of data collection (the observation stage) was given expedited approval under categories (6) and (7) by Purdue University's IRB (Protocol #1802020187), though for

several weeks it was stuck in IRB purgatory. This was my second trip to the community, but the IRB insisted on a more rigorous review process than I had been through before, including obtaining an official letter from the director of Silver Vistas, Dianne, giving permission to conduct research there. I emailed Dianne multiple times over the course of two months, sending copies of my work to show her that I was serious, and letting her know that I could talk with her on the phone and answer any questions that she might have—but I didn't hear anything back from her. I called the Silver Vistas office phone and it rang off the hook. For a while I was convinced that Dianne wasn't real, and that I was just never going to be able to get IRB approval to do this work, and I'd have to find a different dissertation project.

Figure 5: An image of participant Rose petting Silver Vistas Community Director Dianne's dog, a stout beagle

When I arrived in Florida in March 2018 for my second site visit to Silver Vistas, I went straight to Dianne's office to see if I could beg her to let me meet with residents, but she was nowhere to be found. The office was empty, except for a tubby beagle. I like dogs, so I got down on the floor and started scratching its ears. He immediately flopped down on the ground and heaved his body over so that I could rub his belly, and I obliged. As I sat on the floor and petted the dog, Dianne emerged and saw me, and told me that she'd sign whatever I wanted her to. I think that maybe meeting me in person, and seeing me treating her furry friend well, showed her that I was a trustworthy person? I had to remember that sometimes we can't just connect with gatekeepers, informants, or community partners on a bureaucratic level—we have to connect with them on a human one.

This vignette illustrates that research should involve continual negotiation of access and consent. I think that it's appropriate that we use "consent" to discuss both permission for sex and for research—because the way that we theorize consent in sexuality should also be the way that we theorize consent for research. Consent, according to Planned Parenthood (2016), should be…

- Freely Given
- Reversible
- Informed

- Enthusiastic
- and Specific

The consent that research participants give should not be coerced, and should be vocal and continuous as well. They should be able to consent to certain acts and refuse to consent to others. And consenting once to research is not consenting to all research. Though I had been to the community before to conduct interviews in 2016, I needed to re-establish ties and make sure that they were still okay with me collecting data. Research should involve continual negotiation of access and consent—and sometimes that consent looks different than you might expect. Sometimes consent involves working with a gatekeeper…or giving their beagle a belly rub.

3.4 Participant Recruitment and Relationship-Building

In the *Convivial Toolbox*, design researchers Sanders and Stappers (2012) explain that there are special considerations when conducting research with older adults.

> "Elderly participants have a lot to share and have the time for sharing. Plan on sessions with the elderly to take up twice as long as sessions with younger people. It takes some practice to decide when to steer the conversation, and when to let it go its own pace and direction" (pg. 104).

Being conscientious of the idiosyncrasies of the communities and cultures that we research with is critical to building trust with them. This includes understanding their values and norms, so that we can treat them with respect and represent their lived experiences as faithfully as possible. You have to meet community members where they're at.

In my work, this means integrating myself into the community when I take a trip to gather data. On my first couple of nights in the retirement home, I'll go to meals and chat with residents around the table. I'll make an appearance at karaoke night and sing a popular 50s song to show that I understand and value the same cultural icons that they do. I'll join a team of seniors on trivia night. All of these activities are important to build rapport and gain trust—as well as to recruit participants—but meeting participants where they're at doesn't start with recruitment. A few of the folks I have interviewed or observed for this project are elderly widowers who live alone. They were uncomfortable with inviting me (a 20-something woman) into their apartments to watch them work with their computers, so I had to make interventions by conducting research in the front hall with the door open, or relocating them and their laptops to a public sitting area somewhere else in the building. This required that I listen to them, understand

their anxieties and the cultural logics (Ratcliffe, 2005) underlying them, so that I could respect their wishes.

This is how I meet older adults where they're at, but this practice is critical in all intercultural work. Trust and rapport can be built in a variety of ways. If you're an adult who's worked with kids, you know that you should get on their level to help them feel comfortable. Working with certain religious traditions might involve dressing more conservatively than you're used to or learning how to participate in prayers or rituals. Considering body language, vocal cues, and nonverbal communication can be important for working with participants who have disabilities: not rushing folks who stutter or speak slowly, respecting participants who may be uncomfortable making eye contact.

To return to the conversation about IRB, some compliance boards do not recognize humanities research as *research* because they claim that it does not provide "tangible benefits" to participants (McKee, 2003, pg. 491). Benefits can be very material (like monetary compensation) or more symbolic (like time or listening), but it's clear that practice should be reciprocal: that is, participants should get something out of it, just as we do as researchers.

In her recent dissertation, Heather Noel Turner (2018) highlights reciprocity—along with advocacy—as a key practice of social justice research. In her study, she defined reciprocity as "…structur[ing] opportunities to exchange knowledge, labor, and resources with participants and related peoples, communities, organizations, and influencers" (pg. 71). This can mean helping community partners to build capacity in their organizations, engaging in advocacy in local communities, and compensating research partners for their labor.

I mentioned before that, to build relationships with potential participants for this study, I sometimes showed up at karaoke night at the retirement community and took requests. Certainly, this can be an example of giving back to the community, but I recognize that we're not all singers. But we all do teach, and teaching is one way that we can thank participants for their time and their energy. Offering lessons, leading workshops, or creating video tutorials are all ways to leverage our expertise to help the communities we work with. For me, this often involves providing tech support. During my last trip, I asked elders to complete a series of tasks on the computer: things like searching for directions, changing their desktop background, and creating an account on a social media site. After this process, I'd ask them if there was anything they'd

like to learn, or any other questions they had about how to use technology. In this post-mortem period after the research, I did all of the following…

- Set up a new illuminated magnifying glass that a woman bought to use while crafting, but couldn't figure out how to install batteries in
- Taught a man how to use keyboard shortcuts to change the display size on his laptop, and to create email lists to contact participants in the two different support groups he managed
- Sketched out documentation on paper, explaining the steps to send a Facebook message
- Helped walk a woman through using her doctor's new online patient check-in portal
- Taught a woman how to identify sponsored content in search results, so she could differentiate between bullshit advertising and legitimate websites

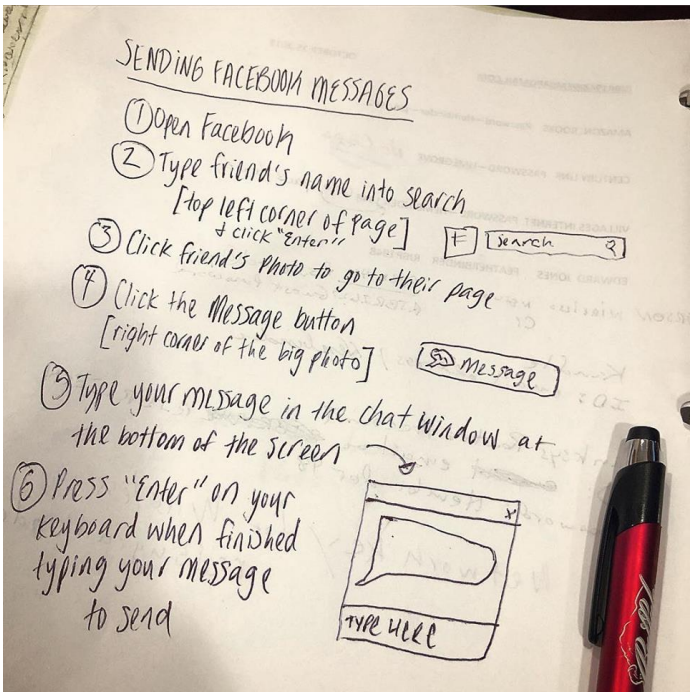


Figure 6: Documentation written for Peggy Sue, detailing how to send a Facebook message.

These might seem simple, but to the research participants, they provide solutions that they had been searching for to persistent problems. As computers and writing scholar Cynthia Selfe (1999) has said, "small, potent gestures" can make a world of difference.

3.5 Data Collection Methods

Research data for this study were collected during two separate site visits to Silver Vistas in 2016 and 2018, respectively. Multiple modes of data triangulation promote triangulation, which increases the validity and credibility of a research study (Teddlie & Tashakkori, 2009). For this reason, and to present the most accurate and faithful picture of participants' lives and experiences, this study combined qualitative and quantitative data through semi-structured interviews, naturalistic observations, and structured task analyses.

3.5.1 Interviews

In March 2016, I conducted semi-structured interviews with 15 residents (as well as Marilyn, an employee of the Vistas who serves as a resident liaison and occasional tech support). These interviews, ranging from 7 to 30 minutes in length, asked the participants to describe their computer and internet use, when and how they developed their computing skills, and the issues that they had recently with their devices and how they troubleshot those issues (interview questions available in Appendix A). All interviews were audio recorded and later transcribed.

3.5.2 Unstructured (Naturalistic) Observations

In March 2018, I took a second trip to Silver Vistas, this time to conduct two observations each with seven participants. The first observation, a more naturalistic/ethnographic approach, involved participants demonstrating their typical daily or weekly computer use while "thinking aloud" (Flower & Hayes, 1981; Nielsen, 2012) their processes and feelings as they interact with their device(s). The goal here was to get as close to a naturalized observation of the participants' computer use as possible, to see a representative slice of these older adults' digital lives.

3.5.3 Structured Task Analyses

The second observation employed structured task analysis methods (Hackos & Redish, 1998) to generate data on older adults' strategies for navigating unfamiliar computing situations and troubleshooting, as well as determining which design features help or hinder their interactions with digital interfaces. I asked seven participants to think aloud their process and reactions as they completed a series of increasingly complex digital tasks. These tasks were…

1. Access the internet on your computer
2. Set up a new homepage for your internet browser
3. Find a news story of interest to you about world events
4. Determine the distance between your home and the nearest Kohl's store
5. Find a government document that answers the question, "how do I deduct medical expenses for transportation to and from doctor's appointments on my taxes?"[10]

[10] My original IRB protocol included two additional tasks, but it became clear during the first two observations that the first five tasks were already taking up more time and posing more difficulty to the participants than I had

I did not assist the participants in completing the tasks, but instead asked guiding questions and reminded them to explain to me how they felt, and how they would go about solving the issue if they were posed with a similar problem in real life. This session identified "pain points" for members of this population attempting to complete tasks using computers and the internet and generated rich qualitative feedback from participants while doing so.

Both observations with each participant were video recorded, and a short exit interview was conducted to debrief participants' and answer their questions about the experience (observation protocol and exit interview questions in Appendix B).

3.6 Data Analysis of Audio and Video Recordings and Field Notes

Interview data for this project was analyzed using verbal analysis methods, following Geisler and Swarts' (2020) systematic coding method outlined in *Coding Streams of Language*. I transcribed the 16 interviews from March 2016 myself, and the final transcripts of three hours and 47 minutes of audio recordings totaled 95 pages of single-spaced data.

The data coding process followed a grounded theory approach (Birks & Mills, 2011), where categories of analysis "flowed up" from observations about the data that emerged through repeated readings. After experiencing frustration and "analysis paralysis" when attempting to begin data analysis digitally (through NVivo qualitative coding software and making comments and notes in both Microsoft Word and Excel), I decided to return to more analog methods to make sense of the wealth of data. After printing a paper copy of the interview transcripts and organizing them in a three-ring binder, I began highlighting them with different colors from a 72-pack of double-ended markers[11]. Each color corresponded with a different code, and the codes coalesced under several categories. The codes that emerged were:

- Digital literacy development/learning: stories of how a Silver Vistan learned to use a new (to them) technology, or established/revised their understanding of what a technology could do

originally anticipated. The tasks that I removed were "6. Register for an account on Pinterest.com and create a private board," and "7. Create and validate an account on Venmo.com." The members of the community did not express much interest in social media for a variety of reasons (which I explore in Chapter 5, which details the results of the March 2016 interviews), rendering the sixth task somewhat unnecessary. I intended the seventh task to test participants' ability to use their mobile phones for two-step verification, since older adults have the lowest adoption of smartphone and SMS technologies.

[11] Shout out to the Staedtler company for creating the office supply that single-handedly saved my dissertation.

- Literacy sponsors: mentions of individuals or groups that helped a participant develop their skills, or teach them something new about computers or the internet; technology teachers
- Predecessors to computing: references to precedents to the computer or the internet, or analogues that helped participants make sense of how their devices worked (see Chapter 6 for a more detailed discussion of antecedents and analogues)
- Computing preferences: whenever a participant expressed enthusiasm or disinterest in the computer, or a particular program or website, or indicated that they would prefer to use the computer (or not) for a particular task or purpose
    - *Category split into two codes: "anti-computing" and "pro-computing"*
- Computing purposes: several codes were used under this categorical umbrella to demonstrate the different reasons or tasks that participants used their devices for
    - *Category split into nine codes: "communicating," "information search/research," "banking/finance," "shopping," "craft/hobby," "church/spiritual," "gaming," "health/medicine," "word processing"*
- Computing deterrents: mentions of elements or factors that discouraged participants from using technology, or that stood in the way of them realizing their technological goals
    - *Category split into seven codes: "difficulty learning/neuroplasticity," "fear," "lack of need or exigency," "gender gap," "hardware/connectivity issues," "ergonomic/material factors," "privacy/security issues"*
- Curriculum of aging: references to any kind of assumption or stereotype about older adults and technology (Bowen, 2012), cultures of youth surrounding technology, or the "digital native/digital immigrant" (Alexander, 2017; Bennett et al., 2008; Prensky, 2001) divide
- Problem-solving: anecdotes about troubleshooting a technological problem, or a time that something went wrong with a computer or device

Some of these themes were outlined before I began coding—I had already identified physical, cognitive, educational, and cultural considerations for technology use as preliminary categories (Smith, 2019)—while others developed as I read through the interview data. As I coded the transcripts with the different colors, I also wrote notes in the margins justifying my coding choices, as well as recording my initial thoughts on the phenomena that I was noticing and the themes that I saw emerging. Patterns of stories and experiences appeared across cases as well, such as "dinner table narratives" of older adults witnessing younger people using their

smartphones at mealtime (see “Obtrusiveness” in Chapter 5) and hierarchical taxonomies of digital knowledge and expertise (see “Declarative versus Procedural Knowledge” in Chapter 6). I made notes of these recurring patterns and began synthesizing them in brief research memos at the end of individual interview transcripts (Strauss, 1987, pgs. 109–129). When I finished coding, these memos, as well as tables that I created summarizing the overall interview results (see Tables 1 and 2), formed the foundation for the interview results chapter.

While my coding process for the observation data was similar, I sought out an automated speech-to-text service to save time on transcription. I uploaded the nearly five hours of video to Temi.com, which provided quick automated transcription through speech recognition software. I then cleaned the transcription myself to eliminate malapropisms, errors, and unrecognized words. This approach provided a happy medium where I was not spending days endlessly pausing and rewinding to transcribe the video data, but I also still had the opportunity to complete a pass through it and refamiliarize myself with the content before beginning the coding and analysis process. Still, the transcription of the observations took longer than the transcription of the interviews, due to the complexity of the audiovisual data: to paint a complete picture of these interactions, it was necessary to transcribe the participants’ words, their actions, what was going on with the interface(s) they were navigating, as well as contextual factors (where their technology was located in their home, if they were having difficulty that day due to influences like arthritis pain or tremors or having a glass of wine at dinner, if they needed assistance from their spouse or neighbor to use their computer, etc.). Ultimately, the combined transcripts of the unstructured observations and structured task analyses totaled 41,528 words, or 173 single-spaced typed pages. These data were also enriched by field notes that I took during and after the observations, which I combined with brief notes that I made during the transcription cleanup process.

After cleaning up the observation transcripts, I began a coding process similar to that for the interviews. I used the same colors and codes from the interviews to analyze the unstructured observations, and wrote comments in the margins as well to elaborate on my coding schema, but also created a separate research memo document for each participant to note my reflections, questions, and additional emerging themes. For example, I noted that one participant experienced trouble inserting a flash drive into a USB port on her desktop computer; I posed a question about

whether another participant had adopted social media between the 2016 interviews and 2018 observations, and made a note to myself to check the interview data for evidence of this.

The field notes, transcription notes, marginal coding comments, and research memos formed a layered interpretive framework, where observations and judgments built over time with each pass through the data. In his foundational book on qualitative analysis, Anselm Strauss (1987) cautions researchers against "talking about people" (pg. 128) in research memos: a recommendation that I actively pushed back against as I worked through my coding and sketched out reflections about the Vistans' experiences and stories. People and their lives (both on- and offline) are at the heart of this work, and the elements that I seek to foreground most actively throughout the research process—for people and their lives are at the heart of usability, as a field and as a practice. As Jay Dolmage (2017) notes, "usability aims to humanize system design" (pg. 125): to forget about the humans at the core of the human-computer interaction experience is to continue to perpetuate ageist, sexist, and otherwise oppressive legacies that have historically permeated technology design and education (Selfe & Selfe, 1994).

This reflective work echoes Blythe's (2007) call for recognizing the rhetorical nature of research activity in his essay on coding digital texts and multimedia. While working through both the manifest and the latent content of the observations—that is, the more symbolic or structural meanings (Berg, 2001) underlying the actions taking place on screen and the words being spoken, or the emotions and motivations behind participants' utterances and actions—I took care to explain my choices and interpretations. Again, this work follows feminist methodology at its core, recognizing that my standpoint (Collins, 2008; Harding, 1992; Hartsock, 1983; Hekman, 1997) as a researcher, and my relationships with these participants formed through embeddedness in the research site, enrich this work rather than contaminating it—all the while seeking to minimize harm and maximize benefit for the Silver Vistans and their community.

The data analysis was even more complex than that of the interviews, because of the diversity of tasks that these participants completed online during their first round observations (from online shopping, to interacting with patient portals for doctors' offices, to betting on horse races, to social networking), as well as the differing reactions to the assignments in the second round observations. There was a high level of variation in participants' experiences, and accounting for this took time. I conducted similar systematic coding (Geisler & Swarts, 2020)

with the verbal data from these sessions, while also employing task analysis methods (Hackos & Redish, 1998), namely task sequences and hierarchies (to explain how participants went about completing the five tasks from the second observation, as well as solving problems), user/task matrixes (compiled from aggregate data across the observations, to identify the most common activities that these participants engaged in online), and task scenarios for more detailed descriptions of observations serving as "focal examples" to illustrate particular difficulties or themes identified across the interview and observation data. An example of one of these cases is 82-year-old Holly's difficulty searching for information online: she repeatedly typed search queries into her Gmail search bar (rather than a search engine or the address bar of her web browser) and worded them as though they were URLs (rather than keywords or phrases, e.g., *"www . why don't we have Donald Trump's tax returns . com"* rather than *"trump tax return news"*). When she did get to a search page from her email client, Holly was unable to differentiate between paid advertisements and legitimate search results, and got caught in a seemingly endless loop of sponsored search engine links (not actually finding an answer to her question)[12]. Both the transcription cleanup process and data coding helped me to identify more focal examples like this one to illustrate the key themes that I drew out from the data.

On the topic of focal examples, it became clear during data coding that readers could benefit from a "deep dive" into one individual participant's experiences. Providing an extended analysis of one Silver Vistan would help the various audiences for this dissertation to better understand how the study took place and to get a view into the daily digital life of one member of the target age cohort. Data from a single participant can provide a deeper dive into their lived experiences, giving a rich qualitative account that can yield insights into more subjective phenomena like ideology and motivation, while also more faithfully representing the individual's experience. I selected Holly for this illustrative case study, opting to write an additional standalone results chapter giving more extended narratives and detailed explanations of her experiences. I selected Holly for this chapter because she was one of the most talkative participants of the study sample, making her an ideal candidate for this kind of in-depth exploration. She was also one of only three individuals (the others being 82-year-old Gerald and

[12] See Chapter 4 for more information on this task, as well as Holly's experience throughout both rounds of data collection for the project.

86-year-old Rose) who participated in both rounds of data collection for the study[13], making her a noteworthy participant for the depth and breadth of data she provided.

3.7 Methodological Considerations

The analysis for this project was primarily qualitative in nature, though it also incorporated some basic quantitative analysis of the time it took participants to complete tasks, the number of sites they visited, the number of clicks to completion, etc. The data collection and analysis for this project combined rich, qualitative semi-structured interview responses with more targeted task analysis information and statistics because of the need for contextualization and humanization of user data.

Popular methodologies in technical communication like actor-network theory (ANT) and new materialism (or object-oriented ontology) provide a framework for theorizing the relationships between objects in a human/technological system (Read & Swarts, 2015)—but, as I and others have argued previously (Smith, 2017; West-Puckett, 2017), ANT lacks the context to paint a complete picture of users' experiences in that system. Such methodologies fail to consider epistemological, ontological, and ideological forces—such as Bowen's (2012) "curriculum of aging"—that shape human/technological assemblages. Put another way, material frameworks that only foreground the interactions of things function in the realm of explicit, physical actors (people, computers, applications, etc.), to the detriment of implicit, symbolic forces that also exercise control over human-technology interactions (race, class, gender, age, affect, history, etc.). This means that the experiences of users from diverse backgrounds are collapsed into a dominant (typically white, Euro-American, young, able-bodied, masculine) norm, with underrepresented groups either treated as an afterthought or ignored entirely.

[13] Participant attrition across the two stages of data collection for this study can be attributed to a few factors. First, given participants' advanced age, it is unsurprising that at least three of the 16 original interviewees passed away between the first and second site visit. The average life expectancy in the US is 76 years for men and 81 years for women (O'Grady, 2018)—both lower than the average age of the research participants at Silver Vistas, 82. Additionally, older Americans have been increasingly mobile since the second half of the 20th century—that is, more and more individuals age 65 and older have been migrating to other regions of the country, either because they are seeking new amenities (such as those provided by a retirement community, or a new city) or assistance (from relatives and/or hospice care). Older age cohorts (age 75–84 and age 85+) are more likely to move than younger ones (age 65–74) because of increased medical needs and widowhood in the later stages of their lives (Tirrito, 2003, pgs. 48–49).

Because of this tension between the material and the cultural, I aimed to integrate the two in this dissertation by using mixed-methods analysis. It is my goal to provide actionable findings about the user behavior and experiences of older adults here, without sacrificing critical contextual factors and socio-cultural influences (a tendency of flattening user experiences that has, in part, caused age to be overlooked as an influence of technology adoption and usage in the first place). Methodological practices that draw the circle wider to account for elements previously overlooked or disregarded by previous work are a feminist intervention—for "the stakes of continuity and futurity, inheritance, and transformation" of empirical research" are at work in such practices" (Lather, 2008, p. 191).

With this feminist inquiry, I contribute to the field's understanding of users and their needs by creating heuristics for considering age, specifically old age, as a part of user research and evaluation. I hope to build upon the work published by practitioners in user experience (Finn, 2013; Wilkinson & Gandhi, 2015) by expanding the recommendations for designing for older populations, with a twin focus on the experiences of individual older adult users and the cultural assumptions, values, and experiences that are shared across older generations. The data that I collected and the guidelines that I provide can guide research in both academia and industry, as well as the creation of technologies specifically for elders both in the US and globally.

CHAPTER 4: ILLUSTRATIVE CASE STUDY—PARTICIPANT HOLLY

Before examining the technology use of a group of older adults, it helps to understand individual user motivations and behaviors. Because elders are so often stereotyped as "digitally illiterate" or "technology non-users" (Bowen, 2012), providing in-depth, real world examples of their typical computer and internet use can break these assumptions and create a mental picture of a user to build upon. This research combines interview methods with naturalistic observations and structured task analyses to gather stories of users from this age cohort, and to better understand their experiences with computers and the internet. After gathering digital literacy narratives from 16 computer users over the age of 70, and observing seven of those users interacting with their devices and completing a series of digital tasks, I have collected data that represents many different intersecting stories of older adults' technological struggles and successes. Both the individual stories of these users, and their aggregate data from across these interviews and observations, have unique value.

Just as there are affordances and limitations to each type of research method, so too are there affordances and limitations to how the data is interpreted and presented after it is collected. Data presented in aggregate can offer a comprehensive picture of a phenomenon, giving a sense of how prevalent an issue is or how trends are distributed across a group. Conversely, data from a single participant[14] can provide a deeper dive into their lived experiences, giving a rich qualitative account that can yield insights into more subjective phenomena like ideology and motivation, while also more faithfully representing the individual's experience. Put another way, aggregate data has higher reliability but lower validity, and individual data has higher validity but lower reliability, respectively. While chapters 5 and 6 of this dissertation provide themes traced across larger datasets (collected from 16 interview participants and 8 observation participants), this chapter provides a detailed account of the experiences of a single participant in this study, for two reasons: 1) to provide a more nuanced picture of the population being

[14] Note the use of the term "participant" here, instead of "subject." I use "participant" deliberately throughout this dissertation to reflect a feminist methodological tradition of affirming the agency of individuals and populations involved in research studies, particularly those from historically marginalized populations (women, racial and ethnic minorities, persons with disabilities, LGBTQQIA persons, etc.).

investigated through a representative member, and 2) to create a "persona" to give a more defined user picture for researchers and designers.

While the methods involved in this dissertation may be somewhat familiar—semi-structured interviews, observations, and task analyses—the specific population under examination is less frequently explored within rhetoric/composition and technical communication, and is not typically associated with technology literacy. Because adults age 60+ are often stereotyped as technology non-users, or have their motivations for and difficulties with technology misunderstood, it is important to provide real-life examples of older adult users to bust myths and present more complete accounts of their diverse usage and contexts of use. A case study can provide rich, qualitative descriptions of user experiences that present a fuller and more nuanced picture to this end.

To make the typically amorphous or at least inexact concept of "the user" more concrete, user experience architects and computer scientists often employ an example user, called a "persona," to center the product design and development process on the end-user's needs, rather than the developer's own. The concept of the persona, developed by Cooper (1999), provides a model through a fictional character that is grounded in research and data about the target user. This character offers a more three-dimensional idea of who's being designed for, complete with characteristics, emotions, motivations, goals, roles, background, and a story. Personas are popular in user experience (UX) design because of their potential to "bring target consumers to life" (Miaskiewicz & Kozar, 2011), as well as the way that they enable roleplay on the part of a design team , thus focusing the product development and building empathy for the end user (Friess, 2012). Personas also can make otherwise "lifeless" task analyses more "generative," because they provide more definition to the actors in these scenarios (through the use of relatable characteristics, motivations, quotes or taglines, etc.) to promote more engagement and "stimulate reflection" (Pruitt & Grudin, 2003, pgs. 12–13). In the case of this dissertation, the creation and deployment of a persona adds the "human element" back in to human-computer interaction: it gives a real face based in both empirical data and genuine user experience to the otherwise misunderstood and oft-characterized phenomenon of "the senior user." Instead of hypothesizing that "grandma doesn't use the computer to do X because of Y," a persona enables a researcher or designer (or their team) to ask: "why does Holly not use the computer to do X?" Looking at users on a micro level in this way (rather than in a meso level through something like a focus group, or

a macro level through larger-scale data analysis and market research) helps to get at affective elements that are lost in the aggregate, which depersonalizes and dehumanizes users and the populations that they belong to.

Thus, it is important to pair the broader themes and trends from across a research sample with specific examples that illustrate a complete, individual story of a participant, in order to provide critical context, as well as a user persona to point to when attempting to take that data and move it towards a product: a design, a technology, an intervention. The participant from this dissertation whose stories are outlined in this chapter will become one such persona for the rest of the chapters: one example to point to when articulating the needs of older adults as an end-user population. Looking at this individual user's story and experience will also help illustrate the methods and methodology employed in this dissertation, so that readers have a fuller understanding of the context surrounding the data and its collection.

4.1 Participant Background

The focal participant for this case study is Holly[15], a woman living with her husband in the study community since 2014. Holly was 80 years old during the first round of data collection in 2016 and 82 years old during the second round in 2018, respectively. Her husband, Paul, has vascular dementia and does not use the computer at all, making Holly an unusual case since technology use is often divided along gendered lines—even though more women live to older ages than men, men still are more likely to own or use technology than women (Vaportzis, Giatsi Clausen, & Gow, 2017). Because the majority of the retirement community residents who volunteered for this study were women, Holly is an appropriate representative for the study group; and since older women tend to feel less comfortable using technology than men do, she makes an interesting and pertinent case for designers and developers as well.

Holly is a noteworthy participant for a few additional reasons. First, at 82 years old during the second round of data collection, she represents the average age of all participants involved in this study (ages ranged from 70–92 across 23 total participants). Holly was also one of only three individuals (the others being an 82-year-old man and an 86-year-old woman) who

[15] Holly chose her pseudonym for this research after Holly Golightly from her favorite movie, *Breakfast at Tiffany's*.

participated in both rounds of data collection for the study[16], making her a noteworthy participant for the depth and breadth of data she provided. One of the benefits of presenting the case of a single participant across multiple sessions (for this specific participant, one 30-minute interview and two observations of 10 minutes and 14 minutes, respectively) is data triangulation (Denzin, 1978)—that is, gaining multiple perspectives on the object of study. Using multiple methods (in this case, semi-structured interview and direct observation) to collect multiple types of data (verbal, visual, screen recordings, gestures, field notes, etc.) helps provide differing accounts of the phenomenon under investigation, and presents a richer and more accurate account of individuals' and groups' lived experiences in the case of human subject research.

At just over 30 minutes, Holly's interview was the longest for this project, providing a wealth of qualitative data and anecdotes to better understand her technology use, motivations, and difficulties. Her naturalistic observation and structured task analysis observation took ten minutes and 20 seconds and 14 minutes and 12 seconds, respectively. She was able to complete two of the five tasks during the second observation, and her attempts to troubleshoot the tasks she was unable to complete are detailed in Section 4.3 of this chapter. The ergonomic difficulties that she faced (trouble striking the small keys of a laptop chiclet keyboard, as well as seeing text displayed in 12-point font and below), as well as cognitive obstacles (delayed or prohibitive sorting, filtering, and decision-making capabilities) were not unusual for the research study sample, or for individuals in her age cohort in general (as reported in previous studies such as Johnson & Finn, 2017; Lippincott, 2004; O'Hara, 2004; Sibley, 2008; Wilkinson & Gandhi, 2015), but Holly demonstrated unique search habits and patterns, as well as difficulty with search terms and results, which point to problems faced by an older generation who weren't formally trained (either through school or work) in information search and literacy practices. Holly's struggles with finding answers to questions online shed light on difficulties that adults age 60+ have with search engines, sponsored content, and cybersecurity.

[16] Participant attrition across the two stages of data collection for this study can be attributed to a few factors. First, given participants' advanced age, it is unsurprising that at least three of the 16 original interviewees passed away between the first and second site visit. The average life expectancy in the US is 76 years for men and 81 years for women (O'Grady, 2018)—both lower than the average age of research participants at the study site, 82. Additionally, older Americans have been increasingly mobile since the second half of the 20th century—that is, more and more individuals age 65 and older have been migrating to other regions of the country, either because they are seeking new amenities (such as those provided by a retirement community, or a new city) or assistance (from relatives and/or hospice care). Older age cohorts (age 75–84 and age 85+) are more likely to move than younger ones (age 65–74) because of increased medical needs and widowhood in the later stages of their lives (Tirrito, 2003, pgs. 48–49).

The next sections detail Holly's computing skills and motivations, as well as the barriers that she faced in realizing her digital goals and completing the tasks outlined for her in the second observation session.

4.2 Holly's Motivations for Computing

Holly didn't identify herself as a "techy" person: while she said she used the computer for "lots of purposes," she described her understanding of how it worked was "basic." During her interview in 2016, she identified three main uses of the computer in her daily life: 1) communication with friends and family through email, 2) reading news, and 3) searching for information. Like most of the other participants in the study, she did not use social media, seeing it as invasive, over-sharing, and a waste of time. Unlike many of her peers (Smith, 2014; Poushter, 2017), Holly did own a smartphone[17], but she preferred to only use it to make calls. While she had learned how to text and receive emails on her Android, she expressed little desire to learn "texting shorthand," and explained that she'd rather call someone instead of sending them a message. She explained that she was largely satisfied with the knowledge she had about computers and the internet, and she didn't see the need to develop any additional skills beyond the ones that she already used regularly (sending email, searching for information on Google, making purchases online, managing finances, reading and interacting with news media, etc.).

Holly echoed these sentiments two years later during her first observation session (in March 2018), where she demonstrated her typical computer use. Holly explained that she typically used her laptop in the morning after breakfast. Her primary online activities were "ordering stuff" (purchasing mainly through Amazon, but also using Google and Zappos to shop on occasion), and "sending emails out to the children," using Gmail in a Mozilla Firefox browser. She identified her primary email contacts as her children, her daughter's mother-in-law, her financial planner, and some friends. After detailed descriptions of these tasks, she also mentioned, "I do put in if I have to ask about something, such as a medicine, or a sickness, or…" She explained that she used Google to search for information online, though her search patterns and strategies were somewhat unorthodox—a phenomenon that will be explored in the next

[17] While older adults have shown considerable gains in technology adoption in the past decade, there is still a considerable drop-off in smartphone use for age cohorts 50+. Older adults use more tablets and eReaders combined than they do smartphones. It is widely understood that "smartphones are a young person's tool" (Campbell, 2015), but the reasons behind this generational divide have not been extensively explored.

section. She demonstrated her search skills by looking up information on vascular dementia: an activity that she said she engaged in regularly, to help her husband. Using the internet to research conditions and manage health information was a common theme across interviews and observations for several other participants as well, reflecting shared experiences across this group. Many had multiple doctors' appointments each week to manage conditions through visits with general practitioners and specialists', physical therapy, acupuncture, cardiologists and pulmonologists, and more. Chronic medical conditions tend to compound with age, so members of the "oldest old" cohort (80+ years) will often have multiple, intersecting problems that can motivate and/or deter their technology use: they may have more to research online, but decreased ability to interact with the information that they find (due to physical or cognitive disability). Holly also expressed disillusionment with the information she could access about her husband's condition through Google, remarking that "it's all the same." This difficulty could reflect a lack of new or accurate information about vascular dementia online, an ineffective search strategy, or a combination of both.

Throughout her interview and observation, Holly noted that she was online primarily "to talk:" she kept in touch with her children and grandchildren through email, and had recently learned to text at the time of her interview in 2016. Though she messaged her eldest son regularly to maintain contact and also get an insider perspective on current events (he worked as a political journalist and commentator), as well as demonstrating nascent interests in social networking (but only to keep tabs on her family—not to share details of her own life, as she had concerns about privacy and oversharing) and video chatting, Holly maintained that the telephone was her communication device of choice. She also preferred her landline phone over her mobile, explaining: "I like the conversational part of it… And I don't know all the… the shorthand of texting… and I don't want to learn [it]." There were three main reasons that Holly articulated for preferring telephone conversation over text-based or multimodal communication (video chat, instant messages or SMSs with emojis, etc.):

1) <u>She is more comfortable with a single, lower-definition (but highly participatory) communication channel.</u> The ways that Holly differentiated between talking on a landline phone and corresponding over email (or texting, or social media) closely aligned with McLuhan's (1964) distinctions between "hot" and "cold" media. A hot medium, McLuhan explains, "extends one single sense in 'high definition'… the state of being well filled with data" (pg. 36).

In his classification system, radio is a hot medium because it provides high-definition sound, and "do[es] not leave so much to be filled in or completed by the audience" (pg. 36), while the telephone is cooler because of its low definition and higher level of audience participation. McLuhan gives a different notion of "participation" here than our current understanding of "participatory media" (see Jenkins, 2006), which highlights reality television and the social web as "participatory" in that they offer opportunities for users and fans to talk back to media producers, as well as to become content creators in their own right. In a McLuhanist sense, "participation" involves the co-construction of meaning with the communication medium itself (rather than with other humans): how the user "fills in the gaps" in their understanding based on the amount of information the medium provides. As the richness of the medium increases, its level of participation decreases: the more information is provided, the less the user has to "fill in" to make sense of it.

In her interview and observation, Holly articulated a greater desire to "talk" than to "text," aligning herself with a colder medium. She explained that she found social media to be overwhelming, and also demonstrated difficulty navigating through Google search results for an unfamiliar topic (see Section 4.3 of this chapter). When explaining why she didn't prefer to communicate online unless she had to, Holly explained that she wasn't afraid of the internet, but rather felt overwhelmed by the wealth of information that it provided across many different formats. "I don't feel frightened by it," she said, "I feel annoyed because my brain doesn't grasp it quite as fast." This could be explained by the decline in cognitive processing experienced by adults after age 40 (Sibley, 2008), but it could just as easily be a matter of personal preference based in a desire to co-construct meaning with an interlocutor, rather than to have it all provided in a neat, complete, multi-modal package. This preference could be indicative of a cultural and generational predilection toward a different user experience than what is typically offered.

Holly's "annoyance" with the information-richness of the internet also offers a partial explanation for why she doesn't feel the need to learn additional digital skills (video chatting, social media, downloading and reading eBooks, etc.) beyond what was required to keep in touch with her family and manage her and her husband's finances and medicine. This comfort zone was created for her decades ago, when she first picked up computer literacies as a secretary in the workforce in the 90s. Her professional needs, as a woman employed in part-time, mid-skill

labor before the 21st century, also account for some of this resistance to developing additional computer knowledge/skills.

2) She didn't need to learn computing skills (beyond simple word processing) for her job before retirement. Holly learned to use a computer in the mid-1980s, when she returned to work after 25 years as a homemaker. "The school system… asked me to come back," she explained, "and they had computers. And without the secretary at another elementary school, who helped me out considerably, I wouldn't have had a clue, because it just never entered my lifestyle: typewriting and all, but not a computer." For this job, she used a computer solely for word processing and scheduling: the internet did not enter her life until after she had left the paid workforce permanently.

Because work did not provide her with an exigency to engage beyond these simple tasks (and because she was not interested in delving into computing as a hobby), Holly did not see the need to pick them up later on in life after retirement—a trend that was relatively consistent across all participants in both phases of this research. In the sample for this study, if an individual did not use computers and/or the internet in their professional lives, they did not use them extensively in their personal lives either; but if they had extensive experience with these technologies in the workplace, they felt more comfortable and confident using them for multiple purposes on their own as well. Participants who participated in computer training courses—either through local libraries, community centers, or colleges—were also more frequent technology users than their peers who had not had formal training. On the other hand, users like Holly—who did not have extensive technology experience inside or outside of the workplace—preferred to only use their computers when they "had to." Holly's grandchildren and her financial advisor would only contact her over the internet, so she communicated with them via email, but this was largely the extent of her digital engagement.

3) Her peer influence and cultural upbringing both push her towards telephone, rather than internet, communication. Holly had several friends who did not use computers at all: her "telephone buddies" with whom she'd talk on her landline on a regular basis. When describing them, she voiced a nostalgia for a time when the telephone was the default communication medium:

> "…[the computer is] not what [I was] brought up with. We had a more simple life in my growing up. In everything! And so, nothing was really too complicated. Your first phone had

> an operator. And… and at that time—actually, in Staten Island, New York, and I would be about, probably six or seven maybe—we had a phone, but you didn't even have to… the operator, she must have been sitting in the backyard, but she'd get… I'd pick the phone up, and she'd say, 'Who'd you want to call? Pat, or Maryann?' My friends… and you told her a name. You basically didn't even have to give her a number, so it was kind of a whole different era."

As a member of the Silent Generation, Holly grew up in the golden age of telephony, so it makes sense that she is more comfortable with communicating through this medium than through email, webchat, or text message. Her Generation X children, conversely, had experience with computers in high school and college, while her Millennial and Generation Z grandchildren cannot remember a time before the internet. The division between Holly's preference for telephone communication and her children and grandchildren's preference for email communication is an example of "heritage literacy:" the change in literacy knowledge from across generations, as "practices, tools, and concepts are adapted, adopted, or alienated from use, depending on the context" (Rumsey, 2009, pg. 575). While popular culture presents older adults as a group that has rejected technology entirely, Holly provides an example of an octogenarian who has adapted the computer to suit her needs (information search and retrieval, communication with some audiences but not others, managing finances, shopping), while her grandchildren, who prefer video chat and texting only, have alienated themselves from the technology of the landline telephone entirely.

At first glance, Holly might seem like a typical older adult user, because of the limited number and scope of activities that she engages with online. Technology researchers and designers may seem such users as digitally "deficient" because of ageist ideology that surrounds computer literacy and usage: they are perceived as "too basic," if not entirely "technologically illiterate." An article outlining a research agenda for studying older adults' digital lives explains: "The benefits of the new social computing environment are not equally applicable to the users," they write, differentiating between younger and older individuals, "especially those who cannot keep up with the advancement of the technology during a transition period" (Ji et al., 2010, pg. 1123). This statement—which comes from researchers who are self-professed older user advocates—implies that elders "cannot keep up" with technology advancement; that older adults are left in the dust, with technology outpacing them or passing them by.

Instead of conceptualizing the oldest technology users as slow, helpless, or unable to keep up with the times, presenting a persona like Holly's gives a fuller picture of the motivations behind why members of this age cohort adopt some technologies, while adapting or alienating themselves from others. Ji et al. (2010) write that one of the goals of their study was to get more older adults on social networking platforms—but conducting user research and gathering user stories, as in this dissertation, demonstrates that older adults are uninterested in joining social platforms because their modes of communication and relationship-building differ greatly from those of younger generations. Instead of attempting to shoehorn all age cohorts into a single model of computing, why not consider how to build devices and platforms that suit more localized user needs and desires instead? Modifying our expectations to fit user goals, rather than attempting to convince the user to follow our expectations, realigns technology to be more user-centered: more *humanistic*.

Ji et al. (2010) go on to assert that older adults who have attempted to participate in digital life "have not adapted properly" to changes in technology. In Holly's task analysis observation session in 2018, she demonstrated search strategies that could have been viewed as "improper adaptations" to an unfamiliar and quickly changing digital environment. The next section describes the difficulties that Holly faced when trying to find information and answer questions online, and how a user-centered view of technology that resists ageist assumptions might shed more light on how and why she struggled with the tasks assigned to her.

4.3 Barriers to Holly's User Goals

After Holly demonstrated her typical internet use during her first observation session—which included reading and responding to email, reading news, performing some healthcare research to help her husband as his dementia progressed, and shopping online—she began the structured task analysis with some trepidation. "This is like taking a test," she muttered, "I'm not an expert." When participating in the structured analysis observation session, Holly demonstrated an unusual search pattern and low information and data literacy, causing her difficulty in the search tasks (which accounted for the final three of the five tasks in the analysis), which asked her to:

1. Find a news story of interest to you about world events

2. Determine the distance between your home and the nearest Kohl's store
3. Find a government document that answers the question, "how do I deduct medical expenses for transportation to and from doctor's appointments on my taxes?"[18]

4.3.1 Search Strategies & Queries

Holly began the search exercises by trying to find a news story of interest about Donald Trump's finances[19]. Unlike a typical search strategy, which would begin by navigating to a search engine (like Google or Bing) or typing a query into the address bar, Holly started her process for this task (and for all of her searches) from her email client. She typed what she was looking for into the search bar in Gmail's interface, which is her most frequently visited page (though not her browser's homepage—she did not know how to change it). This search request (and all others that Holly initiated) was typed as though it was a webpage address, written in sentence case (with capitalization of proper nouns, as well as some punctuation, such as apostrophes to designate possession):

www . info on Trump's finances . com

When Gmail yielded no results, because Holly had no messages in her email folders that would match this query, she returned to the search bar and clicked "Search the Web For," which generated Google search results in a new tab. She clicked on the one that most accurately reflected her interests: a December 5, 2017 story from *The Guardian* reporting the delivery of Donald Trump's Deutsche Bank records to special counsel Robert Mueller.

[18] The original IRB protocol for this study included two additional tasks, but it became clear during the initial observations that the first five tasks were already taking up more time and posing more difficulty to the participants than I had originally anticipated. The tasks that I removed were "6. Register for an account on Pinterest.com and create a private board," and "7. Create and validate an account on Venmo.com." The members of the community did not express much interest in social media for a variety of reasons (which will be explored in Chapter 5, the chapter describing and analyzing the results from the interview study), rendering the sixth task somewhat unnecessary. I intended the seventh task to test participants' ability to use their mobile phones for two-step verification, since older adults have the lowest adoption of smartphone and SMS technologies.

[19] Structured task analysis observation data was collected in March 2018, a time when the 45th president's tax returns were a topic of perennial media conversation.

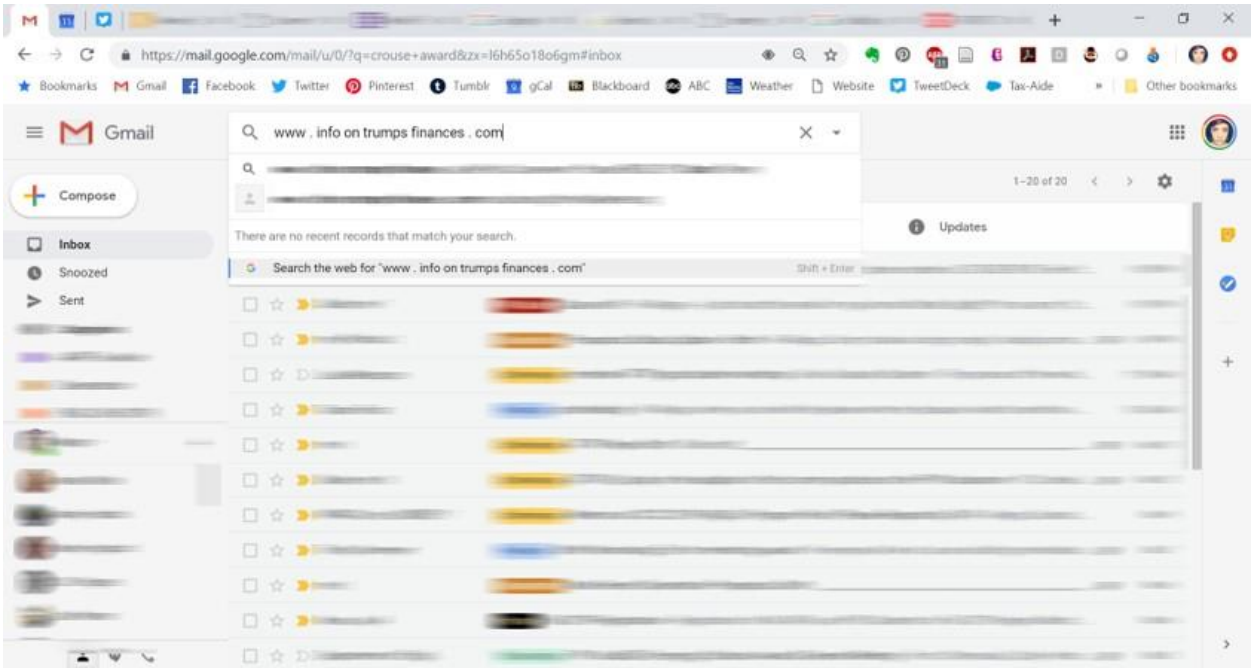


Figure 7: A representation of Holly's search strategy[20]

At the outset, this strategy appears unwieldy: why not type queries directly into a search engine? why take these extra steps? Additionally, it can also seem outdated: the "www" has been dropped from many URLs over the past decade, and the term "World Wide Web" itself is considered old-fashioned, like "cyberspace" or "information superhighway." However, the additional steps did not affect Holly's search speed or the accuracy of her results[21]. She was able to find the information that she needed and complete the task without trouble: she did not articulate any difficulty as she explained her steps through the think-aloud protocol, and she was satisfied with the result at the conclusion of the task.

4.3.2 Plugin Installation, Potentially Unwanted Programs, & Cybersecurity

The remaining two search tasks did pose challenges for Holly, however. When attempting to determine the distance between her apartment and the nearest Kohl's store, an

[20] Note the search terms used (typed as though they were a website URL), as well as the highlighted "search the web for..." text below the suggested results. Note that this is a replication of the search approach that Holly took: she was not searching in Chrome, but Mozilla Firefox. She also did not have any browser plugins installed.

[21] Though her inability to identify and filter out sponsored content did, as described later in this section

online mapping website prompted her to install and authorize a browser plugin in order to continue. While the study's IRB protocol and the verbal instructions provided to participants explained that the researcher would not provide assistance during the structured task observations, I did intervene before she clicked "allow," under the premise of "doing no harm" and "minimizing risk." After I advised, "I don't think you want to install that," she admitted, "I don't even know what that is," indicating that she was unaware of the potential security risks that installing a program from an unidentified source could cause. Digital privacy and security for older adults are topics with increasing prominence in both news media and research, with growing numbers of scams targeting elders because they are thought to have more money and assets in their possession than middle-aged and young people, with fewer safeguards and protections. At the time of this writing, the second most prominent item on the AARP's[22] website was "Technology & Money," demonstrating the strong linkage between digital and financial security. With an entire section devoted to detecting scams and fraud, mapping scam activity, and combatting identity theft, AARP's website makes it clear that this is a critical concern for seniors—and Holly's inability to identify a potentially dangerous plugin that could compromise her identity and financial data makes it clear that the problem is far from being solved. Additional training for older adults in this area from both technology educators and cybersecurity professionals could help to arm them with knowledge and strategies to protect their information. This could take many forms: infographics or digital reports, webinars, tutorial videos on YouTube, informational sessions in retirement communities or local libraries, etc.

4.3.3 Sponsored Content & Information Literacy

The final task that Holly was able to complete during the observation asked her to find a government document that answers the question: "How do I deduct medical expenses for transportation to and from doctors' appointments from my taxes?" The first search query she entered in Gmail was:

www . government document regarding deduction of medical expensis [sic]

The next three minutes of Holly's activity involved her clicking through results generated from this first search in a kind of daisy chain of advertisements: a sponsored content loop. She

[22] The American Association for Retired Persons: a special interest group and organization devoted to empowering Americans age 50 and over. AARP is among the largest political lobbying groups in the United States.

glanced at the first four results on the page—all paid ads, denoted by "Ad" in boxed green text below the hyperlink headline and URL. Holly's user journey from this initial search result page was as follows:

1. Holly clicked the first link, Tax Deductible Medical Expenses | Search & Find Quick Results.

2. A list of search results for the same query ("government document regarding deduction of medical expenses") appeared, from the website *Information Vine*, a potentially dangerous search provider that redirects users to sponsored search results.

3. *Information Vine* provided four sponsored search results that Holly lingered on. These results were displayed as "ads related to tax deductible medical expenses:"
   Pharmacy Automation – Section 179 Tax Deduction
   Free IRS E-File ®
   Tax Credits & Deductions – Biggest Refund Guaranteed
   Medical Expense Tax Deductions – Find Your Answers Today

4. Holly clicked the last link, which directed her to search results for the same query from *Ask.com*.
   Medical Deductions for Taxes
   Expenses Tax Relief – Here
   Claims Medical – Claims Medical
   Medical Claim

5. Again, the first four search results displayed were sponsored results. Clicking on the first one provided, Medical Deductions for Taxes, directed Holly back to *Information Vine*.

6. Holly returned to the previous screen and looked at the suggested search terms displayed in *Ask.com*'s right-hand pane, "Related Search."
   Medical Expenses
   Dental Tax Deductions
   Medical Expenses Report
   Self Employed Tax Deductions
   Business Tax Deductions
   Medical Tax Deductions
   Tax Deductible Medical Expense Questions
   Medical Mileage Tax Deduction
   Deducting Medical Expenses
   Home Improvement Tax Deduction
   Qualified Medical Expenses
   Deductible Medical Expenses

7. After reviewing these options, Holly clicked the third sponsored result, Claims Medical, which opened a new tab with search results from *Metacrawler.com*, a

search engine combining the results of multiple search platforms, for the query "claims medical." On this site, she scrolled down beyond the sponsored search results, and clicked Medical Billing Services, another sponsored result. This brought her to a website for Kareo, a billing software company. She returned to the previous page, and clicked another sponsored link for Medical Claims Processing, which displayed a website for Apex EDI, an electronic claims clearinghouse.

8. She gave up on the task after this group of results, explaining, "I don't know what I want here, to be honest with you. It would take me a while to figure it all out."

Holly's experience reveals an inability to identify sponsored content: that is, search results that are displayed first because the content provider has paid the search engine to prioritize them. While some search engines clearly display sponsored search results first, and mark them as ads, others providers are less upfront about the paid inclusion of some or all results. Because Holly did not know which results were advertisements and which were not (or which advertisements were legitimate and which were predatory), and because she didn't tend to scroll below the first four to six results that were displayed after she entered a query, she was unable to find an accurate answer to the question asked in the final task. Not only were her attempts unsuccessful, but also potentially dangerous to her (as in the case of the mapping task) because some of the search providers she was linked to have a history of installing malware and other potentially unwanted programs (PUPs) on users' devices.

Holly is not alone in this experience: the difficulties that she experienced differentiating between sponsored content and legitimate search results are also indicative of a broader trend for her age cohort. After the 2016 presidential election, media and scholarly attention turned to "fake news:" false stories or otherwise biased information circulated online with the intent of misleading readers. While attention was initially focused on both college-level and K-12 classrooms to address this issue (Wineburg et al., 2016), the group with that faces the most difficulty identifying fake news, as well as the highest susceptibility to sensational fake news claims, is actually older Americans age 60+ (Guess et al., 2018). As with scams and identity theft, older adults are more vulnerable because of their lower levels of digital literacy (understanding of digital media, devices, and interfaces) and information literacy (the ability find and interpret claims and data, particularly with regard to persuasion). Millennials and members of Generation Z have difficulty with determining which websites are legitimate and which are not, and they have grown up with computers and received extensive K-12 instruction on

technology use and digital literacy. Older adults, conversely, may not have even had formal training on basic internet use (as in Holly's case), let alone retrieving specialized information using advanced search strategies, identifying and understanding targeted advertisement, using antivirus software and ad blockers to protect their data, etc. This is an area of great concern for this age cohort, and one that deserves attention from writing studies just as much as the development of research skills for university students. With their increasing focus on information literacy (Artman et al., 2010; D'Angelo & Maid, 2004; Scharf et al., 2007), rhetoric and composition teacher-scholars (particularly those in technical communication) are well situated to design educational programs and materials to inform this population on how to assess material online.

Throughout the process of completing these tasks, Holly also struggled with the chiclet keyboard on her laptop. "See," she said, "my fingers [can] type faster, but this is too small for me… no, I don't like it… this is not a good keyboard for an older person." A veteran administrative assistant, Holly could likely manage upwards of 60 words per minute on a typewriter or traditional mechanical keyboard, but the small keys of a laptop were more difficult for her fingers to strike quickly and accurately—an ergonomic complaint that has plagued personal computing for over 35 years (Shackel, 1987). She faced similar difficulties with the touchscreen keyboard on her Android phone, but was able to work around these material constraints (albeit somewhat slowly and haphazardly) with a stylus. Computing is an embodied experience, and perhaps with no other population is this more salient than with older adults, whose quality of life is seriously impacted by conditions that increase with age: loss of fine motor control, tremors, reduced visual ability, and hearing loss. Designing with these embodied considerations in mind improves user experiences not only for older populations, but for all people: it's important to attend to these needs in order to make technology more accessible, easy, and enjoyable to use for all. Attending to these dimensions allows the public, as a whole, to benefit from improved usability.

In addition to the physical, embodied difficulties that she faced—fingers struggling to strike keys, eyes straining to read small text—Holly also alluded to cognitive barriers that affected her uptake and use of the latest technology. First, she described the generational gap between her usage and that of her Generation X children and Millennial/Generation Z grandchildren:

> "It's fascinating. Do I know a lot? No. My kids are 55 times [better at computing]… 'use Skype, use this'… I haven't got a clue what they're talking about… And they come down, they try to show me, and I still don't know what they're talking about. So I'm basic… Um, but I don't know the ins, ands, and buts of it, I'll be honest with you. I know how to copy from it. I mean, I can do that. But, uh, I'm not nearly as good as, like, my children."

The difficulty to understand the "ins, ands, and buts"—the inner working of a computer or smartphone—was expressed by multiple research participants in addition to Holly; there was a strong desire to comprehend *how* technology worked and *why* it was the way it was, and frustration when it proved more complicated than a simple explanation. Holly expressed that she wasn't *afraid* to learn more about digital engagement—she didn't experience the same fears of identity theft or breach of privacy as many of her peers—but rather that she couldn't retain the information needed to be a more advanced computer user.

> "…people tell me it's [my computer use is] very simple… I'm not saying I will never touch any more or learn any more, but, uh, it's confusing for me to learn too much. And I'm not stupid, it's just not… my brain is not wired for that… I don't feel frightened by it… I feel annoyed because my brain doesn't grasp it quite as fast."

There is ample information from neuroscience and gerontology about the decline in cognitive processing and memory power that occurs in old age (Campbell, 2015; Johnson & Finn, 2017; Sibley, 2008), but less evidence specifically addressing older adults' motivation to learn new skills, or the particular link between this declining neuroplasticity and perceptions of technology as a domain restricted to young, agile people. Additional work needs to be done in this area to better identify the how cognitive changes attributed to age, as well as the socio-cultural factors such as the "curriculum of aging" (Bowen, 2012) that dictates the roles and perceptions of aging bodies in society, combine to discourage older adults from adopting technologies beyond what they determine is absolutely necessary for survival.

4.4 Lessons from Holly's Case

One of the noteworthy takeaways from Holly's experiences—both those she recounted in her interview, and her habits and user journeys shared in her observation sessions—is how they contradict or complicate stereotypes of older adult technology users. Holly did use computers in her working life, but she developed working knowledge of computing and word processing after 25 years away from the professional sphere. She was taught by another woman, demonstrating

the impact of "pink-collar" (Bowen, 2015; Webster, 2014) knowledges and professional development/training in spreading technological expertise to women in the 80s and 90s. While women over the age of 65 *are* less likely than their male counterparts to feel comfortable with information technology and use it regularly, they *also* form gendered networks to "hack" this system and teach each other computing skills. Holly was not the only participant in this research who told a story of woman-to-woman technology mentoring: 86-year-old Minnie also noted in her interview that a fellow secretary in her workplace invited her to a computer training course at a local college, where they both faced ageist assumptions as the oldest students in the room. Secretarial work, with its emphasis on keyboarding skills and information management, provided a bridge into computing for several of the women across this study. By attending to the intersections of age with other markers of difference—like gender, class, or race—researchers and designers can better understand users' previous experiences with technologies in their respective socio-cultural contexts.

Holly's experiences as an octogenarian computer user stand as an exemplar of the diversity of use for this population: though her habits may appear ordinary at the outset, they actually provide original results that offer a counternarrative to the stereotype of the "technologically illiterate grandma," particularly upon further examination of her search strategies, which are grounded in an earlier understanding of web protocol and access than that of many younger "digital natives." Holly's insistence on typing search terms in web address format (including markers like "http://," "www.," and ".com") mark her as an internet user who learned how to access information in a pre-search-engine age—demonstrating a greater knowledge of the inner workings of technology than she lets on, and perhaps also greater than those of her Millennial grandchildren, who might not remember a time when they needed to type a full web address.

Of course, Holly's story is just one of the many narratives gathered through the multiple iterations of this research. While individual cases and stories speak to the human element in humanities research—that is, they illustrate the phenomenological experience of *user* experience—aggregate data presents a more complete picture of trends across an age cohort. The integrated scope of this work differentiates it from similar studies on the topic from both the humanities and computer science: it combines rich, qualitative and affective data from individual stories with more generalizable trends collected from a larger population to give a more complete

picture of how technology design impacts older adults. Thus, thematic results generated through analysis of the interview and observation data will be presented in Chapters 5 and 6, respectively.

CHAPTER 5: INTERVIEW RESULTS

This study emerged, in part, from a desire to bust myths about the technology usage and literacies of older generations of American adults. When planning my first research trip to a retirement community to interview a handful of 70- and 80-somethings about their experiences with computers and the internet, I aimed to establish a baseline understanding of how this local population of older adults—who were largely affluent and therefore had high access to expensive technology, as well as support and concierge services—used their digital tools. Establishing a clear and nuanced understanding of the devices used by a group of older adults from Silver Vistas, as well as their positive and negative user experiences with these devices, would help guide the development of further research questions and data collection instruments.

When I first visited Silver Vistas from March 6–12, 2016, I had more residents volunteer for interviews than time to speak to them all. I was given access to public lounges in the building to conduct interviews, but many Vistans invited me into their apartments and offered snacks and drinks. Sometimes, background noise from the television or classical music can be heard over the conversation in the recordings. One woman told me to "make myself at home" in her living room and asked me to "just throw the couch pillows on the floor" to get comfortable, as she signed the informed consent form. Other Vistans who weren't being interviewed sometimes wandered into rooms in the middle of conversations and asked to be added to the list of participants for the study. The willingness of members of this community to share their stories and experiences—to a relative stranger, and often with others present!—brings to bear critical implications for IRB and ethics, as well as methodology for conducting research both with groups of older adults and in communities writ large.

In the end, interviews for this project lasted three hours, 17 minutes, and 48 seconds, and their transcripts totaled over 29,000 words. The results offer clear trends for computer and internet experience for users aged 70+, as well as noteworthy barriers faced by members of these age cohorts.

5.1 Participant Backgrounds

Sixteen community residents participated in interviews for this project: four men and twelve women, ranging in age from 70 to 92. Nearly all belonged to the Silent Generation, born between 1928 and 1945, with the exceptions of one Baby Boomer (Carol, 70) and two members of the Greatest Generation (Enid, 90, and Donald, 92). Additionally, one of the community staff members, 60-year-old Marilyn, agreed to sit for an unrecorded, unstructured interview about residents' technological needs and trials; my field notes from this interview are occasionally used throughout results to provide context for participants' responses and experiences. Marilyn, a part-time employee of Silver Vistas in the position of "resident liaison," often served as the residents' "first line of defense" when troubleshooting technical problems with the community's digital infrastructure.

Demographic data from participants, as well as their self-reported dates of first computer and internet use, are provided in Table 1. Participants are presented in the order in which they were interviewed.

Table 1: Interview Participants and Demographics

Name	Gender	Age	Interview Length	Previous Occupation(s)	First Computer Use	First Internet Use
Enid	Female	90	12:03	Unknown	n/a[23]	n/a
Holly	Female	80	30:10	Homemaker; elementary school secretary	1981	2008
Bill	Male	73	11:38	Schoolteacher; middle school principal; grain farmer	1992	1995
Carol	Female	70	7:05	Secretary	1998	1998
Harvey	Male	89	9:51	Architecture & engineering estimator	1982	1999
Eleanor	Female	89	8:55	Sales	2013	2013
Helen	Female	77	11:21	Bookkeeper	n/a	n/a[24]
Kitty	Female	78	19:19	Secretary	Early 1980s	Mid-1990s
Gerald	Male	80	14:06	Teacher, project manager, director of personnel	1975	1990s
Beatrice	Female	88	13:14	School secretary	n/a[25]	n/a
Donald	Male	92	13:14	Architect	1985	"right away"
Josephine	Female	80	15:07	Episcopal priest; librarian	1987	Mid-to-late 1990s
Minnie	Female	86	15:05	Executive secretary; small business financial manager	Couldn't remember	Couldn't remember
Florence	Female	85	8:44	Dressmaker; entrepreneur	1993	1997
Rose	Female	84	21:10	Executive secretary; bookkeeper for medical office	1988	1996

[23] Enid was unable to use a computer because she was legally blind. In lieu of an interview, she demonstrated how she used her Optelec magnifier—an assistive technology that enabled her to read print books and correspondence, write letters, and cross-stitch.
[24] Helen identified as a technology non-user, explaining that it was her "husband's job." She owns an iPad tablet, but does not use it.
[25] Beatrice never learned how to use a computer. She was present during her husband Donald's interview and elaborated on his responses or prompted him to provide additional information.

While answering eleven questions about their history with computers and the internet, current uses, and difficulties, participants frequently told stories about their devices, learning experiences, and technological triumphs and tribulations. To amplify these older adults' (typically under-explored and under-represented) experiences, and in keeping with feminist storytelling methodology (Klages et al., 2019; Moore, 2013; Quesenbery & Brooks, 2010), their stories are presented directly and in their own words whenever possible, rather than excerpted or paraphrased.

5.2 Computing Purposes and Activities

When initially prompted to explain their purposes for computing and how they use their devices, most participants described themselves as "basic" users, or said that they only used their computers to check and send emails. However, additional prompting and follow-up questions yielded an additional myriad of activities beyond the most common "email" and "information search" responses. Even those participants who reported using their devices at most weekly for monitoring their email account still provided rich anecdotes about their digital literacy development and preferences as users over the course of their interviews. The wide range of digital activities and purposes represented across the participant interview data are displayed in Table 2. Again, participants are presented in the order in which they were interviewed.

Table 2: Participant Digital Activity Breakdown

Name	Email	Text Messaging	Social Media	Video Chat	Word Processing	Banking/ Finance	Search / Research	News	Shopping	Gaming	Health / Medicine	Church / Spiritual	Craft / Hobby
Enid													
Holly	✓					✓	✓		✓		✓		
Bill	✓					✓	✓	✓	✓		✓		✓
Carol	✓					✓	✓	✓		✓			
Harvey	✓		✓					✓					✓
Eleanor	✓						✓						
Helen	✓												
Kitty	✓	✓		✓		✓	✓	✓	✓				
Gerald	✓				✓	✓				✓			
Beatrice													
Donald							✓			✓			✓
Josephine	✓	✓	✓	✓	✓		✓	✓		✓		✓	
Minnie	✓		✓		✓	✓	✓		✓	✓			✓
Florence	✓					✓	✓						
Rose	✓		✓	✓	✓	✓	✓	✓			✓	✓	✓
TOTALS	**12**	**2**	**4**	**3**	**4**	**8**	**10**	**6**	**4**	**5**	**3**	**2**	**5**

The activities that these older adults revealed through their interview responses covered the domains of communication (email, social networking, video chat, instant messaging, etc.), information and reference (searching or "googling" for information, researching, etc.), finance and banking (managing retirement accounts and corresponding with financial advisors, checking stocks and markets, paying taxes, etc.), news and media (visiting news sites, listening to online talk radio, etc.), hobbies and crafts (managing information for golf groups, downloading patterns for embroidery or knitting, etc.), gaming (playing card or arcade games either individually or with other players, online sports betting, etc.), shopping (purchasing online for at-home delivery or pickup in store), health and medicine (scheduling or checking in for doctors' appointments, managing prescriptions, checking the Veterans Affairs My HealtheVet portal, researching conditions and treatments, etc.), and religion and culture (participating in online Bible study, coordinating church groups and events, etc.). This section details these computing purposes, from those most frequently observed across the study sample, to those less common.

5.2.1 Communication

By far, participants identified communicating with others—friends, family, businesses, like-minded community members, healthcare providers, financial advisors—as their primary reason for using computers. This type of communication was referred to in many ways: "talking," "keeping in touch" or "keeping in contact," "corresponding," and "keeping track," to name a few. Most participants (9 of 16) reported checking their email daily, while three checked it weekly or less. The necessity and ubiquity of email was clear to all participants who used it, though many remarked on the frequent or annoying nature of messages. 86-year-old Minnie explained the glut of information in her inbox: "I use it for keeping in contact with my friends, if they also are using the internet. I get a lot of mail…. Email that I delete, um, a lot of it is, uh… I think everybody in the world knows my email address. A lot of which I delete." Similarly, 80-year-old Gerald kept the same email address since 1995, so he had accrued many contacts and been added to many mailing lists. "I get about 50 emails a day," he estimated.

Less commonly used communication methods included (in order of frequency) social media (Facebook), video chat, and text messaging (through SMS or mobile applications like Facebook Messenger or WhatsApp). Though it was the second most used communication

platform behind email, individuals in the study sample largely eschewed Facebook, and many were vocal about their distaste for it.

> "I don't like it. I don't… I don't know why. I have nothing to hide, but sometimes Facebook… they put everything on it but the kitchen sink. Uh, friends of mine, their daughter is gonna have a baby… I know more about the birthing and the pregnancy of her than I ever did of my own. And it doesn't interest me… I know it's terrible… I just don't feel comfortable with it. I mean, I don't wanna know all that stuff. And… what am I gonna put on it?" (Holly, 80)

Another resident explained how he learned a way to get around this phenomenon.

> "I do keep track of [my son] by Facebook… it's okay. I scroll through an awful lot of stuff that I'm not interested in, you know. And people who talk about their friends that don't mean a thing to me, I just passed by… My daughter taught me how to delete these suggested posts that come on and so forth, and get rid of them. So I was getting a whole load of those, and so I finally got rid of them by deleting them all. And [Facebook] says, 'well, we'll try to get things more in your interests'" (Harvey, 89).

Other participants expressed additional concerns about social media, related to information literacy, digital identity management, and security.

> "I think it's [the internet's] a helpful tool. Now, the Facebook or some of the ways it's used on social media, I question. And the concern that I have being a former… educator… the concern I have is young people getting on those machines and getting unfiltered information. You know, when I grew up…we didn't know today's news until tomorrow, and usually it was the parents that talked about it to us. So we had a different perspective and were kind of guided as to what they wanted us to know and what they felt was appropriate for us to know. And now, uh, you know there's just too much unfiltered stuff that they can get a hold of" (Bill, 73).

> "I don't want to get so hooked on Facebook that it controls my life, and I think it does a lot of people…I just think Facebook is intrusive and I think it does bad stuff too…they said in this movie, when you put something on Facebook—when you put something on the internet, you put it on in ink, not in pencil. It never goes away" (Kitty, 78).

> "I don't like Facebook…if I were alone in the house and was going on a vacation, I don't think the world needs to know that the house is gonna be alone. There have been some incidents where they would go and rob your house" (Minnie, 86).

Though they identified that digital communication could pose problems and risks, a few participants (3) kept in touch using platforms beyond email: instant message and video chat. The benefits of video chat platforms like Skype and FaceTime for maintaining contact with family were emphasized by these older adults, who emphasized the joy of being able to see and hear their grandchildren. Josephine, whose children and grandchildren were flung to many corners of

the globe, was particularly vocal about the benefits of technology for "closing the gap" between her and her family.

> "It [her computer] came because of the kids. Because it was a wonderful way of keeping in touch with them…Skype and FaceTime and all. That was beautiful…I communicate constantly with people, either just internet or Skype…I am learning to get on it more to find out what's happening to, uh, the people I care about…I use, uh WhatsApp. You can send pictures on that…Pictures [are] very important. Because I want to see them growing up, and in person—that's what I love about, you know, being able to really see them, and watch the kids grow up…it's important to watch them grow" (Josephine, 80).

While many participants highlighted word processors as an antecedent to computers in their digital literacy development, or explained that they learned how to use computers in the workplace in order to compose and circulate documents, relatively few of them (4) mentioned word processing explicitly when recounting their purposes for computing in 2016. Those who did mention Microsoft Word typically used it to compose formal documents like year-end Christmas letters. One of these participants, Josephine, explained that she preferred hand-written letters sent through postal mail to typed ones sent through email, even though they would take longer. Harvey concurred, explaining:

> "The friends that I do still have contact with [back home], it's either by phone or by letter. Because they prefer the letter, you know. And I don't…that way you don't forget. You're writing the letter, and then…and so forth and so on. But everybody teases me, 'You're always going to the mailbox!' Well, I'm mailing! And there's birthdays and anniversaries" (Harvey, 89).

Regardless of the format, correspondence was clearly an important part of daily life for the older adults living in this community, and most emphasized that they valued the ability to communicate instantaneously through their email accounts—even if it could lead to information overload.

5.2.2 Information and Reference

Beyond connecting them to other people, the older adults frequently reported their technology connecting them to information and events (current or otherwise). Information search and research was the second most common activity that these participants engaged in after email. The oldest participant, 92-year-old Donald, claimed that he did not "communicate with anybody" online, and that he only got on the computer "when my friends force me to use it," but when

pressed for further information, admitted that he "used the research part of it." His wife, 88-year-old Beatrice, fueled the conversation by highlighting Donald's hobby of painting.

Donald:	I don't use the email as much as I should, but I do use it once in a while. Only when my friends force me to use it… like, 'haven't you looked at your computer lately?' I get… all the time.
Beatrice:	Tell Allegra that you're an artist. And you get your pictures from the computer.
Allegra:	Oh!
Donald:	I'm an amateur artist.
Beatrice:	He's a wonderful artist. Excuse me. Go ahead, Donald. But tell the girl that's what you do.
Allegra:	Yeah?
Beatrice:	Primarily.
Donald:	Yes…well, I use the research, uh, part of it. For instance, Beatrice showed me a picture of a couple of parakeets sitting on…some, uh, wooden branches. And uh…she said she thought it was very pretty and she wanted to get a shot of it…uh, a painting of it. But I didn't like the arrangement, so I'm gonna get on the computer, and I'll punch in "parakeets" and I'll get about a million pictures of parakeets in all different positions and shapes and sizes.
Beatrice:	He loves to do that, yeah.
Donald:	And that's what I do.
Allegra:	Mm-hmm. So you use it for…for reference images.
Donald:	Right. And then I print that and then I look through it all and see which ones I can use, and then I copy them into the picture.

Beyond seeking out inspiration for their art, community residents used search engines quite regularly for a variety of purposes. Search activities referenced in the interviews included answering questions, seeking out more information on topics of interest, looking up telephone numbers for individuals and businesses or using the digital White Pages, researching authors for a book club, or just "googling around." One participant, who used multiple internet-connected devices, explained, "I have an iPad and an iPhone and a computer, so I…I'm constantly looking up something."

Just because these women and men *could* find information online did not mean that they were always successful in their attempts, however. Three participants either mentioned or demonstrated "going down the rabbit hole" when looking for information: getting lost on a news

page or Wikipedia and forgetting their initial purpose for logging on. This theme resurfaced in the observation sessions in the Vistas two years later, when one participant explained that they often got lost while researching current events online, and another got sidetracked by learning more about the day's Google Doodle during his structured task analysis (see more in Chapter 6). While many claims of memory decline in old age are exaggerated or oversimplified (Powell, 1994; Tirrito, 2003, pgs. 96–97), one area with substantial research evidence in this domain is cognitive load. After age 40, an individual's ability to filter out perceptual information unrelated to their goal drops off sharply (Siple, 2009): an issue that can be compounded by the oldest adults' relative unfamiliarity with digital spaces and interfaces (Johnson & Finn, 2017, pgs. 119–126). This can lead to confusion, inability to complete a task successfully, or total abandonment of one's goal (either consciously or unconsciously). Rose described this difficulty as follows:

> "[I'll use a font enlarger option on a website] if I can find it. Again, uh, so much of this stuff is finding what's on the page. I, I find it's very confusing sometimes to look at a page and you've got ads all over here…you're trying to get the information that's in the middle. And then they stick an ad between the parts" (Rose, 84)

Other Vistans simply did not know how to seek out data online, or that the types of information that they needed were available on the internet. Holly remarked that she was once unable to find the phone number for her financial advisor, and a Silver Vistas employee "…took my phone, got me his telephone number…it took her like two seconds. She Googled. And then I learned how to Google." The ability to find information on the internet that they would otherwise look up in a print book, or call a phone number for, is perhaps still novel or even totally unfamiliar for some of the oldest adults; Holly's experience trying to find a contact number demonstrates the need for additional documentation and education around search techniques that the computer-savvy may find elementary or simple.

Finally, participants' fears of "too much information" or "unfiltered stuff" online could pose barriers to their success with searching and retrieving information, as well as sorting, filtering, and deciphering search results. Beyond the fears of misleading or false content that Bill articulated in his interview, multiple other participants mentioned digital scams. Indeed, avoiding scams and fraud is one of the key priorities of the technological and financial initiatives of the AARP, the largest interest group focusing on older adults in the United States. The organization runs a fraud watch network and frequently posts tips and resources for avoiding scams on its website and circulates them in its publications. As of February 2021, the AARP Fraud Resource

Center detailed 60 different types of scams, from ransomware to "VA pension poaching," on its website. Several of the types of scams listed by AARP were referenced by Silver Vistans. Carol and her husband Bill received multiple emails with fake tracking numbers for items that they did not purchase; she explained that they "read it in the paper and they tell you to be very cautious," which kept them from clicking on hyperlinks in the scam messages. Gerald explained a time when he received a message that asked him to call an offshore tech support firm on the phone to fix a problem with his AOL account. In general, members of the community were quite aware of the prevalence of scams and viruses spread through email and websites, and took precautions to protect their personal data accordingly.

Beyond the immediate financial or data security danger posed by scams, the Silver Vistans also faced deeper information literacy problems when attempting to differentiate between legitimate content and misinformation or deliberate disinformation—or even just trying to pick the best search result for their query out of a list of suggestions. Additional discussion of these older adults' experiences with searching and finding tasks, as well as implications for design, documentation, and teaching, are provided in Chapter 6.

5.2.3 Banking and Finance

Half of the Silver Vistans interviewed made some reference to conducting monetary transactions or monitoring their accounts online, though several of those articulated a preference for face-to-face banking. Digital finance to be a necessary evil for these older adults, though they didn't articulate any clear drawbacks to managing their money online. Most comments made about online banking or investments were short and matter-of-fact. For example, Bill briefly noted during his March 2016 interview, "Right now I'm in the middle of doing tax stuff, which it [the computer] comes in handy for…I e-file through my own accountant. I get the material gathered, send it to him, and he processes it." Gerald briefly noted that he did "banking and credit cards on the internet." Minnie used the computer for banking and finance in the workplace, recounting software that she learned on the job for her role as financial manager for a small company. She praised the functionality of the TurboTax software for completing her income taxes in retirement, explaining that she had been using the program "for years," and "it's been very good." Rose also did book-keeping in her professional life and continued to monitor

her accounts online in retirement but noted that she preferred to see an investment banker face to face throughout the year for financial management.

One noteworthy phenomenon that emerged from participants' discussion of finance was a gendered computing divide—but not necessarily the kind that one might initially assume. Though multiple married (and recently widowed) female participants explained computing as something that their husband did, and not them, three women (Holly, Carol, and Kitty) detailed their experiences managing household finances digitally. Both Carol and Kitty explained that they used Quicken to "do our books" and "keep track of finances," with Kitty adding that she kept up with the stock market on her iPhone as well. It was unclear whether Holly was always the financial administrator of her household or if she assumed the role after her husband's vascular dementia diagnosis, but she too noted that she "kept track of things, money-wise." However, she also indicated that she preferred to have hard copy documents on hand, again affirming her generation's apparent preference for paper letters, correspondence, and files.

Another woman who considered household finances (and technology) to be her husband's domain explained how she had to familiarize herself with both of them very quickly when her spouse passed away unexpectedly.

> "My husband used the computer. And for several years he wanted me to learn how. And I said, 'No, this is yours,' you know, 'You take care of it." And so he did, and I went and did my own thing. And um, he went up and died on me, so then I had to…get into the computer. And my son and I had quite a time trying to find whatever he had in there, but we finally did. Because I didn't want to learn, but I had to learn fast, so" (Florence, 85).

In Florence's case, and in the case of most of the other eight Silver Vistans who identified finance as one of their major internet activities, online banking was more of a necessity than a preference. While being able to receive an instant update on an account or a fund was a nice perk, it wasn't something that they were particularly excited about, or had any strong feelings on.

5.2.4 News and Media

While Bill might have lamented the rise of the 24-hour news cycle, he and five other participants mentioned consuming news or other media online. Carol referenced "reading the internet," while Harvey and Kitty had digital subscriptions to hometown newspapers (the *Boston Globe* and *Detroit News*, respectively). Kitty also had a talk radio app installed on her

smartphone that enabled her to listen to her favorite pundits. Josephine's children and grandchildren were scattered across the globe, so she kept up with current events in their neighborhoods. Rose scanned the headlines on her AOL homepage. No participants made any reference of watching streaming video (from paid providers like Netflix or Hulu, or free providers like YouTube) in the interviews, or in later observations.

5.2.5 Craft & Hobby

Several Vistans used the internet to help organize or direct their leisure activities in retirement. In addition to Donald the painter (who had raised several hundred dollars for local charities by auctioning off his work), there were several other artists in the community, including an active set of quilters and embroiderers. Rose and Minnie both downloaded quilt and embroidery designs from the internet and used digitally connected sewing machines. Rose explained their process:

> "I will go online and find, like…well, take the embroidery designs…I go on certain sites that I know carry designs and I'll pick out what I'm looking for. Say I'm looking for a butterfly. I'll check three different places for that particular kind of design. I will pick out my design, I will purchase it or just download it if it's a freebie, and onto my large computer. Then I have to put it on to a jump drive, which plugs into the [sewing] machine and transfers the media to the machine" (Rose, 84)

In addition, Minnie used her computer to manage email lists for announcements and correspondence for her two book clubs, as well as to research authors for the monthly books.

The Villages bills itself as an "active" retirement community, and highlights its wealth of recreation activities on its website—particularly golf. As of February 2021, there are over 50 golf courses throughout the community, including a dozen country clubs. Even into their 70s and 80s, many Silver Vistans took advantage of these facilities and golfed regularly. Bill, in fact, participated in three different golf groups, which he managed over email. Email provided a convenient and nearly universally used tool to coordinate games, record and exchange scores, and plan meetups.

Finally, Harvey mentioned that he used his computer to keep in touch with his hometown Masonic Lodge, but did not elaborate beyond mentioning that he preferred to get Lodge notices by postal mail. Within the category of crafts and hobbies, it becomes clear that Vistans used computers and the internet as tools to either organize groups, or make their work more

convenient. Donald could have sought out reference images for his art in other ways, but Google Images provided him with more options to customize his paintings and get the specific angle or composition he desired. Rose and Minnie still did some embroidery and quilting by hand, but the computer programs that they used enabled them to create more intricate designs, and automate processes like embroidering matching images or text on t-shirts for a group. These Vistans had recognized the unique affordances of email, search, and design programs and capitalized upon them to automate their lives.

5.2.6 Gaming

Games provide another way to pass time in retirement; Silver Vistans seemed to prefer card games over most others. While Carol played solitaire on her computer, Gerald and Minnie both played bridge on Wednesdays and used their email accounts to schedule games and keep track of scores.

> "We have a card game tonight—we play poker on Wednesday night, once a month, second Wednesday—so we'll play cards and we communicate sometimes by reminding people about the meetings and so on" (Gerald, 80)
>
> "I just scanned the bridge scores from yesterday and sent them to the gal who keeps track of them. So I did that by email" (Minnie, 86).

Donald, on the other hand, preferred chess. While he didn't do much online in the way of communication—he claimed to check his email less than daily—he was a frequent player of online chess programs, enjoying competing against computer-generated opponents of "different degrees of difficulty."

While none of these Vistans played games with other people online, preferring computerized opponents, multiplayer online gaming could provide one way to combat social isolation for older adults—particularly in periods that necessitate physical distancing measures, like the COVID-19 pandemic (Brooke & Jackson, 2020). Additional exploration of online gaming—specifically in the realm of gambling and betting—is offered in Chapter 6, with Carl's observation.

5.2.7 Shopping

Holly loved shopping online. She remarked that she felt like she always had packages coming in the mail for her—particularly shoes. Kitty's experience was similar; she swore that she did all her shopping on Amazon, explaining "I buy paper towels, I buy toilet paper, everything on Amazon.com." Other residents were less enthusiastic about the prospect of buying items online. Minnie used the internet to "see the new styles from Chico's" and "look up different aspects of shopping, sometimes," but preferred to make her purchases in person. Bill explained that he was "not big about wanting my credit card going over the internet, but sometimes you almost have to." Security concerns were a main reason for abstaining from online shopping—that, and enjoying the experience of browsing and buying in-store.

Other residents of the community mentioned in their interviews that they had heard of Amazon, but they hadn't used it, or didn't wish to. Again, the COVID-19 pandemic could have boosted Vistans' willingness to engage in digital activities that they wouldn't have otherwise considered, like online shopping. This experience, like Florence's of quickly picking up computing skills after her husband's death, highlights the nature of *necessity* as a critical factor facilitating older adults' adoption of digital tools. Because, as Gerald explained, "If you're 75 or 80 years old, you can do other things with your time than become proficient in the computer. And probably enjoy them more, you know." Most of the Vistans proved that, if there was no real *need* for online shopping, they wouldn't bother with it.

5.2.8 Health and Medicine

One area where necessity dictated that Vistans use digital devices, at least occasionally, was health and medicine. Holly's husband suffered from vascular dementia, so she occasionally used her computer to look up information on his condition, though she acknowledged that she was often less than impressed with the articles and fact sheets available. Bill mentioned researching "medical issues," explaining that he felt that WebMD was a "pretty good source" and that he often looked up symptoms to find more information on specific conditions that he or a friend might have.

Beyond researching conditions online, older adults may also use the internet to interact with healthcare providers through patient portals or billing systems. When asked to recount a

recent computer or internet problem, Rose detailed many difficulties that she faced "with doctors' offices and their lousy programs."

> "Their programs are set up very poorly, most generally…the other place that I had problems with was ordering medications online. Their website was set up, and you have all of your information to begin with, about you…where are the prescriptions? You have to scroll down and down before you find the prescriptions…or you have to flip for two or three other pages to find the prescription. And then you find you've got prescriptions from ten years ago that are no longer anything at all, and they should be wiped out, you know? *[laughs]* As far as the communication with the patient is concerned" (Rose, 84).

Rose's prescription ordering experience highlights issues with user-centered design. As patients age, their number of conditions and comorbidities increase, and so too do their prescribed medications. The designers of these patient portals are likely younger and healthier than the septua- and octogenarian users in Silver Vistas, but these users represent a population that is both vulnerable and needs additional guidance or documentation to successfully interact with such interfaces. Conducting user research with older adults could help ensure that the users' mental models match the navigation spaces provided, as well as clarifying instructions (Johnson & Finn, 2017, pg. 131). Rose continued:

> "And they're all different! I am with four different doctors, and a hospital. Everybody has set their site up differently, so that you never know whether you are…what the site will do for you. And I find that when I communicate with the family physician, I'll say 'check me in' ahead of time…I'll get there and they'll say, 'we didn't get that information.' Very discouraging when you spent 15 minutes maybe filling out the form as to whether you've had this, that, or the other thing, and what's wrong with you and what prescriptions you need and all this. And then they say they haven't got the information." (Rose, 84)

The lack of continuity across platforms, as well as her limited familiarity with the interfaces' features or functions, frustrated Rose greatly. Users' time is precious—especially if those users, like many of these older adults, would much rather spend time offline than on—so large amounts of scrolling or many minutes spent attempting to complete a task can greatly decrease user goodwill. A negative experience like Rose's unsuccessful appointment check-in can also contribute to the notion of the "curriculum of aging" (Bowen, 2012): the idea that older adults are technologically incompetent, or unable to complete seemingly simple tasks with technology. Building interfaces that respond to aging users' needs, and that help users complete their tasks with the least amount of friction possible (Buley, 2013), can help shift culture around age and technology, in addition to improving user experience. Two years later, Rose walked

through the process of checking in for a follow-up doctor's appointment using a health system's patient portal. This experience is detailed in Chapter 6.

5.2.9 Church and Spirituality

The Villages boasts over 120 churches within its community (Dinan & Solerno, 2020), and Silver Vistans were frequent attenders of worship services and other church programming, such as Bible studies and choral music performances. However, few participants described interacting with their houses of worship online; only Josephine and Rose mentioned engaging in online religious activities. Rose's reference to church was cursory; when explaining whom she communicated with online, she listed off children, grandchildren, doctors' offices, and hobby groups before mentioning that "we get a weekly message from our church in the email, telling what the sermon's going to be, what the Bible study will be, and so forth."

Josephine, a retired Episcopal priest, recounted how she developed her computing skills in the late 1980s and early 1990s while attending seminary. The priesthood was a second career for her; she started her working life as a librarian and bookstore owner, in addition to raising children. She had no need to learn the computer until seminary, and she found the learning curve to be steep. "It was hard enough that the kids taught me in two weeks how to use it," she explained. "I was in my 50s." Initially she typed her term papers on WordPerfect, before learning Microsoft Word when it rose to prominence in the mid-1990s. She expressed frustration with trying to keep up with the latest software: "Windows keeps changing and Microsoft keeps changing. If it weren't for my grandkids, I wouldn't be able to keep up with any of it." At the time of her interview in 2016, Josephine was using her computer to read and research the Bhagavad Gita, the primary holy scripture of Hinduism. She approached the study of religious texts very methodically, and tried to use her computer to support her understanding in a number of ways. However, her efforts were not always successful, she explained:

> "I don't like the, um, format for writing. Like, when I'm reading the Gita, I…because there's so many people and names and things, I wanted to start making a chart of the…Krishna and the children and the brothers and cousins. And with the other format I could pshhh *[makes zippy hand gesture]* on Word, but I…I get very frustrated. I mean, when my daughter comes in I'm gonna find out, but right now I am totally frustrated with Word" (Josephine, 80).

Religion, like shopping, is an area that COVID-19 has likely affected for the Silver Vistans, along with older adults in similar communities across the United States. Many churches moved their services online in spring 2020 to help mitigate the spread of the pandemic, including congregations in The Villages (Dinan & Solerno, 2020). Because individuals over the age of 65 are among the most vulnerable to COVID-19, many older adults have had to seek alternatives to their traditional face-to-face worship. Digital services, Bible studies, devotionals, and more provide the option for elders to continue engaging in their faith practices, while maintaining a safe physical distance.

5.3 Old Age Cohort Trends and Outliers

Two participants' responses were especially contrary to existing research and prevailing stereotypes about older adults' technology habits. While 96% of Americans aged 18-to-29 owned a smartphone in 2019, and 92% of those aged 30-to-49, that number drops to 79% for those aged 50-to-64, and 53% after age 65 (Pew Research Center, 2019). Age is, in fact, the demographic criterion accounting for the greatest variation in smartphone use in the American population—more so than household income or education level. However, 78-year-old Kitty and 80-year-old Josephine both described extensive smartphone use, despite belonging to an age cohort that largely rejects these devices. Kitty argued that her iPhone was as easy to use as a garage door opener or TV remote control and explained that she used it for "quite a lot."

> "If we ever have anything happen [to our iPhones]… I would feel… I would have my arms cut off, you know? Yeah, we really are hooked… This morning I had an appointment early in the morning—8:30 I had to be there. And I left the house without my phone… I was totally out of touch with the world. Nobody knew where I was, I didn't know where anybody else was."

It is unsurprising that Kitty felt "limbless" or "naked" without her iPhone, when the range of her digital activities is considered. Over the course of her 19-minute interview, she touched on all the following apps or activities that she engaged in on her smartphone:

- Email
- Grocery list-making and keeping notes
- Google, information search, and White Pages
- Amazon and other shopping
- Weather, news, and current events
- Text messaging and IM

- Calendar and scheduling
- Travel arrangements through TripIt, airline tracking
- Camera and photo storage
- Stock market and investment tracking/management
- Flashlight app for getting around the house in the dark at night
- Talk radio, to listen to pundits and keep up to date on politics
- A heart rate tracker
- MapQuest and navigation
- FaceTime for video chat
- iTunes for music
- Kindle app for reading in bed at night on the iPhone (Kitty owned a Kindle eReader as well that she used during the daytime—it didn't have a backlight for nighttime reading)
- Newspaper apps for daily and weekly publications she was subscribed to in a digital format

A self-proclaimed "dedicated Mac user," Kitty used her iPhone for a variety of purposes, but at times struggled to describe the "how and why" behind her usage. When I asked her which apps she used most often on her iPhone, she asked, "is mail an app?" Though Kitty demonstrated robust and sophisticated technology use, she had developed little understanding of the technical terms for the technology, or the inner workings of her devices. Her visual memory of where her most-used programs were located on the phone, paired with her muscle memory of common touch or click patterns, provided sufficient scaffolding for her purposes, without needing to understand that each icon on her iPhone screen represented an application that was stored inside of its memory. While many of her peers in the community expressed a desire to develop a greater understanding of how their computer worked or what its pieces were called, however, Kitty appeared very satisfied with the type of knowledge that she had of her devices, which she had developed through on-the-job learning and early computing classes in the late 1980s (for her desktop and laptop Macs), and on-the-fly help from her children and grandchildren (for her smartphone).

While Kitty picked up smartphone use out of a personal interest in technology and desire to have access to information and communication while on-the-move, 80-year-old Josephine's story was grounded in the need for family connection. With children and grandchildren scattered across three continents, Josephine used Skype, FaceTime, WhatsApp, and Facebook to communicate with her relatives—through video and audio chat, text messaging, and sharing pictures.

> "I talk on the iPad or the iPhone. Whatever is handy. I mean, I usually have my phone with me. But, we're constantly… pictures are very important. Because I want to see them growing up, and in person—that's what I love about, you know, being able to really see them, and watch the kids grow up… I can't go anywhere. But it's important to watch them grow." (Josephine)

While she did use technology for other purposes—as a former Episcopal priest, she read and researched holy texts online—Josephine's primary reason for continuing to use a computer after retiring from work was maintaining relationships. Stories of keeping in touch with her grandchildren across the world dominated her interview, highlighting the power of technology to enlarge the world of the "oldest old," particularly those prevented from traveling because of medical conditions—like Josephine, who had COPD and needed a portable oxygen concentrator to supplement her pulmonary function. A smartphone enabled her to stay connected with her loved ones without being tethered to another bulky device—broadening her world to reach a son in South America, a daughter in Africa, and a granddaughter on apprenticeship several states away. This dual capacity of connected devices to broaden the world to take older adults to places that they wouldn't otherwise be able to access, yet also to narrow the world to bring them closer to far-flung friends and family, has great potential to combat senior isolation and loneliness—a potential further explored in the conclusion of this dissertation.

5.4 Digital Learning and Literacy Development

The level of proficiency and comfort that Silver Vistans felt with their devices was largely dictated by how, when, and where they developed their computing skills. Adults age 70+—or those born before 1951, as of the time of writing—did not learn computing in school, and sometimes not on the job either. About half of the participants in this study reported having not learned how to operate a computer until after they had left the workforce. As a general rule, if a participant learned how to computers in the workplace—even in the simplest sense, like Gerald and Holly, who reported only interacting with PCs for word processing before they retired—they were much more likely to report frequent computer use in their 70s and 80s. Investigating the trajectories and locations of this age cohort's digital literacy development broadens our understanding of how to meet older adults where they're at when designing interfaces and documentation, as well as illuminating critical gaps in their computer and internet knowledge.

5.4.1 Necessity is the Mother of Invention

For the majority of the participants in this study, exigency was the key motivator for users to develop their technology skills. If a Silver Vistan didn't *need* to use the computer for something, then they generally did not use a computer at all—members of this community generally weren't electronics enthusiasts and didn't relish learning new things online. Those who did express that they got some enjoyment out of computers and/or the internet had learned how to use them early, and for professional purposes—typically with some kind of supervisor or teacher (see the next section of this chapter for additional explanation of these types of "literacy sponsors," to borrow a term from Deborah Brandt)—to "get their feet wet" and develop basic skills, before seeking out more advanced or targeted digital experiences.

Seven of the participants initially developed their computing skills in their workplaces. Holly, Minnie, Kitty, and Rose all held secretarial positions and used computers for those jobs; consequently, all four of them reported using their own personal computers with moderate or high frequency in retirement. Josephine learned how to use computers and the internet for writing and research when she sought a second career in her 50s as a clergyperson. Bill developed his computer skills around the same time, while working as a schoolteacher in the late 1980s and early 1990s. Gerald also worked for a school system and learned how to use a computer for word processing and communicating there.

Harvey was the only Silver Vistan who could be described as a computing hobbyist, having learned how to input commands on a 8-bit home computer in the 1980s—an experience that he recounted in detail. His son bought him a Commodore 64 and encouraged Harvey to take "…a course at Mass Bay Community College in computers…programming, which in those days was called Basic. And uh, I learned a little bit about programming, wrote a few simple programs for myself…and that was my start." No other participants indicated that they had any programming experience, or knowledge of source code or hardware engineering beyond the most rudimentary understandings. Though Harvey had not built a computer or programmed in quite some time, his interest in computing persisted into retirement: he reported using his PC "all the time" at 89 years old. His experience, and the experiences of his neighbors who had to learn how to use a computer in the workplace, demonstrates the power of necessity for computer usage and literacy development: folks who *had* to learn computers generally used them more than the folks who had the option not to.

Computer non-usage tended to fall along gendered lines at Silver Vistas. Women who didn't have to use computers in the workplace tended to use them much less, and sometimes not at all, in retirement. Carol, Eleanor, Helen, and Florence all described computing and technology as their husbands' domain. Though Carol and Eleanor both learned basic computing at home from their husbands, neither reported doing much online other than keeping up on current events and touching base with family. Helen "never really had to use a computer—that was my husband's job." She sent emails occasionally, but kept an Apple iPad gifted to her by her son in a drawer. The computer was also Florence's husband's domain; she owned a dressmaking business in the 1980s and 1990s, but personal computing and the internet hadn't really taken off before the time that she retired from full-time work. Donald, the oldest participant at 92, did not use the computer at work either—he explained that he learned after he retired—and he rarely logged on in retirement. His wife, Beatrice, never learned how to boot up a machine. These Vistans didn't feel the need to use computers regularly in their 70s and 80s—either because the utility of computers for everyday private life had not been demonstrated to them in a compelling way, or because they simply felt that they had better, more important things to do with their time.

Necessity also played a decisive role in developing Silver Vistans' digital skills after retirement. The experience of "needing" to learn a new technology is perhaps best encapsulated by Kitty's reflections on videoconferencing, when she explained "I don't do Facebook, but I do FaceTime…my daughter-in-law told me if I didn't learn, I would never see my grandchildren again." The need to keep in touch with family and friends, or the need to take part in the lives of children and grandchildren—particularly if they were separated from them by great distance—presented perhaps the greatest exigency for learning how to use the internet. The combination of distance and necessity created a clear need for digital communication; take Rose's reflection on the difference between her and Minnie's internet use, for example:

> "My dear friend [Minnie] has only one daughter, she has no grandchildren. She's not really interested in Skype, she's not really interested in Facebook. I have friends all over the world so, you know, I've heard from people in South Africa. I've heard from people over in England—distant cousins, that the child was very ill. And I spent a lot of time online, finding out how he was doing. I wouldn't have had anything—a letter would take too long to come across the pond!" (Rose, 84)

Thus, if prospective conversation partners preferred to use the computer to communicate, or *only* used the computer to communicate, Silver Vistans would generally log on to keep in touch with them; but if they would just as easily call on the phone or send a letter through the

post, that was the preferred mode of communication. These experiences demonstrate this age cohort's need for some kind of a catalyst to precipitate their digital literacy development. The Vistans would not just pick up the computer like any other skill because it was the hip thing to do—they needed a clear rationale, like the necessity of work or the distance of an out-of-state family member, to trigger or expedite their learning.

5.4.2 Technology Teachers: Literacy Sponsors

The encouragement or tutelage of individuals or groups also advanced Silver Vistans' technological knowledge. Not only did friends and family induce these older adults to use the internet by requesting that they correspond through email (or instant message, or video chat); they also took the time to teach them computing skills. The individuals in the Vistans lives who helped develop their technological usage took on the role of what Deborah Brandt (1998) calls "literacy sponsors," whether they served as teachers, mentors, cheerleaders, providers, or tech support. Brandt (1998) describes such sponsors as "any agents, local or distant, concrete or abstract, who enable, support, teach, model, as well as recruit, regulate, suppress, or withhold literacy—and gain advantage by it in some way" (pg. 166). For the residents of Silver Vistas, a few distinct patterns of technology sponsorship emerged: Vistans learning digital skills received support from colleagues, family, friends, neighbors, and tech support professionals.

The development of individuals' computer skills and usage is imbricated in broader social, cultural, and economic networks, as Brandt (1998) notes. Again, the workplace functioned as one of the earliest providers of technological literacy sponsors for those Vistans who cut their digital teeth there (instead of at home, or elsewhere). When asked how they learned to use computers, multiple Vistans recalled experiences with colleagues who modeled certain practices or activities for them. Holly, a retired school secretary, reflected on how the assistance of a younger coworker helped her acclimate to personal computing when she returned to the workplace after a prolonged absence:

> "I didn't work for twenty-five years [after having children]. The school system there asked me to come back, and they had computers. And without the secretary at another elementary school, who helped me out considerably, I wouldn't have had a clue... because it just never entered my lifestyle—typewriting and all, but not a computer" (Holly, 80).

Rose not only recounted learning basic computing and word processing with the help of coworkers—she also gave back her knowledge later on in her career by modeling the same kind of practice for younger colleagues.

> "I worked in an office for 15 years, and the computer came in the middle of that; so I got a lot of—to me, technical support there. And lots of hands-on…well, the younger girls didn't want to spend the weekend there, so I did. So I was able to show others what I knew about it, just from working with it" (Rose, 84).

Other Vistans' workplaces sponsored their attendance in computer classes or seminars. Not all experiences were entirely positive, however. Minnie recounted being marginalized by younger students in a computer course for her age and relative lack of experience:

> "Well, I was trained as an executive secretary, so I always knew how to type. Uh… when computers first started being used… I don't remember the year… I took a night course at the high school with a friend of mine, and we were the oldest ones in the class. When they asked our age, we laughed. *(laughs)* Um… and that was a very basic course. And years later, when I decided to go back out looking for a different job, I went back to my alma mater and took a course in Word… which was really a very good course. And it taught me a lot. Then after that, computers were there, so I used them!" (Minnie, 86)

Because older adults belonging to the Silent Generation and above typically went through compulsory schooling prior to the personal computing revolution, they have learned (and continued to learn) through a patchwork of additional institutional and extra-institutional contexts. Some learn through on-the-job training, while others are taught by relatives or children or grandchildren. Some are self-taught through a variety of methods: immersion or trial-and-error, how-to books, etc. Others took courses at local libraries or community centers, such as the urban community technology center that is the focus of Rachel Tofteland-Trampe's work (2017). The Villages also offers neighborhood workshops and seminars covering various aspects of computing, as well as its own lifelong learning community college.

Clubs and organizations also provided fertile ground for digital literacy sponsorship post-retirement, as well as testing sites for trying out computers and programs to do new things. Rose and Minnie both taught lessons and led workshops in the embroidery club that they frequented. As Rumsey (2009) notes, quilting and other forms of textile art represent the intersection of literate practice and technological practice: a contact zone where cultural identity and mechanization meet. As such, quilting-as-literacy shows the adaptation of meaning-making tools—especially when computer-aided sewing machines are involved. Rose explained, "a lot of

the women don't understand how to download their designs….it's just a matter of having someone hands-on in. Hands-on is the only way that adults seem to learn." As members of this user community, Rose and Minnie had unique insights into the expertise and needs of the population—making them ideal sponsors and teachers.

Indeed, one of the most effective means for overcoming negative assumptions about computers was seeing other members of the age cohort or community who could serve as technology role models and literacy sponsors. 78-year-old Kitty, one of the youngest participants in the project, recounted an experience when she encouraged a relative to try out a new device.

> It's scary, you know? You think, 'How can I do that?' And you just… if you just… I have a sister-in-law the same way. She will not use an iPhone. Her kids gave her an iPad and she just will not… she says, 'I'm too stupid. I can't learn it.' And I said, 'No, you're not too stupid. Anybody can do it. Trust me.' (Kitty, 78)

If family or friends were not available to assist a Silver Vistan when they had a question or concern about technology, they typically outsourced their query to tech support—the final form of digital literacy sponsorship that was prevalent in their interview responses. While some staff members at the Vistas would occasionally serve as impromptu tech support for community residents, many of them had their own personal support available for home visits or remote access on their computers if they had an issue. Some Vistans requested help from members of Best Buy's "Geek Squad," a team of customer support representatives. Helen, Minnie, and Rose, as well as later observation participants Judy and Carl all sought the services of a local electronics expert, Ray the Repairman, who ran a business solving technology issues across The Villages. Rose, who had known Ray for over a decade, explained her experiences with him:

> "He is a computer repairman who works out of his own home. He does not have an office. You pay him when you, when he comes to the house…he comes and will spend an hour with you, and it's a flat rate for the hour if he's there five minutes or if he's there 60 minutes. So I always try to accumulate questions, because he teaches also while he's here. I've been very pleased with the type of support I've had from this gentleman. He comes with all of his tools in the palm of his hands. Little plug-ins" (Rose, 84).

Ray the Repairman was not the only such independent computer contractor in The Villages; as a resource-rich community, opportunities for technology learning and support were abundant. As Brandt (1998) notes in her essay coining the term, the availability or visibility of literacy sponsors demonstrates the "persistent stratification of opportunity and escalating

standards for literacy achievement" (pg. 167). Older adults living in The Villages and Silver Vistas possess greater socio-economic privilege than most others in their age bracket, with a median home value of over $280,000 and a median household income of $63,841 (United States Census Bureau, 2019). These individuals had the financial capital to hire their own computer experts, as well as to purchase the latest and greatest technology if they so desired—the inflation-adjusted cost of Harvey's Commodore 64 would be over $1,500 in today's dollars! Moreover, these individuals also had access to family with high levels of computer literacy who could help them get un-stuck if they had an issue, as well as technological resources within The Villages designed specifically for the knowledge and needs of older adults, such as lifelong learning community college classes, local workshops, and computer clubs[26].

However, with all their financial and locational privilege, Silver Vistans still struggled to access technology due to ergonomic, infrastructural, and educational issues; these are explored in greater depth in the later subsections of this chapter, as well as in the analysis of the March 2018 observation sessions provided in Chapter 6. Considering the role of technology literacy sponsors in the lives of older adults provides critical insights into access and equity for this age cohort, but if these elders cannot even turn on their machines or access the internet (or refuse to, because of emotional or attitudinal influences), even the most knowledgeable or determined sponsor cannot influence their skill development or usage.

5.4.3 Attitudes toward Developing Computer Skills and Knowledge

Most of the interview participants described themselves as digital novices or people who "don't do much on the computer." Nine of the fifteen total older adults interviewed made some kind of statement identifying their technology usage as basic or minimal.

> "I'm not technically smart, you know?" (Eleanor, 89)

> "I think probably the computer's a lot easier to use than I use it. I feel ignorant about 95% of what the computer can do, because I haven't taken classes. I haven't been interested

[26] The Villages boasts over 2700 social clubs for residents, including several devoted to computers and technology. I did not have any interaction with these groups during my field work there, but a cursory Google search revealed five with their own websites: The Villages Computer Club, Computers Plus, The Villages iPad Club, Connected Villager, and Hands-On Tech. At the time that I wrote this chapter (January–March 2021), these clubs were meeting remotely to keep their members safe and healthy as the COVID-19 pandemic stretched into its second year. While these groups typically met once or twice a month in one of the 30 recreation centers across The Villages, they had embraced Zoom during the pandemic for continuing their activities.

> enough to go to workshops or anything, because it's not a high priority for me even though I realize the family would like it to be." (Gerald, 80)

Some participants provided hypotheses for why—their age cohort in general, or them personally in particular—were hesitant to use computers or stopped at the basics. A steep learning curve made one participant feel intimidated by technology.

> "…we are intimidated by that, and we don't have the interest in technical advances that young people have—probably because we didn't grow up with it, you know." (Eleanor, 89)

While participants who had greater comfort levels with computers typically felt that way because they *had* to learn how to use them in the workplace, the lack of necessity for technological learning in old age proved a deterrent for some. Participants explained that they didn't feel compelled to accumulate digital skills beyond what they absolutely needed to—email to communicate with family or businesses, health portals to manage doctors' appointments and medications, and finance websites to manage money, investments, and taxes. Gerald, who recounted quite early computing experiences (in the late 1970s), explained that he would prefer to develop other types of skills than computing tricks:

> "If you're 75 or 80 years old, you can do other things with your time [beyond] becoming proficient in the computer. And probably enjoy them more, you know. I'm a fairly spiritual guy: I spend a lot of time reading and writing religious stuff, and I don't find the computer as much fun as I do an old book to read." (Gerald, 80)

This preference for "analog" media was quite common across residents of the retirement community. In addition to Holly's preference for the telephone over email, Harvey's desire to send print letters through the post to his friends and family, and Bill's trust in print media over the 24-hour news cycle of online outlets, four other Vistans expressed some kind of inclination to an earlier technology over the computerized option. Helen favored phone calls and letters for keeping in touch with her friends from back home, explaining that she felt that she was less likely to forget an important date or anniversary if she was writing a letter by hand than if she was typing an email. Gerald's wife was in memory care, so he conference called his children every Sunday night from his landline phone to give them updates on her condition. Even with her frequent and sophisticated digital communication across a variety of platforms, Josephine expressed a special joy at receiving printed letters in the mail from her children and

grandchildren. Minnie voiced a desire to learn Skype but indicated that she felt more comfortable with the telephone.

The preferences that these Vistans voiced demonstrate their attitudes towards what they believe computers and the internet cannot do for them, or at least cannot do as well (or effectively, smoothly, comfortably, etc.) as they can do the way that they have been doing for years. These are generational values linked to perceptions about the accessibility, function, utility, and trustworthiness of technology, as explained by Dennis Baron (2000) in his essay, "From Pencils to Pixels." Distrust toward the personal computer was preceded by distrust toward the television, the telephone, the erasable graphite pencil, the mass-printed book, and even toward writing itself as "a technology that restructures thought" (Ong, 2001). This is not to discount the Vistans' preferences—they are legitimate and grounded in many years of technology and media use!—but it is important to place them in their appropriate socio-historical context, to better understand the factors shaping their usage.

These values towards technology are also reflected in generational narratives and anxieties about computers and the internet. For example, some participants attributed their self-professed "low" or "minimal" technology skills to cognitive factors.

> "I don't mind learning…it's just that sometimes it takes too much of my brainpower." (Holly, 80)
>
> "It doesn't seem fair that the older generation doesn't catch on to it for some reason or other. I don't know the reason, but it takes a lot… These days I don't remember too much." (Donald, 92)
>
> "It's something that I don't need that much, so it's a slower learning; where things that you really want, you take… and learn." (Josephine, 80)
>
> "It's hard for an older person, and we are slow. We're slow to absorb things" (Rose, 84).

While there is evidence for a decline in memory, attention span, and reading speed in adults over the age of 65 (Brajnik & Giachin, 2014), much of the difficulty that members of these age cohorts face when using the internet is not for lack of cognitive effort or capability, but rather slower information processing. Content-rich websites are designed with more *types* of information—often simultaneously presented, in multiple formats, and sometimes conflicting—than a printed page. "In this situation, older adults remember too much information that they should ignore, and too little that is important for their goals" (Siple, 2009, p. 11). While attention

deficits are seen as characteristics of youth culture—primarily linked to conditions like Attention Deficit Hyperactivity Disorder (ADHD), which saw a diagnosis and treatment explosion for youth in the 1990s—inability to focus attention or ignore distractions actually increases with age, defying generational stereotypes.

Additionally, older adults face difficulty adapting to devices and programs designed to appeal to the young—which is the case for many technologies, particularly mobile applications. Participants occasionally alluded to an understanding that folks their age weren't the primary market for a website or explained that they were just "too old" for computers. Many of the reasons provided for technological resistance were grounded in a "curriculum of aging" (Bowen, 2012): assumptions about the technological abilities of older adults, and views associating technology with youth. Thirteen of the fifteen participants in the interviews, or 86%, reflected an implicit curriculum of aging at some point in their responses, either by framing technological skills as a part of youth culture, reinforcing stereotypes about older adults' digital literacy capacities that had little or no basis in reality, or foregrounding "body failure" (Bowen, 2012, pg. 453) as a defining characteristic shaping their computer use (or non-use). Florence didn't see herself as a "real user" of technology because she only opened up her laptop to email friends and family and occasionally research information of interest; she had internalized a narrative that technologically literate practice had to look like the type of computing that went on in schools or workplaces. Others articulated the intersection of aging and technology use as follows:

> "…We're at that age that… that modern stuff isn't… 'not that stuff,' you know" (Helen, 77).
>
> "I don't know if we need more…I'm not sure if an older person needs more instruction, because I'm not sure we comprehend it all" (Holly, 80).
>
> "These young ones…they can't even go to the golf course without having their phones…and with their kids, that's fine, but come on…" (Carol, 70).
>
> "Because we're already intimidated and we really don't need that extra…at least those of us who are not as, uh, astute with technology won't be intimidated and we can do basic skills. We don't have the interest in technical advances that young people have…probably because we didn't grow up with it, you know" (Eleanor, 89).
>
> "My kids, the grandkids, wanted me to get an Apple. The older kids said, 'Mom, it'll take you two years to learn it, and you're not gonna be around that long" (Josephine, 80).

Josephine's statement in particular reveals a sense of resignation about cultivating digital literacy and technology usage in older adults: why bother teaching a user if they are just going to be dead soon? Why change the interface for an age cohort that's at the end of their usage journey anyway? The experiences of these Silver Vistans highlight the need not only for interface change and educational change, but cultural change as well. Technology usage is predicated upon technology learning, but learning can't occur if there isn't a desire for learning or an attitude that is amenable to learning. While there will always be people who do not wish to adopt new technologies, these research participants are often indicating cultural narratives and assumptions that hinder them from fully participating in digital society, or that frame their participation as "insufficient" or "lesser than." Even with such ageism encoded into interfaces and education, older adults are already users and designers of technology. To fully embrace older adults as technology users, and to empower them to access whatever technologies may support or extend their literate lives post-school and post-work, such curricula of aging must be interrogated and dismantled.

5.5 Deterrents, Problems, and Roadblocks

Even the most technologically savvy or active Silver Vistans still had problems with their technology, or voiced concerns about it. Participants' reflections on the difficulties that they experienced with computers and the internet shed light on common roadblocks that their age cohort face when attempting to realize their technological goals. While the most readily apparent deterrents to computing for the oldest old are material in nature—interfaces that are not designed for aging eyes, ears, hands, or bodies—and these issues were prevalent throughout the Vistans' interview responses, more hidden or latent problems emerged as these individuals reflected on their experiences with their devices.

5.5.1 Ergonomics and Material Concerns

Six of the fifteen participants referred to their devices or the websites that they visited causing some kind of physical problem for them. These problems were often ergonomic in nature, in that they impeded the individual's ability to accomplish the task that they were trying to complete. "Ergonomics" as a term and as a field of study emerges from aeronautical

engineering during the first and second World Wars, where "human factors focused on the design of equipment and devices to best align with human capabilities" (Buley, 2013, pg. 11). While ergonomics and human factors in the mid-20th century aligned to focus on "respect for people" in addition to maximizing efficiency, its ties to capitalist modes of production and its focus on humans' ability to *do work* make it an imperfect lens through which to view the computing experiences of the oldest adults. This is why I prefer the term "material considerations," which highlights the relationships between humans and their devices without granting primacy to work or the task to be accomplished. Material and human factors coexist together, both pushing and pulling, to enable and constrain older adults' technology use.

For example, when asked what would make computing easier for her, Rose immediately identified text size as a material concern.

> "Well, number one, with the aging person, if it's on the computer and you have to look at it, you gotta have type that's large enough. Because of the eyesight problem. Many of us with macular degeneration have very little eyesight, and we need to have the print big enough" (Rose, 84).

Such difficulty reading small text is also one of the primary reasons why older adults above the age of 60 use smartphones so much less than their younger counterparts. The ability to customize device or application settings to magnify text and images could aid participants' ability to read and reduce eye strain—that is, if they could find those options in the device settings and understood how to use them. Rose admitted that she struggled to locate assistive options in technology, but she had mastered the "pinch zoom" function on her Kindle eReader to magnify the text to a readable size: about 25 words per page. She wished that she could use this gesture across all of her devices, reflecting the importance of consistency in procedures in order to aid older adults' procedural memory (Czaja et al., 2019, pg. 26).

In a more classically "ergonomic" scene, Gerald struggled with the transition from a desktop to laptop computer, because of the change in device configuration and body position.

> "My kids bought it for me so that I would get out of the idea of having a large computer on a desk, so I could carry the…the laptop with me anywhere I went. Keyboard is a little harder to use for me than the other one was. I'm not quite as happy with it as I was with the other one. It's faster—it does a lot of things quicker—but uh, as far as word processing, it's not the best to have. I had a separate keyboard with the other one, and I could bring the keyboard up close to the edge [of the desk] and so on. Part of it is I don't have as nice an area to work in here as I do…so some of it just has to do with

> space…isn't as large as I had in the house. Now I have the computer in the den, which is also a second bedroom. So, it serves a different purpose than that" (Gerald, 80).

Gerald's experience demonstrates how "newer" or "faster" technology is not necessarily "better" for the oldest old. Additionally, it draws attention to the importance of considering context of use, in addition to the design of devices and interfaces themselves. Gerald highlighted the configuration of his computer room and the challenges of a small laptop screen and chiclet keyboard again during his observation sessions in 2018, showing the persistence of these problems for him over time.

Mice, trackpads, and touchpads also posed repeated difficulties for the Silver Vistans. Florence recalled having trouble connecting her mouse to her computer for six months and was unable to determine whether the problem was with the mouse itself, or the port that she was trying to connect it to. This experience demonstrates the often-interconnected nature of ergonomic and hardware issues.

Kitty used FaceTime on her iMac desktop computer, because the picture was bigger there than on her iPhone, and easier for her and her husband to gather around and see. She also lamented the fragility of her iPhone; as an older adult, she was more susceptible to falls, and mentioned that she had dropped her phone and shattered the screen before.

> "I would like it not to be fragile, I think…I, as an older person, am clumsy. And I'm scared to death…I'm scared to death I'm gonna lose it. I'm scared to death I'm gonna break it. And I am scared of both of those things" (Kitty, 78).

Anthropometric studies, or those that gauge human-body dimensions, have identified a greater range of movement control errors for older adults, as well as a decline in muscular strength after age 60 (Czaja et al., 2019, pgs. 28–9). These factors mean that devices that are less precise, but more resilient, are best suited for the needs of this age cohort.

Beyond the more readily apparent material concerns like ergonomically designed devices and peripherals such as mice and keyboards, Silver Vistans also made references to what computer scientist Paul Dourish (2017) calls the materiality of information representation: the dimensions of software and digital information that "constrain, enable, limit, and shape" (pg. 6) the ways in which they can be interacted with and used. These dimensions—classified by Dourish as heft, size, fragility, and transparency—can be manipulated to aid vision and motor control (Johnson & Finn, 2017). For example, Holly recounted struggles with the heft and fragility of the windows of her internet browser:

> "Well if you go 'click click,' it [the browser window] leaves or something, or it floats somewhere and you're looking for it! You know, or sometimes my computer will jump because I forget and I kind of land my fingers down…" (Holly, 80).

Josephine also hinted at materiality of her computer's operating system when voicing frustration at changes between the different versions of Windows. When operating systems looked different (a material concern) and located information in different places (an information architecture concern), it created confusion and frustration for her, and for other participants.

These difficulties with the materialities of interfaces voiced by Vistans in their interviews provided a small window into their experiences typing and clicking on their computers; I quickly realized that, in order to truly understand their struggles (and successes!) with programs and websites, I would need to directly observe them interacting with their devices. This realization set the stage for the March 2018 observations in the community described in the next chapter.

5.5.2 Obtrusiveness

While many participants voiced discomfort or misgivings about digital technologies, one specific narrative of technological alienation (Rumsey, 2009) occurred multiple times throughout the data collection process—a recurring narrative. In interviews and in casual conversations about this project, several participants identified a common space of technological dysfunction: deep discomfort with the way and frequency that "young people" use their cell phones. Take, for example, this response from 73-year-old Bill:

> The only other thing that is of concern to me is that, um... when... I'll just give you an example. A couple years ago we went out for an evening meal. Eight young people, about your age actually, um, came to sit down by a nearby table. It happened to be a circular table. Eight of them, sitting around the table. And within, I would say, two or three minutes, everyone was sitting there with their phone, maybe talking—you know, conversing with each other, and maybe not—but that... I don't think... is a good thing for personal relationships. That's about all that I can say about it. (Bill, 73)

Bill wasn't the only participant to reflect on the ubiquitous nature of mobile phones, or to hypothesize that the widespread proliferation of such devices was having detrimental effects on communication and social interaction. His neighbor, 80-year-old Gerald, offered a similar dinner-table-narrative:

> I don't do much with communicating with people that I can call on the phone, if I can do that without bothering them too much. So I do that. The kids all text, all the time, 3–4

> times a day they text each other. And I've just seen that as being very intrusive into the quality of life. When you're sitting down to dinner and everybody's on their smartphone, it's a little distracting not to be able to have a conversation. Or somebody gets up from the table because somebody called them while they're eating… those kind of things bother me a little bit. I think… I may be paraphrasing Einstein in a little… but I think he said at one point, something to the effect of, "When technology supersedes communication between people, we will have raised a bunch of idiots."[27] (Gerald, 80)

Finally, 78-year-old Kitty highlighted the importance of setting clear boundaries around technology use, to protect children and guard family time.

> AWS: Well, the last question that I have been asking folks has been about children and grandchildren and the internet… and you touched on that. They FaceTime you and they email you as well?
>
> K: And I think it's so wonderful. People say, um, they spend too much time on the computer—well, they're not allowed to bring their phones or their gizmos to the dinner table. (Kitty, 78)

All three of these exchanges demonstrate the distinct generational divide indicated by the gap in smartphone use between the old and the young. It is well-documented that there is a steep drop-off in smartphone use after age 50 (Poushter, 2017) and that older adults demonstrate greater use of tablets and eReaders combined than they do of smartphones (Smith, 2014) but the reasons behind this gap have not been extensively explored. It's easy, but reductive, to attribute this refusal to ignorance or old-fashioned luddism—these elders are just "behind the times!"—but what if designers, developers, and theorists were to examine this phenomenon through the lens of Bowen's (2012) curriculum of aging? Recognizing the different cultural expectations embedded in this situation—norms governing mealtime etiquette, maintenance of relationships, the valuation of face-to-face conversation over digital communication—can help user researchers and designers to better understand the problematics of the "technologically illiterate old person" stereotype.

Bill, Gerald, and Kitty's recurring narrative of smartphones-at-the-family-table reflects not only values surrounding communication and socialization, but also the attribute of technological *obtrusiveness.* In their literature review on understanding obtrusiveness within a telehealth technology context, Hensel et al. (2006) define obtrusive technology as that which is

[27] It is worth noting that this quote is either a misattribution or complete fabrication. Its first documented use is by Jeff Goldblum's character in the 1995 film *Powder*, but there is no record of it before that point.

"undesirably" noticeable or prominent, physically and/or psychologically. Their conceptual model outlines eight separate dimensions of user perceptions of obtrusiveness: physical, usability, privacy, function, human interaction, self-concept, routine, and sustainability (see Hensel et al., 2006, pg. 429).

While obtrusiveness is subjective—prominence that may be undesirable for one user could be considered appropriate or even advantageous by another—a later study building on this conceptualization noted that obtrusiveness was well-represented in older adults' reflections on assistive technology (Courtney et al., 2009). Participants in that study highlighted additional demands on their time and effort, potential physical discomfort or strain, financial expense of costly devices, invasions of privacy and infiltration of their home spaces, and interference with their daily routine as potential obtrusions posed by the adoption of a digital health monitoring technology—a range of concerns reflected by participants from The Villages in the interviews for the present research. However, it is critical to note that these potential obtrusions were just that—*potential*—as Courtney et al. (2009) were interviewing older adults about a hypothetical information-based assistive technology (only two of their 29 participants were actual users of such devices during the time of data collection). Several Silver Vistans also voiced concerns about the potential obtrusion of technologies that they had never actually tried, such as webcams and social media platforms. For example, Rose explained that her neighbors didn't understand why she used Skype to communicate with her grandchildren; they expressed fears of webcams and videoconferencing software obtruding on their privacy and routine.

> "I find that they're frightened that the thing will come and they'll be in their altogethers. *[laughs]* This is the one thing I've heard from different people about it, that… 'well, if it comes on all of a sudden and you're not dressed!' Or, uh, if you're in a compromising position! *[laughs]* But no. Skype is a great communicator for us who have children and grandchildren and great-grandchildren all over the country" (Rose, 84).

Rose's experience with her peers was not an uncommon one, and it signifies a critical gap that could be filled through a multi-pronged approach. Actually introducing older adults to these technologies, providing appropriate documentation and education, and designing culturally responsive interfaces grounded in "aging in place" theories could make this endeavor more successful, diminishing some of these misconceptions and unfounded fears about obtrusive devices.

Hensel and colleagues (2006) collapse "obtrusion" and "intrusion" for their definition (p. 428), combining the eight dimensions that they highlight into a single conceptual model (pgs. 429–30). For the purpose of understanding technology's effects on older adults and their views of these phenomena more broadly, however, I advocate for separate operationalizations of *obtrusiveness* and *intrusiveness*. *Obtrusive* technology sticks out, as Hensel et al. (2006) note: it's noticeable or prominent in an unwelcome fashion, perhaps clashing with its surrounding environment or signaling something undesirable about its user. *Intrusive* technology causes disruption in the lives of users, through invasion of privacy, changing norms or habits, or otherwise undesired psychological, social, and/or cultural consequences.

Obtrusion is typically physical in nature, while intrusion points to less tangible, more symbolic or latent (but no less inconvenient or insidious) effects of technology (Smith, 2017). Obtrusion and intrusion exist along a continuum, with their manifestations ranging from physical, to functional, to procedural, to relational. See Figure 8 for a representation of this modified conceptual framework.

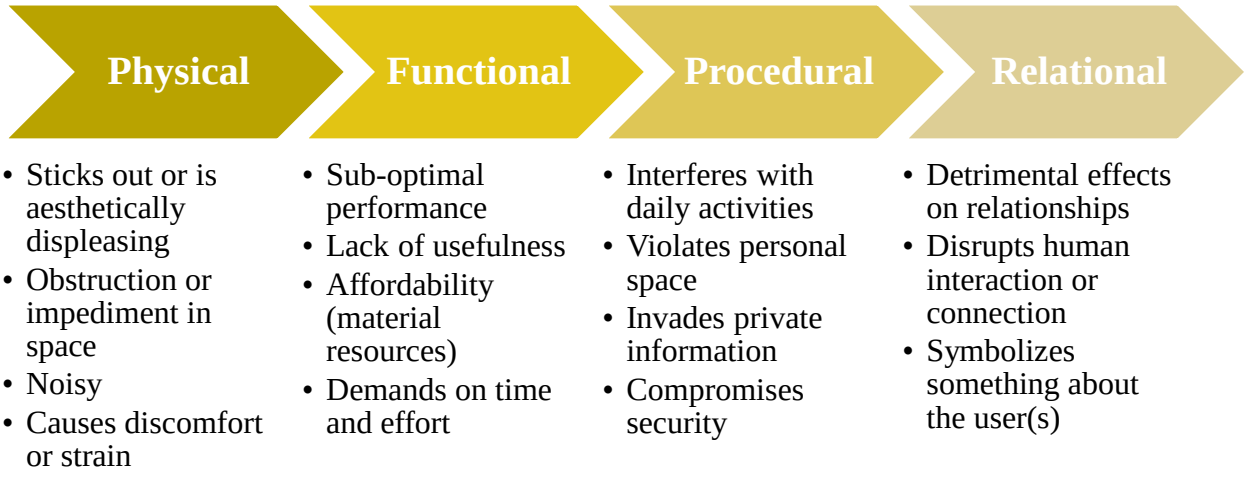


Figure 8: Obtrusive → intrusive manifestations of technology (adapted from Hensel et al., 2006)

5.5.3 Identification and Language

Four years after conducting these interviews, I was struck by a pattern in them. While I conducted systematic analysis of the data, I noticed that, while I typically used possessive determiners (*your*, *his*, *my*) when referring to participants' devices and my own, the older adults

tended to use definite articles that did not indicate possession (*the*, *a*). I was struck by their repeated use of the phrase "*the* computer" to refer to the device that they were using, rather than "*my* computer" and wondered if the difference could be significant. A simple analysis of collocations in the transcription data confirmed my hypothesis. See Tables 3–6 for quantitative data on the collocational patterns for articles and determiners co-occurring with "computer" in the interview transcripts.

Table 3: Researcher Indefinite Article Collocations with "Computer"

Article	Number of Uses
a	2
the	7
TOTAL	**9**

Table 4: Participant Indefinite Article Collocations with "Computer"

Article	Number of Uses
that	1
a	7
the	43
TOTAL	**52**

Table 5: Researcher Possessive Determiner Collocations with "Computer"

Article	Number of Uses
his	1
their	3
my	3
their	3
your	11
TOTAL	**21**

Table 6: Participant Possessive Determiner Collocations with "Computer"

Article	Number of Uses
his	1
their	1
our	2
your	3
my	12
TOTAL	**19**

To summarize, while I used possessive determiners to refer to computers 70% of the time and indefinite articles 30% of the time, the research participants' language was nearly the opposite, with Vistans using possessive determiners 25% of the time and indefinite articles 75% of the time. This finding is significant not only because it confirms the theoretical discourse on obtrusiveness shaping technology perceptions and adoption for older adults; it also demonstrates how members of the oldest old age cohort place deliberate rhetorical difference between themselves and their technologies. These research participants separated themselves from their devices through language, rejecting identification or association with their technology. This rejection also reflected fears of a "cyborg" (Haraway, 1990) mentality; participants did not see

technology as an extension of themselves, because they didn't wish to be identified *by* their technology. Florence hinted at this notion as she said of her computer, "It is something that people, they like it and, you know, use it all the time…but it's not something that's…I could live without it." Even the most hardcore users of the Silver Vistas, like smartphone maven Kitty, expressed fears of technological dependence:

> "If we ever have anything happen, I would feel…I would have my arms cut off, you know? Yeah, we really are hooked…This morning I had an appointment early in the morning…and I left the house without my phone. And we live on the third floor and we park in the garage, so we go down this elevator, walk down this hall, go down this elevator…and I was not gonna go all the way back up for my phone. So, for about two hours this morning, I was totally out of touch with the world. Nobody knew where I was. I didn't know where anybody else was. It was kind of fun" (Kitty, 78).

Such fears of technological dependence and resistance to identification with one's devices can pose significant barriers, both for older adults' participation in digital life and for technology designers' and manufacturers' ability to market to these age cohorts. Again, this situation makes the case for values-based user research that seeks to understand usage beyond clicks and keystrokes—identifying generational differences and affirming the need to design for an age-diverse population.

5.5.4 Technology Non-Users: The Case of Miss Enid

The wealth of data from these interviews perhaps raises just as many questions as it answers, but one is important to address here, in order to make sure that a key research participant is not excluded from the analysis: what of the Silver Vistans who did not, or could not, use computers? When making initial contact with leaders in the community, and planning for recruiting participants, I asked the Silver Vistas staff and members of the resident welcome team if they knew of anyone who didn't use technology, to ensure a balanced research sample. Immediately, these community gatekeepers recommended that I "meet Miss Enid."

Upon visiting 90-year-old Enid's apartment, I was struck by the intricate needlepoint work that decorated the living area from ceiling to floor. Rose, who was asked to introduce me to

Enid, told me that this detailed needlework was all the more impressive because "Miss Enid has been legally blind for quite some time." All residents and staff at Silver Vistas referred to her as "Miss Enid," perhaps out of southern convention, or perhaps because she was one of the oldest and most well-respected residents of the community. Miss Enid invited me into her home office, where she said she did all of her reading and writing. She said that she could not use a computer because of her low vision, but she pointed me to a device that looked like an older, square CRT monitor suspended over a drawing tablet (see Figure 9).

Figure 9: Rose at Enid's Optelec machine, using the device to magnify the printed text of the study recruitment script.

This device, made by Optelec (a subsidiary of Vispero, "the world's leading assistive technology provider for the visually impaired"), was a desktop video magnifier: a reading aid that continuously displays an image from a camera magnified on a screen, from 1.5 times to up to 170 times larger than life. Miss Enid would turn the device on using a switch underneath the monitor, before placing documents that she was interested in reading (typically the newspaper, printed letters from friends and family or businesses, her Bible or devotional books) on the reading table underneath the camera. She would manually focus the camera on the document using a button on the reading table, and could control the camera, magnification, and resolution using additional buttons. She explained that her model was at least twelve years old, adding,

> "The new ones, they tell me, you don't have to focus. They focus themselves…there's 52 and a half laser lights in here. There's no lightbulbs. So, if one goes out, they have to send you a whole new cartridge. But I've had twelve years and, knock on wood, I haven't had a problem" (Enid, 90)

While Enid's video magnifier helped her considerably with reading, writing, and crafting, she acknowledged that she was fortunate to have it—and at no direct cost to her. Her Optelec machine was loaned to her by a local division of the Lions Club, an international service organization aimed at improving communities and meeting humanitarian needs. She explained this to Rose, who suffered from age-related macular degeneration (ARMD), and encouraged Rose to seek out help from a similar organization instead of attempting to purchase assistive

technology on her own. Enid's relatively old machine was estimated at around $2000 in value, while similar magnifiers could cost anywhere from $800 to over $5000 USD, depending on their screen size, resolution, and features (some desktop magnifiers offer a voice-to-text option that runs optical character recognition, or OCR, software to recognize words on a page and speak them aloud to the user). This cost could easily be unfeasible for an individual relying on Social Security or disability compensation to get by. Smaller handheld, portable, and even wearable optical magnifiers are also available, but they may also be costly or unsuitable for a user's specific needs (e.g., a handheld "purse size" magnifier may work fine for reading the options on a restaurant menu, but may not be suitable for long blocks of text, like a printed novel; a set of 2x magnification glasses may help an individual with earlier-stage glaucoma, but a higher magnification level will be necessary in later stages). It's clear that such assistive technology is most readily available to those with great financial privilege, while working-class and poor individuals instead must cobble together resources to retrofit a solution, or simply go without.

Miss Enid's case is a noteworthy one for two reasons. First, it calls attention to the importance of considering assistive technology as *technology*. Though I undertook this study on the basis that I would be gathering data on older adults' computer and internet use, Enid's situation showed me that I wasn't considering many other forms of technology that this age cohort interacted with on an everyday basis—some of which I wasn't even familiar with! Considering these elders' experiences as assets to learning and knowledge-sharing illuminates new possibilities (Rumsey et al., 2012). Drawing the "technological circle" wider affirms that people like Enid are still technology users, even if they are unable to interact with a "traditional" desktop computer; this also opens the possibility that, because the move from a magnifying CRT monitor to a flat-screen PC display is not a particularly giant leap, perhaps these non-users could in fact transform into users if technology design responds to their specific assistive technology needs. Is it so far-fetched to imagine a computer display that can enlarge text, images, and videos in the same way that Enid's Optelec magnified the printed page?

Second, Enid's case demonstrates that even those who "cannot" use computers or the internet still use screen-mediated technologies. Nearly all of the Silver Vistas residents owned televisions (and there were several displayed and nearly always running in common areas throughout the community); digital cable was installed standard throughout the community, but

some Vistans also opted to use set-top boxes from Roku or Apple TV to stream additional content. Minnie was particularly fond of her Roku, as it enabled her to keep up with Red Sox baseball games during the spring and summer seasons. Other residents had home and/or cell phones with screens (though not typically smartphones), while some had cars with in-dash infotainment systems, and still more had eReaders or tablets. Smart assistants (outside of those pre-installed on smartphones, like Apple's Siri) were relatively uncommon during my first visit to Silver Vistas in 2016, but by my 2018 visit, multiple Vistans wanted to show off their Amazon Alexa speakers to me. While personal computers and smartphones may be the most used internet-connected devices, they are hardly the be-all and end-all of technology; and it is important to note that even though individuals aged 70+ may claim to be technology non-users, upon closer examination it becomes clear that it is impossible to get away from "technology" in an age of media proliferation and convergence (Greenfield, 2006; Jenkins, 2006).

These technologies are also used differently by different types of users; as age affects the body, some technologies or features may be more accessible than others. A man with essential tremors or Parkinson's disease may have trouble using a laptop touchpad because of the precision needed for swiping and clicking, but a touchscreen tablet could provide greater access. Miss Enid could conceivably use a television and simply listen to the audio or watch movies with descriptive narration turned on to better understand the scenes being portrayed on screen. Instead of writing off such users as computer-illiterate, it helps to deploy a more inclusive framework, like Rumsey's (2009) heritage literacies, to characterize their usage as literate activity and recognize older adults as technology users on their own terms. Heritage literacies provides a more generative frame for understanding how different generations "adopt, adapt, or alienate" themselves from technology, recognizing the inherently cultural and contextual nature of usage. Older adults, particularly those with disabilities that impact screen-mediated communication, make many adaptations to "typical" or "normal" technological practice. Instead of framing these individuals as "those who cannot keep up with the advancement of technology" (Ji et al., 2010, pg. 1123), which evinces a deficit mindset, a heritage literacies approach recognizes the adeptness and facility necessary to adapt to a changing technological landscape, while one's body is also changing with age.

5.6 Conclusions

The data collected in these interviews demonstrate clear cultural norms and values surrounding computer and internet use for members of the oldest old age cohort, as well as opportunities for improving and targeting technology design, documentation, and education to this population. One of the clearest takeaways from this work was the importance of not assuming a basis for "common knowledge" for older adults' usage: one of the greatest sources of frustrations for Silver Vistans was when they were unable to solve their computer problems or follow an expert's instructions because they did not know the industry-standard terms for computer parts or functions, or they did not fully understand how the system worked. Building a baseline understanding for computing functions and key concepts can empower users to make informed choices when engaging with their devices and surfing the web—not just older adults, though their age cohorts are certainly more vulnerable given their lack of formal digital literacy training. Chapter 6 provides potential interventions in this area, while outlining the results of unstructured observations and structured task analyses with a select group of Silver Vistans.

CHAPTER 6: OBSERVATION RESULTS

Holly: *This is like taking a test!*
Allegra: *It's not a test. I cannot stress enough. You will not—there will be no failing grades. You can only win. (First task analysis session with residents of the Silver Vistas community, March 2018)*

During the March 2016 interviews with 16 residents of the Silver Vistas community, it quicky became clear that in order to truly understand these individuals' experiences with technology (as well as their collective community experience!), they needed to have their technology *in front of them* as I conducted my research. This is not to say that interviewing was not an effective research method for gathering information on older adults' experiences with their devices—on the contrary, the initial interview study generated a wealth of data!—but additional methods were needed to provide a full picture of usage and pain points for members of this community.

The rationale for additional data collection was twofold. First, participants often had difficulty recalling the most used programs on their devices or their typical struggles with different programs and platforms when they were recounting their experiences in a neutral public location, or in their apartment living rooms. Moving them directly to their sites of usage—where they could work with their computers or other devices while they answered questions—would alleviate this problem and generate richer data on how they interacted with their technology, as well as the issues that they encountered. Second, conducting additional unstructured observations paired with a more controlled task analysis would add to the understanding of how these participants really used (and/or didn't use) their devices: filling in gaps in their own retellings of their typical days online, as well as adjusting my own understanding of their digital expertise and repertoires. Indeed, these observations showed me just how wrong I was about 80- and 90-somethings daily internet use, as well as the things that they knew how to do with their computers (and didn't). All in all, the nearly five hours of observations conducted with these participants revealed even more information on the Vistans' day-to-day computing, experiences learning digital skills, common problems with devices and interfaces, and reasons for persisting in their computer usage and learning into their 80s and 90s, as well as just how quickly technologies and their attendant user experiences can change over the course of two short years.

This chapter explores the results of the naturalistic and structured task analysis observation sessions with seven Silver Vistans, describing the computing activities that they shared with me and their reflections on their experiences, before providing key implications for digital design, learning, and culture.

6.1 Participant Backgrounds

Seven community residents participated in observations for this project; six participated in both rounds of observation (unstructured observation and structured task analysis), while one, Carl, only participated in the first unstructured observation. Carl and his wife, Judy, participated in the project together in their shared home office, so only one could complete the task analysis portion of the study—had Carl attempted the task analysis after Judy, his actions and reflections would have been shaped by her earlier performance, and therefore the data collected from him would be less valid and reliable. Carl did not assist Judy with her completion of the tasks in the second observation.

The observation sample had more balanced gender representation than the interview sample, with four female participants and three male participants, ranging in age from 78 to 91. Six of the seven participants belonged to the Silent Generation, born between 1928 and 1945; one participant, 91-year-old Peggy Sue, was on the cusp between the Silent Generation and Greatest Generation. Three of these participants (82-year-old Holly, 82-year-old Gerald, and 86-year-old Rose) had already participated in the research through interviews in March 2016, while four participants (91-year-old Peggy Sue, 90-year-old Hank, 87-year-old Carl, and 78-year-old Judy) were relatively new to the study. Hank had wanted to participate in interviews in 2016, but was unable to find a time to meet that worked with his schedule. Peggy Sue, Carl, and Judy were all aware of the research, having lived in Silver Vistas during the 2016 interviews, but did not participate then. This mix of participants proved ideal for tracing changes in some Silver Vistans technology usage over time, while also adding new voices, perspectives, and experiences to the study.

Demographic data from participants, as well as basic statistics about their participation, are provided in Table 7.

Table 7: Observation Participant Breakdown

Name	Gender	Age	Participated in 2016 interviews?	Observation Time	Task Analysis Time
Holly	Female	82	Y	10:21	14:12
Peggy Sue	Female	91	N	40:09	17:57
Gerald	Male	82	Y	22:14	17:47
Hank	Male	90	N	35:20	31:16
Rose	Female	86	Y	17:16	18:07
Carl	Male	87	N	15:47	n/a
Judy	Female	78	N	34:11[28]	22:44
TOTALS				2:55:18	2:02:03

6.2 Contextual Technology Inquiry: How Were Participants Using their Devices on a Day-to-Day Basis?

During the first session, which took the form of a naturalistic or ethnographic observation with little prompting or intervention, participants demonstrated their "typical" computer and internet use. After I was invited into their homes—and often shown around on a tour to look at décor or pictures, and/or offered a warm beverage—I sat down beside each participant at their computer and began video recording their activity. Seven Silver Vistans walked me through their daily digital routine, starting with booting up their devices and proceeding through typical activities like checking email, monitoring social media, scanning news headlines, and tracking financial accounts. Table 8 offers a broad overview of each participant's activities in this first observation, as well as the different skills or literacies demonstrated as they clicked through various screens and programs and explained their process.

[28] Judy had technical difficulties on her computer midway through her unstructured observation. Her computer was moving slowly and lagging, and eventually froze completely. She rebooted the computer and asked that I observe Carl while it restarted. We moved to the task analysis when the computer was working again, but Judy did show off additional devices (an Amazon Echo smart speaker, a portable GPS, and an Apple iPhone) and skills during the post-task analysis debrief and interview, which I incorporated into the unstructured observation analysis. Judy's observation time of 13:51, paired with our debrief discussion (to which Carl also contributed) of 20:20, gives her a total observation time of 34:11.

Table 8: Naturalistic Observation Activity Breakdown

Name	Time	Sites Visited	Skills Demonstrated
Holly	10:20	Gmail, Amazon, Google	banking and financial planning; email; news and politics; medical information; search; shopping
Peggy Sue	37:23	Outlook Mail, Google, Amazon, Facebook	email; printing; security (virus scanning); search; shopping; social networking
Gerald	22:09	AOL Mail, Facebook, documents and Microsoft Word, Google, AOL Contacts	ancestry and genealogy; email; mailing lists and groups; medical information; search; social networking; sorting and navigating files; travel booking/planning; troubleshooting
Hank	35:20	Fox News, Google, Jitterbug smartphone (text messaging, voice-to-text, Bible app, photos)	banking, investing, and pension; email; images; news; reference (dictionary, encyclopedia, etc.); religion and spirituality (Bible lookup, spiritual commentary, etc.) search; smartphone apps; sports; text messaging; virtual assistant; voice-to-text
Rose	17:16	Facebook, AOL Mail, documents and Microsoft Word, USB devices, embroidery and quilting programs (Husqvarna 4D Embroidery System), Microsoft Picture It!/Digital Image, Google, Missouri Star Quilting Company website, Skype, Nook eReader	social networking; email; calendar and scheduling; travel booking/planning; printing; word processing and correspondence; hobbies and crafting; design programs; sorting and navigating files; photos and photo editing; search; shopping; video chatting; e-reading and books
Carl	15:47	AOL homepage and news; Gmail; My HealtheVet (VA health portal); Wells Fargo; Twin Spires (horse gambling)	banking and financial planning; games and leisure; gambling; health and medicine; news and current events; email; stocks and markets; information search
Judy	34:11	AOL homepage and news; AOL email; Kindle eReader; Amazon; Google Chrome; LastPass password keeper; Carbonite cloud backup; Apple iTunes; Amazon Echo speaker and Alexa virtual assistant; iPhone; Apple Maps; Waze; MoviePass; Apple Calendar; Snopes	news and current events; email; e-reading and books; shopping; information search; security; banking and financial planning; cloud and information backup; bill pay; music; virtual assistant; smartphone; apps; maps and navigation; hobbies and leisure; scheduling and calendar

6.2.1 Jumping-off Points: Email Clients, Browser Homepages, and Facebook Feeds

When demonstrating their daily computer and internet use, participants typically began by checking their email—either through their browser or a client like AOL or Outlook Mail.

They would then show how they searched for information and/or consumed media online, showing off their Googling skills or navigating to their favorite news website. Like Holly, who began her day online after breakfast in her Gmail account, Peggy Sue, Gerald, Carl, and Judy all went to their inboxes first thing after booting up their machines (in Outlook, AOL Mail, and Gmail, respectively). Rose's first session on the computer typically began on Facebook, shortly after she woke up around 5 a.m. (she would also check messages at around noon and 6 p.m.). Hank preferred to look up the Weather on his Chrome OS desktop computer first thing, because "Depending on whether I want to wear a long sleeve shirt or a short sleeve shirt is very important!"

Noting the Vistans' jumping-off points, from whence they began their digital days, shines important light on their priorities as technology users and as people. Gerald and Rose were more conversational users, checking social media early on in their sessions, and reaching out to friends and family. Gerald had changed his attitude toward social media between the 2016 interviews and 2018 observations, engaging with it more after his wife died. Like Rose, whose husband had passed away over a decade before, Gerald found that Facebook helped him to maintain social connections and combat isolation as a widower. Perhaps not coincidentally, the two of them were among the most advanced users of the bunch, demonstrating the greatest comfort with their devices and a wide array of digital activities and tools.

Hank and Judy consumed more media or engaged in more searching activity after their initial routine inbox checks. Judy admitted that she could "often get sidetracked" by advertisements or promotional messages in her email, as well as entertainment news stories on her AOL homepage. Hank spent nearly four minutes learning more about the daily Google Doodle, which commemorated the life of philanthropist George Peabody, in the middle of his task analysis—an activity that he admitted was not out of the ordinary. The two of them enjoyed learning through the internet more than the other participants, not only through their desktop computers, but also through their smartphones (Judy had an iPhone and Hank had a Jitterbug, respectively).

The remaining three participants in the observations—Carl, Peggy Sue, and Holly—were more task-oriented in their orientations toward computers and the internet. They would open their laptops or boot up their PCs to engage in certain activities—namely email, information

search, healthcare management, shopping, and (in Carl's case) gambling—but typically only for brief periods of time. While these three participants encountered more difficulties with their technology than the others, and their usage was more "casual" than their neighbors', they still demonstrated a variety of skills in their observation sessions.

6.2.2 Shopping Successes and Setbacks: The Cases of Peggy Sue, Holly, and Rose

Holly, Peggy Sue, and Rose all walked through their typical online shopping experience—an activity that Holly and Rose said they engaged in relatively frequently, while Peggy Sue appeared less familiar. Holly mentioned that she joined Amazon Prime to buy items with free shipping, and that she had "a pair of shoes coming, I think tomorrow" and sent "things to her son's new dog." Peggy Sue, on the other hand, used the unstructured observation as an opportunity to find a new pair of shoes for herself. The digital shoe-shopping experience, which was ultimately unsuccessful (Peggy Sue was unable to place an order, due to an incorrect Amazon account password), lasted 17 and a half minutes. The oldest participant in the observations, Peggy Sue experienced the following difficulties while attempting to search for, select, and order a pair of shoes that met her needs:

1) Motor Control: Peggy Sue (or perhaps one of her children) had placed a shortcut to Amazon.com on her desktop, which she initially struggled to select. She was unclear on the differentiation between single-clicking and double-clicking a target, and occasionally missed the target, clicked too slow, or made too shaky a click (which was identified by her computer as a drag or a selection, rather than an open command) (Johnson & Finn, 2017, pgs. 59–61).

2) Knowledge and Perception: Appearing unfamiliar with the Amazon search interface, Peggy Sue didn't notice the sidebar options available to her after she typed "shoes for women" into the search bar and selected one of the options presented to her, "Oxfords." She scrolled through some of the thumbnail images, then asked "Where do I get the sizes? Should I go back up and ask 'em for the size?" The same occurred when she needed to select a width option for her shoes (she had narrow feet, or "slims" as she called them). This issue could have emerged because the shoe size menu was presented in a sidebar in a type size that was at least a couple of points smaller than the shoe names, logos, and prices displayed on the main ¾ of the screen; it

could also be attributed to Peggy Sue's relatively low familiarity with the Amazon shopping interface (which can be reasonably assumed from her later password problem).

3) Information Architecture: Later, when navigating Zappos (which I suggested to her for its wide variety of options and Amazon-integrated shipping), Peggy Sue again failed to notice the site's option to shop by shoe size and filter results by width. Again, she didn't seem to understand or recognize the sorting and filtering tools on the left hand side (this time an accordion menu listing options for "Shoe Category," "Women's Size," and "Women's Width" with options that were automatically expanded for the user's view, but could be condensed by clicking a carat). The search interface and navigation were not intuitive to Peggy Sue; possibly because of limited experience with this type of tool, though she claimed to have shopped on Amazon before. She did not appear to have a sense of the hierarchy of options available to her, or a mental schema for understanding how to narrow down her search results and select a subset. (Rosenfeld et al., 2015, pgs. 251–258)

4) Security and Passwords: After finding a suitable pair of shoes on Zappos and adding them to her cart, Peggy Sue could not log into her Amazon account to complete her purchase. She faced some difficulties with motor control—striking the correct keys on the keyboard when typing in her username and password, and holding down the mouse button too long when clicking buttons—but what ultimately stopped her shopping session was incorrect login credentials. She kept her usernames and passwords written down in a binder that she stored behind her computer monitor, a practice that aided her memory but also posed physical risks to her privacy (an intruder could easily access all of her digital identities with a few sheets of paper conveniently located right next to her computer). Such security concerns are common for older adults, who may have difficulty remembering unique or non-dictionary-word passwords (see Kropczynski et al., 2021; Mendel, 2019; Munteanu et al., 2015; Vu & Hills, 2013).

When Peggy Sue referred to the information in the binder to log in to her account, Amazon repeatedly gave her an error message: "There was a problem: Your password is incorrect." Noticing her frustration, I held up the binder next to the screen to cross-reference the login information, and determined that the email noted in the binder for Peggy Sue's Amazon account was slightly different from the one that she had logged into previously: her binder had the correct email listed (psbrown1927@gmail.com), while she had previously logged in under a

slightly different (incorrect and nonexistent) email (spsbrown1927@gmail.com). I explained the problem to her as follows:

Allegra:	This is going to be difficult, because if we try to unlock your account, we'll click "get a sign-in code sent to your email." It's going to be sent to this address (points to the "spsbrown1927" address listed on the sign-in page), which is not your email address.
Peggy Sue:	Mm-hmm.
Allegra:	So there's going to be no way for us to get into your account, because we don't have the email address associated with it, and we don't have the password.
Peggy Sue:	Mm-hmm.
Allegra:	So if you're going to want to order anything through Amazon that requires you to log into your account, you're not gonna be able to; you're going to have to start a new account with your actual email.
Peggy Sue:	Hmm. Well, then we'll just forget it. I'll have my son do it.

Peggy Sue's difficulties with shopping interfaces, and frustration with her inconsistent account information, contrasted greatly with Rose's demonstration of her typical shopping experience on one of her favorite websites: the Missouri Star Quilting Company. She accessed the Google Chrome browser from her desktop and searched for the website directly from her homepage. After typing in "Missouri," Google's search interface automatically completed the query to "Missouri star quilt," which Rose noted for me, pointing to the words on the screen—she was clearly familiar with this autosuggest feature of Chrome. The results provided displayed the homepage for the company, as well as six popular sub-pages on the website: Rose selected the "Daily Deal," noting that she "always wanted to see it first, because it is the cheapest." As she walked through the features of the website, she showed how hovering over an image of a pattern or fabric would display a close-up, before navigating to the "Yardage" tab of the site navigation to sort through several different types of options, showing different organizational schemes and structures (Rosenfeld et al., 2015 pgs. 104–126) for finding quilting materials and notions (see Figure 10).

Rose:	Now, suppose that isn't what I want. I want yardage. I can go up here. What kind of yardage do I want? Do I want precut, or do I want another type—like batik fabric? I can shop by brand. Um, let's go in here *[clicks "Shop by Fabric Brand" to display the different manufacturers available]*

Alright, these are the manufacturers. I happen to know that I like Maywood Studios.

Allegra: *[sees the preview image for a children's wildlife-themed quilt]* Aww, look at the cute little elephant!

Rose: Yeah!

Allegra: Nice.

Rose: These are kits. All sorts of kits. I could go in and get yards from them. I could get pre-cuts: ones that are two inches. I'll show you that. That's—that's sort of interesting *[scrolls back up to the top to select an additional option of "Pre-cut Fabric" under the "Shop By" menu]*. Let's see, "pre-cut fabrics." Okay. These are 10-inch squares; they're all different colors. Look, somebody liked this one real good. *[she motions to a sold-out bundle, and laughs]* This is the line I uh, did my granddaughter's quilt with. It was Maywood. I was hoping maybe it would pop up. But they have charm packs—these are 5-inch squares. They have 10-inch squares and they also have what you call jelly rolls *[continues to scroll down through the results, and points at a result indicating 2.5-inch strips of flannel]*. This is, uh, what a jelly roll would look like.

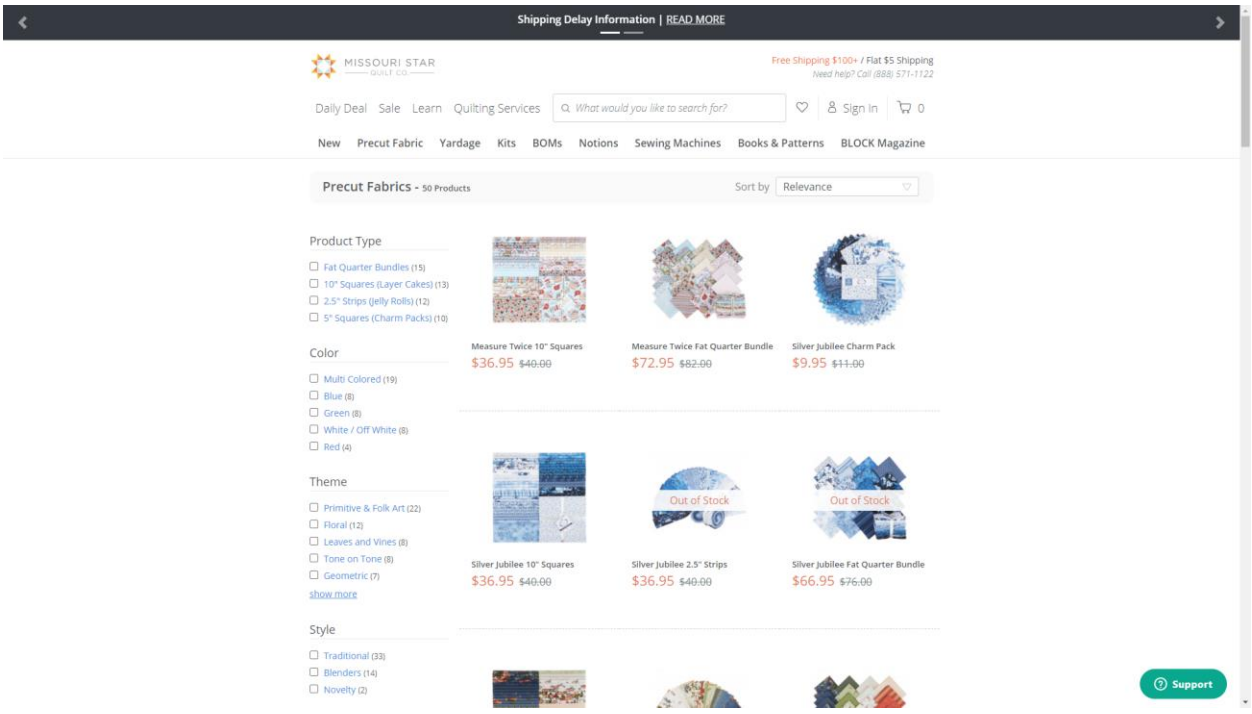


Figure 10: The Missouri Star Quilt Company shopping interface that Rose demonstrated, with her favorite brand selected

Rose's skillful navigation of the Missouri Star Quilt Company website's sorting and filtering features was clearly the product of many hours spent browsing quilting supplies online, as well as decades of expertise with textiles and fiber art—however, she readily applied her understanding of this particular shopping interface to similar websites, like Amazon, demonstrating the transferability of information architecture knowledge across contexts. Consistency in design features, layouts, and iconography across devices and websites, then, can aid older adults in reaching their technological goals, particularly in such a task-oriented activity as online shopping.

6.2.3 From Analog to Digital Designs (and Back Again): The Case of Rose

Rose's usage was also noteworthy because of the variety of design programs that she demonstrated during her unstructured observation. After checking her Facebook feed and notifications, as well as her AOL email inbox, Rose began walking through computer activities that she engaged in more occasionally, like writing letters in Microsoft Word. She immediately noted that she needed to magnify the text and "change the font to a larger font because I can't read it myself," showing her knowledge of these features. The design of technology could help aid or inhibit Rose's usage, as she had age-related macular degeneration and shaky hands. While the various assistive features in Microsoft Word helped her, she experienced difficulty inserting her flash drive into one of the USB ports in the side of her all-in-one Dell desktop computer when she began demonstrating her favorite embroidery program, showing the movement and motor control decline faced by many older adults after age 60 (Czaja et al., 2019, pgs. 18–20). After about 20 seconds she was able to connect the drive, and launched the Husqvarna Viking 4D Embroidery System (see Figure 11).

> "I have to use the dongle because it won't open without it. And say I wanted a design. I can go up here and I can say 'open.' These are designs I have. Well, let's see this patriotic quilt label. This is what I use on my charity quilts for veterans', uh, things. Now, that's in the wrong hoop, so I've got to go up and change the hoop. Oh, I centered it. Excuse me, I got the wrong one. All righty. My hoops…That will go in a four-inch standard hoop. Now, it's not in the right spot. I pick it up and I…move it over, and now I can use the center. Now if I wanted to put that on a, uh, thumb drive, I would put the thumb drive in here and go from there. And then it would be ready to go into the machine and sew that out."

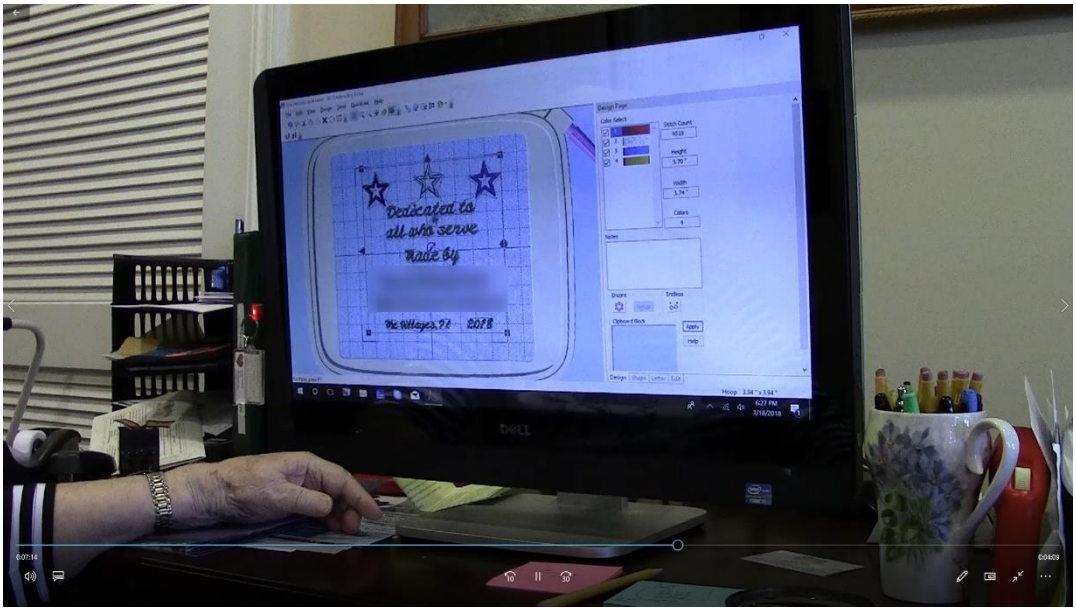


Figure 11: Rose demonstrating the Husqvarna Viking 4D Embroidery System interface, using an applique label for a quilt for charity that she had designed previously (identifying information obscured to protect Rose's identity)

Rose was able to modify the colors in the computerized embroidery designs, change size and positioning of individual elements or the entire design, view measurements and stitch counts, and more in the program. She exercised similar control over design elements, and shuttling between modes and screens, while showing how she cropped, retouched, and arranged image files in her favorite photo editing software, Microsoft's Picture It!. Rose used Picture It!, in conjunction with her computer's pre-installed Digital Image software, to edit images and create collages to post on Facebook, send in emails, and print and attach to her annual mailed Christmas cards. She noted that Microsoft had discontinued the program, but she was able to copy it and reinstall it when she moved machines so she could keep using the program that she had familiarity with, rather than the later editions of Windows photo editing software (like Windows Live Photo Gallery and Photos), which eliminated her favorite features (see Figure 12).

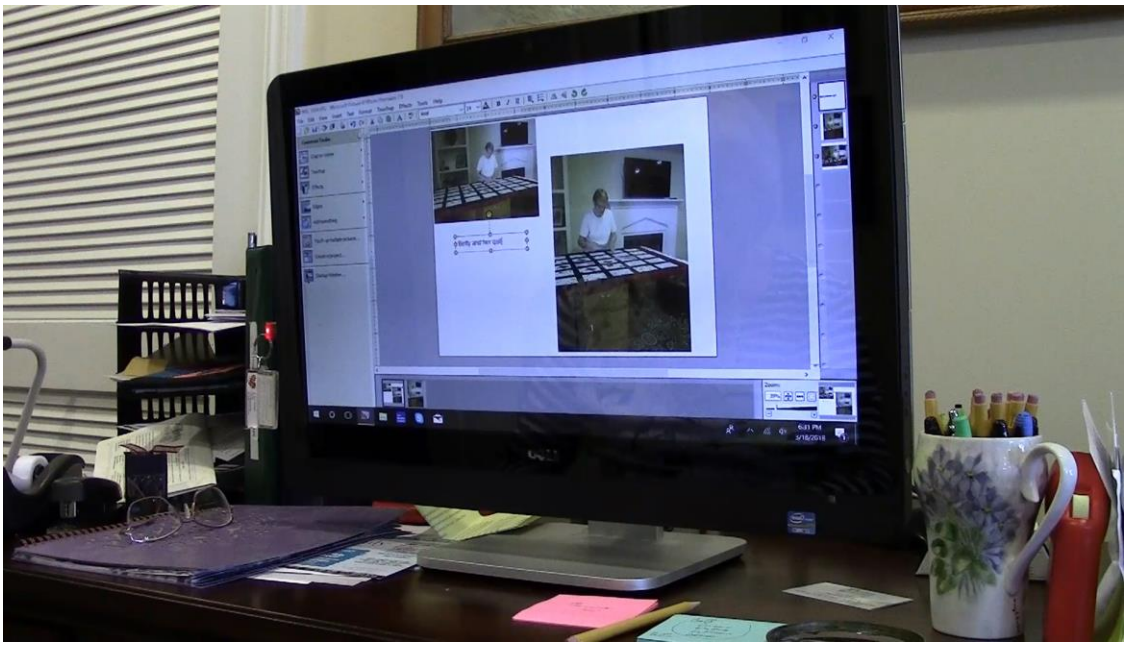


Figure 12: Rose's demonstration of how she created photo collages using Microsoft's discontinued Picture It! photo editing software

Rose showed how she managed her folders of images, sharpened and touched up blurred images, arranged multiple images into collages, and created captions. Her demonstration of these tools showed how Rose was not just a user of technology, but a designer *with* and *of* technology—labels not typically ascribed to older adults. Rose's ability to select and manipulate the technological affordances that worked best for her purposes, while setting aside those that did not, showed her savvy understanding of its potential, as well as the limits of her own capabilities and interests. Her continued insistence on using Picture It! in particular, despite its discontinuation by Microsoft in 2006 (a decade before data collection for this study) showcases this understanding.

6.2.4 Widowers on the Web: The Case of Gerald and Hank

82-year-old Gerald and 90-year-old Hank connected between the 2016 interviews and 2018 observations over their shared experiences of grief; their wives passed away in 2016 and 2017, respectively. Both found that technology played a supportive role in their grieving process, and they connected with each other and a small network of widowers using their computers.

During his unstructured observation, Gerald immediately told the story of his experience of losing his wife to Alzheimer's. "My wife died a year and a half ago, so I'm…still in partial recovery stages from that," he admitted, "You know, 'grief to joy.' And I'm about three quarters of the way to joy, but I'm not really into a lot of social stuff yet." Though Gerald was still hesitant to join in social events like Happy Hour and Trivia Night at Silver Vistas, he found that he was able to slowly reintegrate back into group activities offered by his church. He felt a need to help others with his experience, so he facilitated two grief groups for his congregation—one of which he invited Hank to a year later, when Hank lost his wife to heart disease. During his first observation, he showed me how he scheduled the grief group meetings on his calendar. He used Microsoft Word to compose the agendas for the meeting, before sending them out to the group members through his AOL email account. He noted that he didn't like having to remember who was in which group each time he composed a message, so after his session, I showed him how to create a separate email list for each group (see Figure 13).

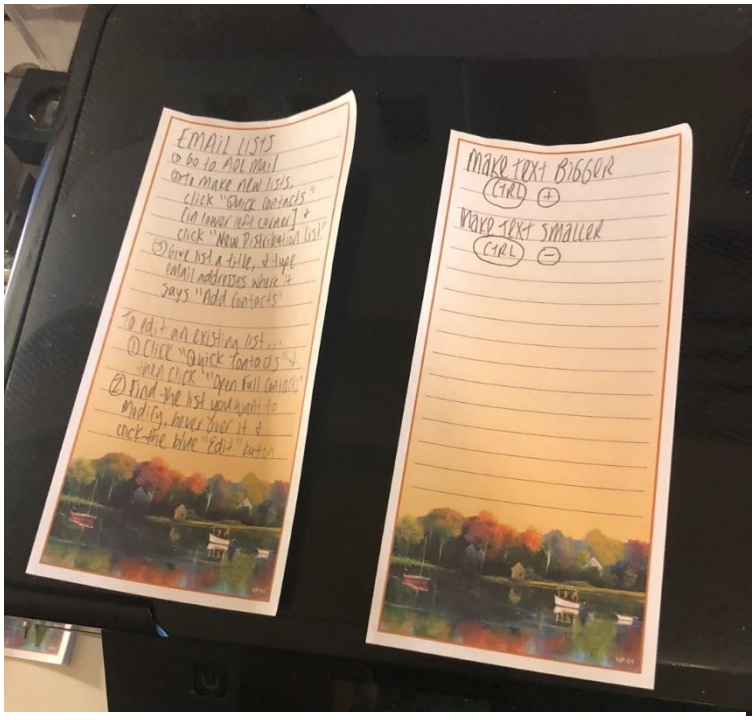


Figure 13: Documentation written for Gerald, who wanted to know how to create an email list for the two grief groups that he managed at his church, as well as how to magnify text in his internet browser

Gerald also changed his attitude toward social media between the 2016 interviews and 2018 observations. In 2016, he saw social media as invasive and preferred communicating with his family by way of conference calls, but he logged into Facebook immediately after checking his email in 2018. His shifting orientation toward social media—and indeed toward computing in general—reflected his shifting needs over time. As Gerald's life changed with loss, so too did his communication.

Meanwhile, Hank's son, Doug, bought him a Jitterbug brand smartphone at Walgreens, which Doug saw promoted at the checkout counter for $35. This appealed to both Hank and

Doug because smartphones were typically quite costly, and Hank didn't want to make the investment in one if it was particularly breakable, or if he didn't want to use most of its features. He explained that it suited his purposes, and that the design of the device and its operating system had specific affordances, like large text, that met his physical needs.

> "It's with Verizon. It's on a special deal of some sort. It has a big keyboard. I guess nobody wanted this stuff. Only old tigers like me. So he picked it up. Of course I had to change everything. I went to this stupid square phone, rather than little flip top, you know? But now I wouldn't be without it…This is, this is my walking computer." (Hank, 90)

Jitterbug's smartphones are designed specifically with older adults in mind, by GreatCall, "the leader in connected health for active aging." Beyond smartphones and their accessories, GreatCall also manufactures and markets "urgent response accessories" like medical alert devices, as well as services and apps for medical advice, fall detection, transportation, and brain games (GreatCall, 2021). The original Jitterbug smartphone, designed in 2006, aimed to be "uncomplicated" and "big finger-friendly" (Pogue, 2006); the most current iteration (as of spring 2021) touts a "simple, list-based menu," large screen, long-lasting battery, urgent response button, video chat, and voice-to-text typing (GreatCall, 2021). It was the latter feature that Hank found most useful, explaining that it "overcomes my inflexible fingers, which have two hands full of arthritis." He could also only see well out of one eye, so the smartphone simplified his usage and kept him "away from having to use the keyboard all the time."

Hank found that he texted and used his smartphone more after his wife died, because he craved the social connection. "There's a lot of stuff that goes on about grief after losing a spouse," he explained. "Too many people, particularly men, tend to go into their house…the worst thing we can do is not mingle with people." He noted that Gerald invited him to the grief groups at his church, and he found them useful, in conjunction with his smartphone. "This also helps you stay in the world because you have it at your fingertips. You can carry it wherever you go." He was able to stay up-to-date on plans for grief group, as well as the most current news and information, using his Jitterbug—in fact, he asserted that he preferred accessing the news on his phone, because it was the most "current."

Gerald and Hank's experiences embracing technology—social media and email lists for the former, and smartphones and texting for the latter—demonstrate the critical role that it can

play for grieving and otherwise socially isolated older adults. During the COVID-19 pandemic, I often found myself wondering about them and the other Silver Vistans, who were among the population most vulnerable to the Coronavirus and thus those most carefully socially distancing themselves. Though such distancing kept the Vistans and others living in retirement communities safe from a potentially deadly virus, it also largely cut them off from the outside world, compounding already prevalent feelings of social isolation (CDC, 2020). Technology holds the potential to combat these feelings and connect older adults to friends and family, particularly when they cannot see their loved ones face-to-face. The same affordances of communication technology that enabled Gerald and Hank to heal from their loss could also foster similar connections for those grieving lost moments and opportunities due to the COVID-19 pandemic.

6.2.5 On the Generational-Technological Cusp: The Case of Judy

The youngest participant in the observations (and the fourth youngest in the entire study sample) at 78, Judy represented somewhat of an anomaly in the data set. The differences between her technology use and that of and her nearly-a-decade-older husband, Carl, were clear; he immediately volunteered her to participate in the structured task analysis, because she did more with the computer, and her desktop machine (they had separate devices) was much newer and faster than his was. Judy not only demonstrated a greater variety of digital activities than any participant involved in the project (except perhaps smartphone maven Kitty), she also showed off a wider range of devices: displaying her desktop computer, Apple iPhone, Amazon Echo smart speaker with Alexa smart assistant, Kindle eReader, and portable GPS throughout the course of the hour that I spent with her and Carl in their home office.

While most female participants in this study articulated that technology was their husband's domain (typically alongside money matters), Carl and Judy's arrangement was the opposite: Judy was the techy one in their relationship, and also managed their finances through the internet. To keep this and other sensitive data secure, Judy used LastPass, a password manager. She explained that she changed her master password for the program "probably once every three weeks," showing knowledge of digital security that far surpassed most of her peers (many of whom stored login information printed in binders behind their computers, or written on sticky notes underneath their keyboards). As an additional layer of protection, Judy backed up her data to Carbonite, a free online cloud storage service. "I've only got in there a couple of

times because I've lost some pictures," she explained, "and I did find out that they are in Carbonite and I was pleased that everything is there."

This positive technological experience was one of many that Judy articulated—a rarity for this study, where participants largely recounted technology failures, headaches, and difficulties. Judy's computing expertise and confidence could have stemmed from her experience learning and navigating a variety of devices, though she acknowledged that she used her computer and her smartphone the most frequently by far. She enjoyed being able to look up information on the go on her iPhone, as well as using locative media like Waze and MoviePass[29] to get information about conditions and events around her. "I just love technology," she explained. "I've always loved it."

Judy's positive attitude toward technology, and her robust experiences with a variety of devices and interfaces, could make her a good candidate for mentoring her peers and serving as a sponsor (Brandt, 1998) for their digital literacy and usage. She explained that she did do some myth-busting with members of her age cohort by using the website Snopes to fact-check claims that they made on email, through social media, and in everyday conversation. She remarked that some friends stopped sending her sensational claims "because I send them back all the time and say, 'This is wrong. Check this up.'" This practice not combated misinformation and disinformation that is prevalent among older adult age brackets (Guess et al., 2018; Wineburg et al., 2016), but also modeled a practice of verifying or substantiating claims to promote information literacy. Moreover, Judy—as a user on the generational cusp between the Silent Generation and the Baby Boomers—could signal a change in user behavior between these two age cohorts, shifting to a more critical orientation towards media and information. Future research in this area could compare the media consumption and literacy habits of 60-, 70-, and 80-somethings to build a clearer understanding of this shift.

6.2.6 Network Speed and Connectivity Issues

Beyond the deterrents, problems, and roadblocks identified in Chapter 5, the Silver Vistans involved in this round of data collection were frequently bogged down by network and

[29] RIP MoviePass, which shut down its mobile ticketing service in 2019, a year after these observations were conducted. Judy enjoyed showing me how she used it at the various movie theaters in The Villages, and I had never seen the app in action before.

connectivity issues during their unstructured observations, as well as the later task analyses. Gerald had a standard set of procedures that he would go through when his computer wouldn't connect to the internet, which he walked through when he demonstrated his everyday usage. "Sometimes it comes on," he explained, "90% of the time it comes on. But every once in a while, it has to find out why we're not connected." Gerald's "90%" figure was generous compared to some of his neighbors' assessments of the internet service at the Vistas: Hank repeatedly bemoaned his spotty connection, and Judy described the internet as "far too slow."

I asked Rose to show me how she used her Barnes & Noble NOOK eReader, but she was unable to demonstrate from her apartment because "I'm having trouble with the connections here…because they, they rewired the building. I still haven't gotten straightened up." She moved us from her desk in the hallway outside of her sewing room, closer to the front door of her apartment. "It will take a while, but it'll do fine here. Over there it's terrible." This issue existed for Rose during her 2016 interview as well, when she explained:

> "Now, here at Silver Vistas we have a problem with communication, uh, because of the way the building is built. Because it's very, very dense—there's a lot of concrete. And they didn't put the right routers in to begin with. Uh, I finally got a right router. Of course, they put it on top of the bookcase so I can't reset it when it needs to be" (Rose, 84).

There were several problems with the Vistas' telecommunications infrastructure as designed: problems that revealed the community developers' assumptions about the internet and technology use of the "oldest old" who would live there. Beyond the building materials that inhibited the wireless internet signal, the community was initially designed to have wireless routers solely in the hallways outside of the apartments, and not in the homes themselves. Thus, the wireless signals often weren't strong enough in the interior areas of Vistans' apartments or didn't reach the inner rooms at all. The "rewiring" that Rose mentioned took place in between 2016 and 2018, but still did not solve all of the Vistans' connectivity problems, as evidenced by the frequent complaints during the observations, as well as the tasks that participants occasionally had to abandon or come back to later because of long loading times. The internet had a "net nanny" firewall installed, ostensibly to protect the residents from computer viruses and malware, but it routinely filtered out otherwise safe content that it deemed "unsuitable." For example, when I was visiting the site in spring 2018, the Donald Trump/Stormy Daniels scandal was dominating media coverage; the firewall routinely blocked stories about Trump and Daniels,

however, on the basis that it was "adult content" (Daniels' pornography career was often mentioned in coverage of her relationship with the 45th president).

Finally, even with the improved coverage in 2018, the wireless speeds were rarely robust enough to stream online video, leaving Vistans with long buffer times if they wanted to watch content on Netflix or YouTube. In fact, the internet service provider included in the Silver Vistas apartment rental packages was so slow and unreliable that Carl and Judy outsourced their broadband to a different company, paying extra for additional equipment and a premium package that would support their multiple devices (two computers, a smartphone, a smart speaker, an eReader, etc.) and diverse, data-heavy digital activities (streaming music, watching horse races, backing up data to the cloud, downloading eBooks, etc.). The placement and prevalence of the building's wireless routers, paired with the heavy-handed content filtering and slow connection speeds, paint a clear picture of how the building's designers assumed the Vistas' digital infrastructure would be used: infrequently, in public common areas, for text-based messaging and reading activities, rather than media-rich contexts. These hardware and connectivity issues represent a problem that could be mitigated by including older adults in the design of technology and planning of digital infrastructure (Mannheim et al., 2019). Ageist assumptions about what 70-, 80-, and 90-somethings do online, and the resources that they need to accomplish those tasks, can be combated by recognizing the agency of older adults to make their own technological choices and articulate their own technological needs—recognition that requires that we take their voices and their usage seriously.

6.3 Testing Older Adults' Digital Knowledge: An Overview of Task Analysis Results

Task analyses, as with most user research work, involve field studies or site visits with people who will use a product or a service. The key to task analysis is learning about users by understanding them *in action*, to better understand how "any and all parts of a product—software, hardware, interface, documentation…help[s] people do things" (Hackos & Redish, 1998, pg. 52). There are many different kinds and levels of task analysis, including

- workflow analysis, or understanding how work gets done across people or divisions;
- job analysis, or understanding what a single person does during a certain period of time;
- task lists or inventories, which explore the different types of goals or activities accomplished by individuals who use an interface;

- process analysis or task sequences, which determine the order in which users accomplish goals or activities;
- task hierarchies, which break down larger goals into smaller objectives; and
- procedural analysis, or examining the steps that users take or the decisions that they make to accomplish a task (Hackos & Redish, 1998, pgs. 60–61)

The structured tasks designed for this project align most closely with procedural analysis, because of the nature of the research question and the goals of this round of data collection: to better understand the oldest old's familiarity with certain digital activities, their thought process and mental models when attempting to accomplish certain objectives online, and the steps that they took when they encountered problems with their technology. To review, the tasks that participants were asked to complete included:

1. Access the internet on your computer
2. Set up a new homepage for your internet browser
3. Find a news story of interest to you about world events
4. Determine the distance between your home and the nearest Kohl's store
5. Find a government document that answers the question, "how do I deduct medical expenses for transportation to and from doctor's appointments on my taxes?"

Participants completed the tasks in order, and "thought aloud" their process as they attempted each one. An overview of the participants' task performance, as well as the time that each participant spent on each task, is provided in Table 9.

Table 9: Task Analysis Performance Breakdown

Name	T1	Time	T2	Time	T3	Time	T4	Time	T5	Time
Holly	✓	0:26	X	0:02	✓	1:08	X	3:17	X	4:04
Peggy Sue	✓	0:38[30]	X	0:07	✓	3:18	X	0:22	X	2:45
Gerald	✓	0:15	X	0:12	✓	1:44	X	2:44	~ [31]	2:41

[30] Peggy Sue took 38 seconds to access the internet on her computer, but after she had opened her browser, proceeded to navigate through her email inbox and her Facebook feed, telling stories all the while. This experience illustrates why it is so important to budget extra time for research sessions with older adults—to give wiggle room for productive tangents and narratives.

[31] Gerald, who would typically call his tax consultant to answer questions about deductions and credits, searched for TurboTax and immediately clicked the live chat "ask a question now" option on the homepage for the tax preparation service. He indicated that he would type in his question and hit "start chat" to ask a representative for an answer. While not a government document, this would have likely gotten him an accurate answer to the question being asked in the task. Gerald's willingness to text with a representative (instead of insisting on speaking with a person over the phone) is also noteworthy here; older adults' preferences for audio conversations over text support

(Table continues)

Table 9 continued

Name	T1	Time	T2	Time	T3	Time	T4	Time	T5	Time
Hank	✓	0:05	X	0:23	✓	1:09	✓	5:54	✓	8:02
Rose	✓	0:11	X	0:05	✓	1:11	✓	8:43	✓	7:47
Judy[32]	✓	0:23	~ [33]	3:30	✓	1:48	✓	2:34	✓	4:23

6.3.1 Task Performance: What did the Vistans Know how to Do? What Didn't They?

While the Silver Vistans expressed after the task activities that they enjoyed the session and found it useful, many felt frustrated or exasperated during the tasks—particularly the final two, which involved more complicated search techniques. "I'm just curious," asked Gerald during his final task, "Do most people know how to do this?" In this way, the task analysis served its purpose, revealing the types of digital activities that the Vistans were most familiar with, as well as actions they didn't know how to take online.

All of the participants were easily able to turn on their computers and access the internet: Holly using Mozilla Firefox, Peggy Sue and Gerald using Internet Explorer (which had been replaced by Microsoft Edge as the default browser on Windows 10 three years previously), Rose and Hank using Google Chrome, and Judy using AOL Desktop Gold (though she had all three other browsers installed on her desktop computer, and later navigated to Google Chrome when working through Task 2).

However, the other tasks were not so easy for the Vistans. None of the participants were able to change the homepage on their internet browser, and many were flabbergasted when I announced the second task to them. Peggy Sue admitted, "I haven't the slightest idea," while Paul conceded, "I don't really know what a home page is." Hank too was perplexed by the

are explored elsewhere in this study.

[32] Carl chose not to participate in the task analysis after his observation session; he, his wife Judy, and I agreed that only one of them should complete the tasks, because the results would be skewed if one partner watched the other attempt the tasks before completing them themselves. Carl was on hand while his wife was completing the tasks, however, and provided feedback both during and after the session.

[33] Judy indicated that she did not know how to change her homepage on AOL, her preferred browser, but she could probably do it on Google. After accessing Google, she searched for information on how to change her homepage and came across information on how to change the homepage on Microsoft Edge. I am somewhat confident that she would be able to find an answer to the question if given enough time, though she didn't actually manage to change her homepage on any browser during the task analysis session.

question, and asked, “what is a home page?” After I explained it to him, he responded with, “I’ll tell you what, it would take me all day to set it up. I haven’t the foggiest.” Holly simply responded with, “I’m gonna tell you ‘no.’”

The only participant to attempt the task was Judy, who took three and a half minutes to seek out an answer to the question of how to change a browser homepage. She navigated to her AOL settings to see if she could find an option to change her landing page there, before searching AOL’s help documentation for any results that could help her accomplish the task. “You know, I don’t know how I would do it on AOL,” she then explained of her preferred mode of accessing the internet, “I could do it on…oh, I don’t know. I could do it on Google, probably.” After opening Google Chrome, Mary typed in a search query: “how to change homepage on Windows 10.” She scrolled through the results, and ultimately gave up on the task. The search query that Mary used did not quite match with the goal of the task, which was to change the *internet browser* homepage (and not the *desktop background* or *lock screen image*), but her inclusion of “Windows 10” does demonstrate her understanding that the operating system of her computer could affect her web browsing experience.

However, other than Mary, all the task analysis participants indicated little desire to change their web browser homepage or learn how to. This hesitation or inability to customize one’s digital experience could be a byproduct of older adults’ lack of identification with their technology, as described in Chapter 5. The Vistans either were satisfied with their page or hadn’t thought at all about the potential of changing it, indicating a complacency about their internet browsing activity.

Like with the first task, all of the participants were able to find a news story of interest to them online; however, they went about this task in several different ways, some of which were surprising to me. I wrote the third task (as well as the task preceding it) expecting that most of the participants would have the homepage of their internet browser set to an internet search provider landing page, like aol.com, my.xfinity.com, or currently.att.yahoo.com, based on my previous experiences with members of this age cohort. For an example of these landing pages, see a screen capture of aol.com’s homepage in Figure 14.

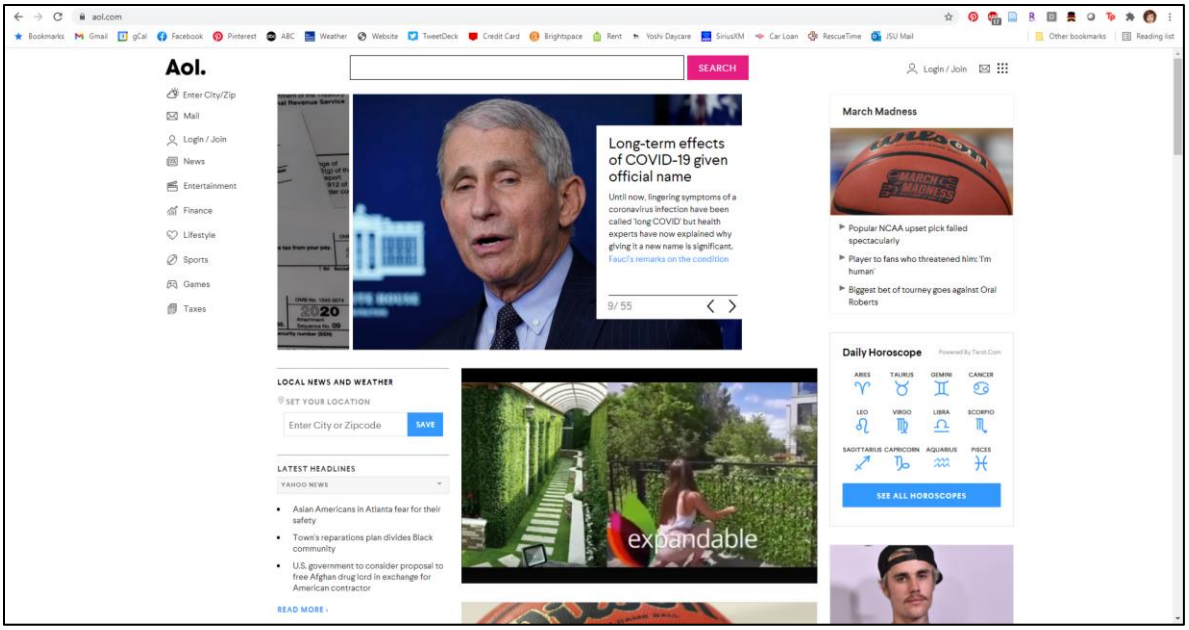


Figure 14: AOL.com landing page (pictured on the researcher's Google Chrome browser) on March 20, 2021

However, most of the Vistans responded to the request to "find a news story" in different ways, showing that they either typically accessed their media in different ways beyond a fixed browser landing page, or that they didn't access much news media online at all. As outlined in Chapter 4, Holly typed a query for a specific topic of interest to her—President Donald Trump's tax returns—into the search bar in her Gmail account, which eventually led her to Google search results. She clicked the first result, which gave a December 2017 article from *The Guardian*. Gerald took a similar approach, seeking out information on a specific topic: recently fired Deputy FBI Director Andrew McCabe. Instead of typing a query into a search engine, though, he navigated to his AOL homepage and clicked a link for a story about McCabe to seek out preliminary information, before typing "McCabe" into the search bar at the top of the page to get more details. He clicked on McCabe's Wikipedia page to learn more about the man and his background. I asked him why he selected this option above the others.

Gerald: Well, I probably would pick Wikipedia and see what they say and I would just go through as much time as I have to look through and compare. Um, I'd be less likely to go to the news networks 'cause I get them on the television. So I wouldn't go to NBC and Fox and CNN and those. I would go to the *Wall Street Journal* or *New York Times* or one of those. Probably the *New York Times*.

Allegra: You picked Wikipedia as your first source. What makes that your go-to?

Gerald: Uh, I don't know…just hearing people talk about it and that they use it and they find it helpful…I appreciate the fact that this is available right away. It's free and it's updated. And that's worth more than anything else.

The idea that some online news content was redundant with the print media that the Vistans were already consuming was not solely limited to Gerald. Peggy Sue did not seem to have much experience with seeking out news content online, because she preferred other forms of media. When the task was presented to her, she responded with, "Well. Well, that should be on Google, shouldn't it? That's the only search beside Amazon, and the Amazon does more selling than anything else, I think." After pondering the task for a few moments, she typed "daily news" into the Google search bar, and scrolled through the entire first page of results: the *New York Daily News* homepage and headlines, the *Villages Daily Sun* (the local paper for the community, run by The Villages Media Management), villages-news.com (an independent news site and aggregator of local content). She clicked the last link, for the *Daily Commercial*, a newspaper out of Leesburg—because its tagline included "local news," and because she recognized the publication since she received it in paper copy daily. She said that she didn't need to click through to a story, because she had already read the day's edition. Hank's approach was similar to Peggy Sue's; he typed "world news" into Google and selected NBC News from the results. After scanning the headlines on the NBC homepage, he remarked that "some of these are old."

Only Rose and Judy took approaches to "finding a news story" that matched my expectations for the task. Both of them opened their browsers to their AOL homepages and watched the featured slider or scrolled down through the headlines until they saw something that caught their eye—closures of Winn-Dixie grocery stores for Rose (she wanted to make sure that her local one wasn't on the chopping block) and royal news on Prince Harry and Meghan Markle for Judy, respectively. Both noted that they didn't look at the news online much lately, because they didn't like all the politics.

The news task not only revealed that the Silver Vistans had many different ways of using the internet to seek out information on current events; it also exposed their presuppositions about digital news media, and their preferences for certain formats over others. The idea that digital news media didn't provide any value added over print publications or broadcast stations was

prevalent across multiple participants. Other participants reflected feelings of "information overload" in the age of the 24/7 news cycle, and actively tried to stay away from news online.

The first three tasks were relatively straightforward for the Silver Vistans. The final two, which asked for geographic information and a governmental answer to a tax question, posed more complicated roadblocks for the participants.

6.3.2 Not all Web Mapping Services are Created Equal

The fourth task, which focused on using web mapping tools like Google Maps or MapQuest, posed unexpected security risks for the participants. Both Gerald and Holly searched Google for information on how to get to a nearby Kohl's store ("kohls directions" and "maps for Kohls in Lady Lake Florida," respectively), which led them to the website mapsanddirections.com[34]. After typing in the starting address and the destination address and clicking the "continue" button, Maps and Directions requested to install multiple plugins on the user's computer, including a maps widget and a "search encryption and privacy" extension. See Figures 15 and 16 for images of the interface and installation messages.

[34] The registration for mapsanddirections.com has since lapsed, and as of March 2021, the domain is for sale.

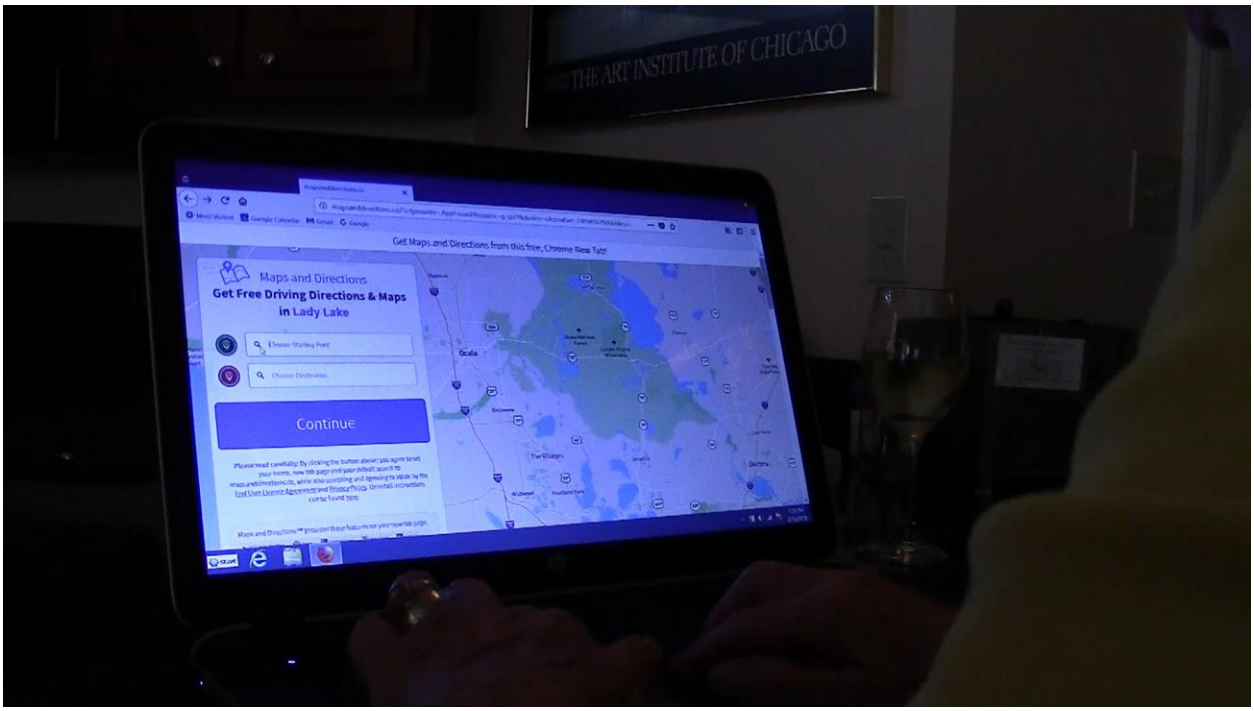


Figure 15: Holly typing the Silver Vistas street address into mapsanddirections.com

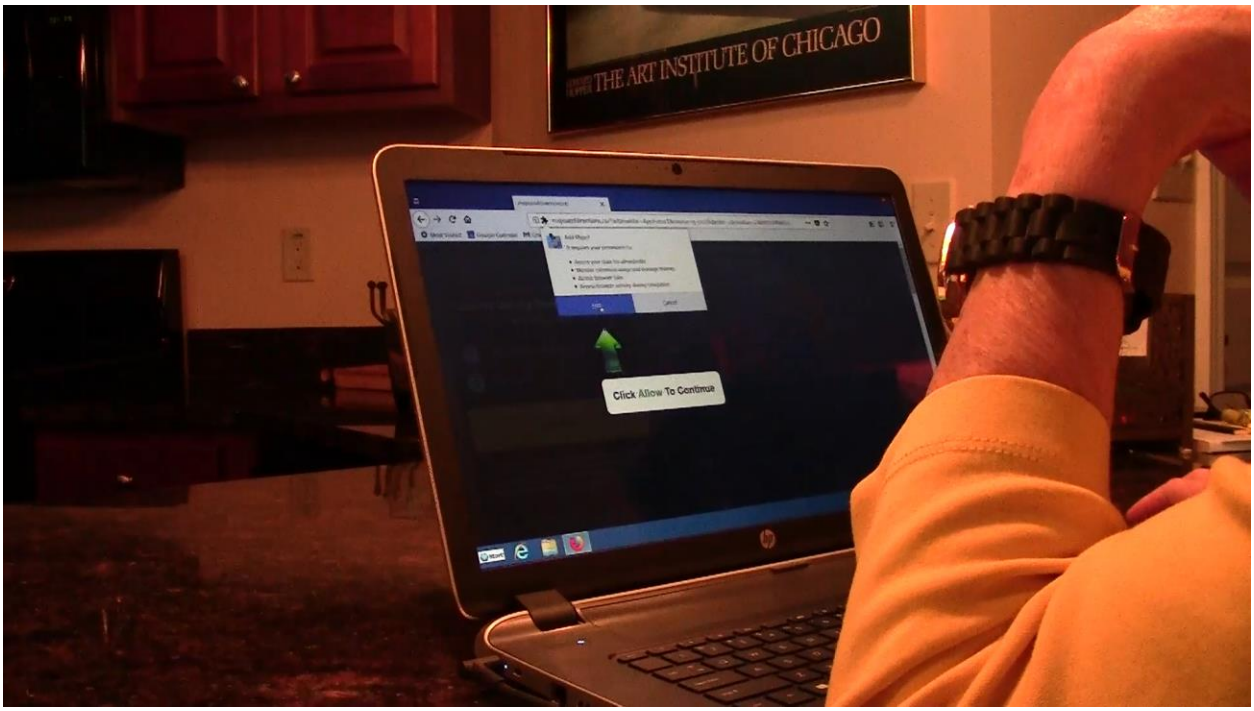


Figure 16: mapsanddirections.com requesting authorization to install a plugin on Holly's Mozilla Firefox browser

When the pop-up message appeared for Gerald, he thought aloud: “I don’t know what that means…what it wants to do.” Holly, on the other hand, immediately clicked “allow.” While I typically stayed silent during the task analysis sessions in order to encourage the participants to problem-solve on their own and treat the tasks as though they represented real goals that they would be attempting to achieve in their everyday lives, my “do-no-harm” researcher ethics training kicked in at this point, and I immediately discouraged Gerald from installing any browser extensions, and took over Holly’s laptop to cancel the download of the maps plugin on her device. This website was clearly exploitative, as it would not display search results without a user clicking through to install the plugin, which was likely malware. Gerald and Holly’s difficulty identifying this threat to their device security exemplifies the potential risks posed by seemingly authoritative websites for older age cohorts.

Peggy Sue wasn’t successful either; when the fourth task was presented to her, she admitted that “I’ve never done it” and “I haven’t any idea.” On the other hand, even the participants who succeeded in calculating the distance between the Silver Vistas and the local Kohl’s store experienced some difficulties finding a mapping service, typing in the appropriate query, or even identifying how to accomplish the task with their computer in the first place. To attempt to answer the question, Rose first typed “kohls near me” into Google search, to find the address of the Kohl’s store in The Villages. She found a pencil and wrote down the store’s address on a piece of scratch paper on her desk, showing how digital tasks or activities can often be intertwined with more analog practices. Rose’s computer then disconnected from the Silver Vistas Wi-Fi network multiple times while she was attempting to connect to a mapping service. She set aside the task and came back to it a few minutes later, when the connection was stronger. When she was able to search for “mapquest” on Google, the first result—a sponsored placement—was for directionsandmap.com, another iteration of the potentially dangerous website visited by Gerald and Holly. Rose recognized the risks posed by the site, however, and refused to change her browser settings or add any plugins. After closing the directionsandmap tab, Rose opened another tab and searched Google for “driving directions bing,” musing that she wondered if Microsoft would provide better results. She scrolled through the first page of results and clicked the sixth link, for “Directions – Bing Maps.” She then typed in her home address, and the address for the store that she had written down earlier, before asking the site to generate potential routes to the store.

Judy recognized that there were multiple ways to go about finding the distance between two points with technology and used the task as an opportunity to test the methods available to her. First, she asked Alexa on her Amazon Echo smart speaker; however, her query ("Alexa, what is the distance between here and the nearest Kohl's store?") yielded a "Sorry, I don't know that" from the assistant. Next, Judy thought she would try to solve the problem using her desktop computer, though Carl reminded her that she would probably use the GPS on her smartphone if the question presented itself in her everyday life. Judy navigated to MapQuest on her computer and was able to type in the street address of Silver Vistas and find the closest Kohl's without issue.

Like Peggy Sue, Hank had not used a computer to calculate the distance between two points before, but he set out to answer the question like he would any other: by typing a query into Google to see what came up. Instead of navigating to a web mapping service, like MapQuest or Google Maps, Hank asked Google: "How would I use the computer to find the distance from Silver Vistas to Kohl's department store?" The results led him to a "frequently asked questions" page on Kohl's customer service website. Hank scrolled through five or six items on the FAQ before finding "Where are Kohl's stores located?" which provided a link to a store locator. The map detected his location and displayed a number of stores in and around The Villages (as well as surrounding areas like Leesburg, Ocala, and Orlando). Hank tried to touch his computer monitor and use "pinch zoom," like on a touch screen or a tablet, to identify the closest store, and was frustrated when it didn't work. "It works on my phone!" He insisted. Next, he clicked a button at the top of the screen to "Find Stores Near You." He entered his zip code and searched for stores within a radius of 50 miles, and the website identified the closest Kohl's store as approximately 3.6 miles away. Hank was pleasantly surprised by his ability to accomplish a task that he had never attempted before; while it took him nearly six minutes to find an answer to the question, his persistence and knowledge of search engines and corporate help documentation were all clear assets aiding his success.

In the post-observation interview, Hank explained that his digital experiences had taught him to be patient with himself and with his technology: "eventually we get there." He identified the mapping task as the most difficult one for him personally: "The hardest ones are finding out how I can find the information off the computer when I don't know how to do it… but you can, you can work your way through it if you know some idea of what you're looking for." Hank's

positive attitude toward technology and willingness to be wrong and learn from his mistakes were encapsulated in his reflections on his experience with the mapping task.

> "It's part intuitive. It's part, what you would say is, letting the machine do its work. Because what it does, the best part about it, it tells you when you don't have it, then it forces you to go back and be more clear on your specification and your question. You have to be very precise…[and] one nice thing: my cost of time is literally nothing" (Hank, 90).

This flexibility provides a counter-example to notions of older adults as technologically illiterate, incompetent, or stuck in their ways. I would argue that, in this activity, Hank (as well as Judy with her multiple devices, and Rose with her refusal to let network connectivity issues get in the way of her goals) exemplifies a type of "literate elasticity" here in his digital attitudes and practices—elasticity that aids him in accomplishing his goals and continuing to build new knowledge, even into his nineties. The multiple methods that participants used to find answers to the distance question also demonstrated the importance of user research to understand that there are many ways to go about accomplishing a task, and not only the designer's originally intended sequence is the "correct" one.

6.3.4 Gauging Information Literacy through Seeking Authoritative Answers to Tax Questions

Though there may be multiple pathways to accomplishing a task, certain goals may require more narrow approaches. One area where I knew students in my courses struggled was finding authoritative or legitimate sources to answer their questions, so I wanted to see if this issue persisted in old age (particularly for older adults who hadn't received any formal information literacy instruction). To gauge this, I asked the Silver Vistans to find a *government* document answering a question about income tax deductions. Three of the participants were able to successfully complete this task in its entirety.

Peggy Sue had a shortcut for WebMD on her desktop; when she heard "medical expenses" in the task description, she immediately clicked the WebMD icon, because the site was her go-to source for medical information. Forgetting the task at hand, she first typed "milage *[sic]* to nearest Kohls" in the search bar at the top of the page. When she was reminded about the task goal, she thought about it for a moment, and then clicked the "News & Experts" link in the top navigation (see Figure 17), thinking that an "expert" opinion would serve as a legitimate source for the tax question.

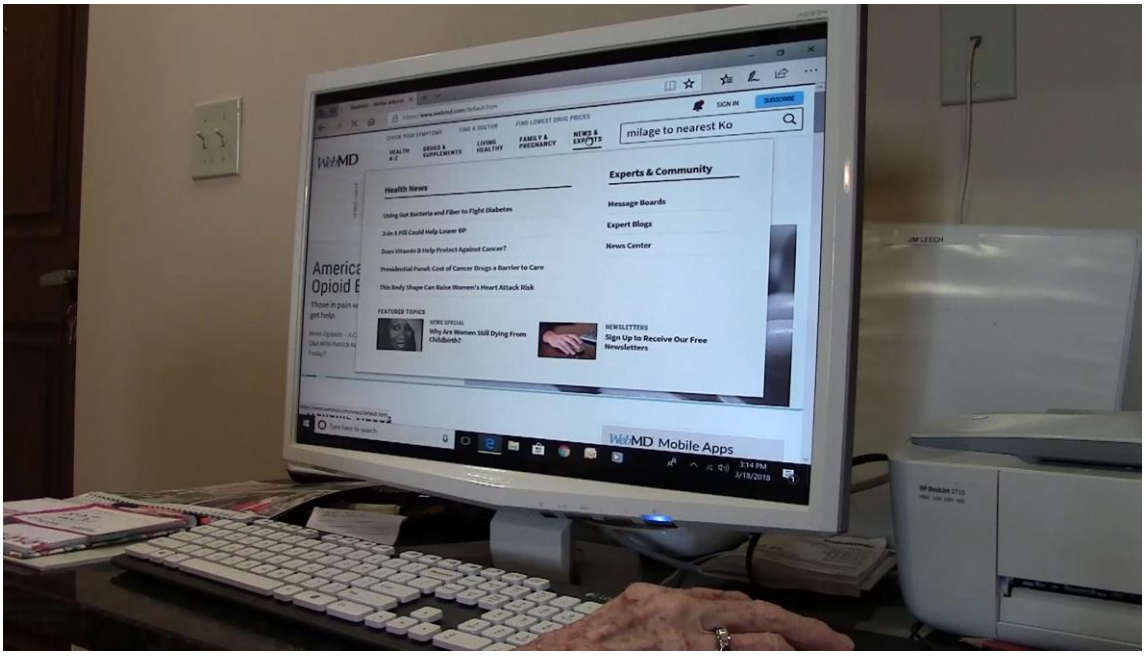


Figure 17: Peggy Sue's navigation on WebMD, as she tried to complete Task 5

After reading the "Health News" on the page for a couple of seconds, Peggy Sue typed another query into the search bar at the top of the page: "medical deduction (taxes) from federal tax statement," then clicked the enter key. When the search results were displayed, she declared that she had succeeded. However, the results did not provide an answer to the specific question about deducting mileage to and from doctors' appointments (the sponsored results led to sites similar to the ones yielded by Holly's searches described in Chapter 4, while the results below those linked to news stories about deducting expenses related to combating obesity and health insurance tax credits), nor did they link to any governmental documents.

Gerald sought out an expert's help for an answer to this question, with mixed results. Initially, Gerald noted that he would call his tax consultant if he had this kind of a question, before typing "IRS" into AOL search. The search bar provided several autocompleted suggestions for queries based on "IRS," including "IRS chat support." He explained that he was familiar with tax support chat rooms and clicked "IRS chat with representative" from the suggested searches. He then selected the first sponsored search result, which advertised "Tax Question Now – Get an Answer ASAP!" He explained that he would type in a question and hit "start chat." While Gerald would have gotten an answer this way, the legitimacy of the website was questionable, and could have posed risks to his privacy and security.

Rose's familiarity with advertisements on search engines helped prevent her from falling into the same trap as Gerald and Holly, with her "sponsored content loop" (see Chapter 4). After Rose typed "How do I deduct medi [sic]" into Google, the search engine suggested an autocompleted query of "how do I deduct medical expenses," which she clicked. She looked at the first three responses, before thinking aloud: "These are ads, though." Scrolling through the first page of results, she paused on the third one, for TurboTax, before moving to the sixth link, "What Medical Expenses are Deductible? – Tax Guide · 1040.com." The site, belonging to a tax preparation company that charged a flat $25 fee for all filers, displayed a long page with a wealth of information on deductible and non-deductible medical expenses. Rose found a section on "travel and lodging," and paused: "But what you want is…the paper?" she asked. "Well, then we need to go to .gov." She opened a new Google window and typed in "IRS medical expenses." She scrolled past the first result, which linked to a TurboTax tip page, and clicked on the second link: "Topic No. 502 Medical and Dental Expenses | Internal Revenue Service." This IRS publication provides official guidance on deductible expenses, as well as how to calculate the deduction. Gerald's process was similar, though his query of "what form would I use to calculate mileage for tax completion" initially took him to Topic 510, which details transportation and vehicle expenses for business. After finding that this publication did not fully answer the question, he tried a second query, "How do I deduct medical mileage," which led him to Topic 502.

Finally, Judy noted that she would typically seek an answer through TurboTax, because it was her preferred source of information related to tax law and preparation, but begrudgingly navigated to irs.gov. "It's easier to read than the government stuff," she noted, reflecting the need for accessible and usable content for older adults. After scrolling through the IRS homepage to scan for information related to medical expenses or deductions, she clicked a button halfway down the page to "Search Forms & Instructions." This button led to a page to apply online for a payment plan. Dissatisfied with this response, Judy gave up on seeking a governmental answer and navigated to TurboTax, where she typed in the query "what form to deduct mileage for trips to doctor" on the TurboTax support page. The answers she scrolled through eventually linked her to an FAQ page about Schedule A, which detailed the guidelines for itemizing deductions.

The final task revealed consistent and persistent issues with information literacy for the Vistans, beyond simply differentiating between a governmental and a non-governmental source. Sponsored search results posed threats to the participants' ability to find legitimate information to answer their questions, as well as to their digital security and safety. The lack of clear visual differentiation between paid advertisement placements and legitimate search results tripped up otherwise savvy technology users—even Gerald, who thought that he was safe by including "IRS" in his search query. This task also revealed how hesitant the Vistans were to seek out tax information online to begin with; most of the participants indicated that they would prefer to contact their trusted financial advisor or tax preparer to answer this kind of question, as opposed to attempting to find an answer themselves using the internet. This comfort level, and clear distinction between "activities that are done online" and "activities that are done offline" should both be key considerations for any designer or developer seeking to create a digital experience for older adult age cohorts. If a 70- or 80-something is more comfortable completing a task—say, ordering takeout from a restaurant or renewing their driver's license—over the phone or face to face, what measures will it take to bolster their confidence to enable them to use a website to do the same thing?

6.4 Forms of Technology Knowledge in Action

Throughout the naturalistic observations and structured task analyses, participants claimed to be able to do things with their devices, or having accomplished certain objectives online before, but when they attempted to complete a task, they got stuck or gave up. Even those participants who were able to demonstrate proficiency in a variety of computing activities or completed several tasks often struggled to describe *how* they were successful: they just *did it*. This could be attributed to the performance anxiety of being put on the spot and having one's computer usage under scrutiny, but even participants who had known me since the interviews two years prior (or even beforehand) voiced difficulty with explaining the thought process behind their queries and clicks. This gap between "doing things" and "knowing how to do things" represents an important schema for older adults, and a potential area for intervention by technology designers and educators.

6.4.1 Declarative versus Procedural Knowledge

The gap that the participants note here illustrates the difference between *declarative* and *procedural* knowledge (also referred to by scholars as declarative and procedural *memory*). Declarative knowledge involves facts and things, while procedural knowledge is the knowledge of how to do something or perform an activity. Consider the experience of Kitty, the iPhone aficionado whom I interviewed in The Villages in 2016. Kitty could find a multitude of information with her phone and send messages through text, image, video, and audio media; but when asked which apps she used, she asked, "Is mail an app?" While she demonstrated complex procedural knowledge of a variety of programs, she lacked the declarative knowledge of what an app was. It became clear throughout the rest of Kitty's interview that she lacked the vocabulary—another form of declarative knowledge—to describe her experiences with technology.

Procedural knowledge is often noted as "automatic" or unconscious in nature, with users performing activities without necessarily recognizing that they know *how* to do something or explain it. Declarative knowledge, conversely, is conscious and explicit (Soliman, 2018; ten Berge & van Hezewijk, 1999). Again, Kitty's smartphone muscle memory affirms this framework: she was able to order items quickly and proficiently from Amazon and play segments from pundits' radio programs on her iPhone, but when asked to explain her process, she struggled. Similarly, during the 2018 observation sessions, multiple task analysis participants attested that they did not know what a home page was, despite having interacted with their home page on their internet browser on a daily or weekly basis. Their computer and internet start-up process, as well as their typical daily activities (usually checking email and/or social media, looking at homepage news and stories, etc.) had become almost mechanical—to the point where they had to "stop and think" about their routine when I asked them to demonstrate their typical usage.

Elders' experiences in this project demonstrate that declarative knowledge does not necessarily have to precede procedural knowledge, but the interplay between the two can further enrich the ability to complete computer-based tasks and participate in digital life with a more robust and stable understanding of the principles and theories that underpin it. The automated nature of procedural knowledge became apparent when I asked the Vistans to complete tasks or used technical terminology. For example, when I wanted to show Peggy Sue how to browse

shoes on Zappos.com, it became clear that she had never considered what it meant to minimize or maximize a browser window.

Peggy Sue:	So, I go to Google and put in "Zappos?"
Allegra:	Yeah.
Peggy Sue:	Okay, well, let's do that. So…go over here? *[moves cursor to the upper left corner of her Internet Explorer browser, and clicks but icon to activate the "Tabs you've set aside]*
Allegra:	Oh, those are for your tabs. You can just minimize the window and open up a new one.
Peggy Sue:	Um…how do I do that?
Allegra:	So, if you want to minimize the window, you click on the little line over here. *[motions to the upper right corner of the browser window*]
Peggy Sue:	*[clicks the minimize button]* Oh! Uh-huh.
Allegra:	That one takes it away…
Peggy Sue:	Oh! It takes it away.

During her digital shopping experience, Peggy Sue also demonstrated little recognition of what constituted a menu, again showing a lack of knowledge of technical terminology or jargon. While it's unreasonable to expect older adults—or any non-expert, for that matter—to know all of the insider terminology related to computers, in the case of Peggy Sue's visits to Amazon.com and Zappos.com, her inability to understand what was a menu (or a tab, or a minimize button) inhibited her ability to receive and apply technical assistance, in addition to her ability to accomplish her task at hand. Peggy Sue's declarative knowledge gap could have been a working memory issue as well; at the beginning of her unstructured observation, she remarked that she didn't even know her own email address: "I have to go and look it up!" External memory aids, like password keepers and tip sheets or help books, could provide one way of bridging the declarative/procedural gap in such cases.

This dearth of declarative knowledge also extended beyond technical terminology, and into the inner workings of applications and devices. For example, when showing off how they used Amazon's Alexa virtual assistant on their Echo smart speaker, Carl and Judy explained that they desired deeper understanding of the technology *behind* Alexa. "Maybe you can tell us how it works," Carl mused. "I don't have any idea how she comes up with any answers so quickly." Judy added, "Yeah, that's kind of a mystery. She's, she's out there in space gathering information." Later Judy also acknowledged that, even though she routinely backed up her

computer's data to the cloud through Carbonite, she did not quite understand what "the cloud" *was* or how it *worked*. "I wish they would set up a class here [at Silver Vistas] about the cloud. I think that most people, including myself, I mean I know what it is, but yet I don't." She knew that cloud computing and storage were important concepts but wanted to develop additional knowledge to enhance her understanding.

This divide between Silver Vistans' procedural knowledge of how to accomplish goals with technology and their declarative knowledge of the different parts of technology and how they worked (as well as what they were called) was a consistent theme throughout the observation sessions. Understanding older adults' mental models and schema is a key step on the way to building interfaces and experiences that meet their needs. Once we gain these insights, though, how do we begin to close the gap between these two important forms of technology knowledge?

6.4.2 Antecedents and Analogues: One Way to Bridge the Declarative/Procedural Divide

Building declarative knowledge of computers—understanding of facts, parts, and terminology—can take many forms. Asking older adults to take a computing course or disassemble their device to observe and label all of the parts may be unreasonable, so how might we build their understanding through other contexts and modes of instruction? To begin formulating an approach, it's important to understand exactly what the Vistans wanted to know about their devices. For example, Donald, the oldest study participant at 92, indicated a desire to enhance his declarative knowledge of computers.

> "I think some instruction, uh, on how to make it work faster would be handy, because the one thing they have here [the sole internet provider in the community] is very slow, and I wish I knew what had to be done to make it faster so I could talk to the authorities here and have them do it…it should be a lot clearer to the average individual what makes a computer very slow or very fast, and how much it costs, and how do you get it faster. That's not clear at all. You have to go to a geek right away, you know?" (Donald, 92)

The exchange that followed revealed the very fundamental nature of the declarative technology knowledge that Donald was lacking in this area.

> Allegra: The difference between the speed of a computer and the speed of the internet…so I know that my computer is quite fast, but the internet here [in the apartment community] is quite slow, and that's what bogs it down

Donald: Oh, the internet isn't the same every place?

Allegra: No! Mm-mmm. There are different, um, connection speeds. So…

Donald: Why don't they make them all the fastest?

Allegra: Well…because that would be fair. And life is not fair.

Donald: There you go.

[both laugh]

Beatrice: They didn't want to pay for it, Donald.

Allegra: The more expensive, the faster it is. It's kind of like…right, so a fast car is more expensive, right? So, if you have a very speedy nice sports car, it's more expensive than an old clunker that can only get up to 55 miles per hour.

Beatrice: There you go.

Allegra: The internet here is an old clunker.

This conversation with Beatrice and Donald highlights the need for *antecedents* or *analogues* to cite when explaining newer technologies to older adults. Illustrating the differing internet speeds or tiers of service by drawing connections to different classifications or prices of automobiles helped build Donald's understanding of the internet—a relatively abstract concept, especially for a man who left the workforce before personal computers really had a chance to proliferate—on a more familiar foundation.

For this purpose, a technological *antecedent* is a direct predecessor of an object or interface, from which a person can draw a clear parallel or evolution. Parts of an automobile have many clear antecedents. The bicycle is one such antecedent: gears are a predecessor for a transmission, and bicycle disc brakes are a more rudimentary form of the vacuum-assisted brake systems seen in current passenger vehicles. The early steam engines used in manufacturing, locomotives, and steamboats also provide a mental model for contemporary internal combustion engines. Antecedents such as these make it easier for all individuals—but particularly those who lived or are living through times of rapid technological change—to understand, in a *declarative* sense, how a new(er) technology works.

However, computers and their many iterations pose a different challenge. Since computers have no clear external moving parts—they are not a fundamentally mechanical interface by nature—it is more difficult to form this declarative knowledge of how they function; unless, of course, you disassemble your laptop or desktop machine. Computers run on math: binary code of 0's and 1's that forms bits and bytes. Users do not *need* to understand the binary

at the time that I write this: out-of-the-box computers are quite safe and usable, and users don't need to have the specialized knowledge to defrag their hard drives, use the registry editor to perform sundry maintenance functions, or follow dozens of steps to set up and secure a home wireless network. These tasks, and so many others, have been simplified and their complex documentation replaced by short quick start guides; users can jump in with no additional training and use their devices without a background in information technology or networking. However, the automated and relatively invisible nature of these processes inhibits the user's ability to develop declarative knowledge of how their device works. This black-boxing, and the lack of a single clear technological antecedent for the personal computer, leads to confusion for elders, which can compound the sense of helplessness or illiteracy that is fostered by a curriculum of aging (Bowen, 2012). Hence, multiple participants in the present study explained that they felt intimidated by the complexities of the computer, or that wished they knew more about how their devices worked.

Technological *analogues*, like the parallel between fast cars and fast internet that helped Donald to better understand the Wi-Fi service in his building, provide a mental model for less visible technological parts or processes, or those with no clear historical predecessors. When teaching basic information science—the 0's and 1's behind digital data encoding, and the most fundamental building blocks for how computers work—metaphors like an artist's palette or the system of musical notation can link the unfamiliar binary system with a more recognizable system. Just as all code is made up of some combination of 0's and 1's, all color is made up of some combination of dark and light. Individual music notes layer and combine to form complex melodies, movements, and symphonies. While most older adults likely do not need to understand the inner workings of code to successfully and knowledgeably undertake tasks with their devices, other analogues can help shed light on elements of their practice, in order to build their declarative knowledge—and thus, their digital and information literacy.

What's more, elders are already doing this analogic work, as evidenced by their frequent references to devices whose functions the computer helps them to perform, like typewriters, telephones, and encyclopedias. Hank, whom fellow residents sometimes referred to as "the Reverend" because of his penchant for leading community Bible studies, highlighted familiar analogues when explaining how he used his desktop computer on a daily and weekly basis:

> "I use this as sort of my, uh, my biography, my dictionary. It corrects my spelling when I ask a stupid question…you know, we're on a very personal basis. And I do that a lot for a Bible study, because it is so handy" (Hank, 90)

Hank's "my biography, my dictionary" comment echoes another, more historic analogue to the present-day personal computer and its hard drive: the commonplace book. In the 17th century, English philosopher John Locke developed a "new method" for organizing information: a book to keep track of papers, notes, and ideas with an alphabetic index, called a "commonplace book." The rhetorical tradition of the commonplace—a common set of topics or structures from whence arguments extended, used to aid memory for spoken debate—dated back to the system of rhetorical education of the classical era, but Locke's commonplace book recorded much more. He used the commonplace to record pages and quotes from books that he had read, knowledge and theories of various forms of science, and various classifications and taxonomies. Locke attested that his book aided his memory and that taking notes in it strengthened the practices of his mind (Yeo, 2004). In this way, the personal computer forms another type of commonplace book, as its directory of files functions as a similar index, and its information forms another external memory aid for its human users. In using his computer to record verses of scripture, portions of commentary that would extend his Bible study, and biographical sketches of philosophers and critics, Hank too was creating his own kind of post-Lockean commonplace through Word documents and scratch paper notes.

While elders in Silver Vistas—particularly those who participated in the task analysis portion of this study—often struggled with accomplishing certain objectives online, this didn't mean that their technology use was basic or unsophisticated. On the contrary, many adults in the "oldest old" age cohort underestimated themselves and their digital literacy; they didn't realize the extent of their usage, or the number of things that they did online. 91-year-old Peggy Sue—the oldest participant in study observations, and the second oldest person involved in the entire project—encapsulated this at the beginning of her first session. After booting up her Windows desktop and describing the location of her wallpaper image (a river that her family used to live on the banks of), she admitted, "The only thing I do, almost the only thing I do is Outlook Mail." Then, over the course of half an hour, she showed her typical procedures for corresponding with friends and family, managing finances, searching for information, printing and managing physical copies of digital records, shopping for clothing, staying up-to-date on her book club and researching authors and publications, and social networking. This is not to say that Peggy Sue

didn't face problems or make mistakes when attempting to complete these tasks—her advanced age made the basic material elements of computing, like seeing and distinguishing small icons and differentiating between single and double clicking on links and icons increasingly difficult for her—but her persistence in attempting to realize her goals, as well as her multiple strategies for solving problems that emerged throughout these attempts, demonstrated a clear willingness to learn and seek answers to her questions. Thus, while older adults may (as an age cohort) exhibit a gap between their declarative and procedural knowledges when it comes to technology, they also possess the self-knowledge and capacity to continue narrowing this disparity.

6.5 Conclusions

Throughout the unstructured and structured observations, the Silver Vistans often underestimated themselves, like Peggy Sue did when she said that she "almost only did Outlook Mail." Many did not seem to realize the extent of their technology usage or digital literacy, or even the range of activities that they participated online! This reveals underlying insecurities that members of this community and age cohort have about their abilities to accomplish tasks with technology and participate in digital life. In this way, bolstering the confidence of older adults in their digital abilities is just as critical as building their technological skills and proficiencies. Building this determination and persistence can, in turn, open the eyes of members of older age cohorts to digital activities that they may have previously thought otherwise impractical or inaccessible to them.

The naturalistic observation and structured task analysis sessions provided a slice of Silver Vistans' digital lives, as well as insights into how they went about answering questions and solving problems online. The data gathered paint a picture of a group of older adults who use their computers—and other devices, like smartphones, digital assistants, eReaders, and portable GPS—for a variety of purposes; but who also choose not to engage in certain activities online, for legitimate reasons related to privacy, security, and convenience. Understanding these reasons, as well as the typical patterns of success and failure for members of this age cohort when attempting to complete tasks online, can inform future technologies targeting their needs. The final chapter of this dissertation provides implications for the design of these technologies, as well as future educational programming, documentation, and research supporting the digital activities of older users.

CHAPTER 7: CONCLUSIONS

In this concluding chapter, I outline key limitations that should be considered when interpreting and applying the study results, before reflecting on how the recent (and still ongoing, as I write this in March 2021) COVID-19 pandemic has highlighted the digital divide between older and younger adults. Finally, I provide key implications from this research for technology design, education, documentation, and culture, as well as ways that the discipline of technical and professional communication (TPC) can support these futures. Moving forward, this work can support the development of technologies and support systems that give older adults a "seat at the technological table," rather than excluding them from digital life and discourse.

7.1 Study Limitations

It is no secret that The Villages, the age-restricted community where this research was conducted, is an incredibly white and wealthy area of Florida. Comparing The Villages to its neighboring city of Wildwood illustrates a stark contrast: while The Villages is 98% white and reports a median household income of over $63,000 (with 4.6% of residents living under the poverty line), over 16% of Wildwood's residents (30.4% of whom are people of color) live in poverty. One of the greatest limitations of the sample for this research, therefore, is its heterogeneity—both in class and in race. As Aimi Hamraie (2015) explains, "the links between aging and disability in design are well established" (p. 339), but both often fail to acknowledge the mediating role of race in access and accessibility, as overwhelmingly white disciplines (pg. 337). Indeed, considering race (and its often attendant marker, class) is critical to understanding social and structural barriers faced by old and young alike. The older adults interviewed and observed for this study were all white or white-passing, and all upper-middle class to have the means to retire from work and live in a supervised facility with monthly rent starting at $3400. This affluence also afforded them the ability to purchase the latest and greatest technology—a privilege not shared by members of their age cohort without the accumulated wealth to stop working after age 70.

The root of *accessibility* is *access*: for technology to be truly universally *accessible*, it must be free of barriers not only in physical design (I can *access* the interface), but also in the

conditions of its acquisition and use (I *have access* to the device, regardless of my background or station). The stakes of accessibility are therefore much higher than including disabled users or enabling aging-in-place: directing attention to the ways that socio-cultural and structural factors can limit access to technology is also critical. Thus, future conversations and research must include people of color in order to truly promote access and equity across identity categories and markers of difference. Intersectional research methods and analyses, participatory design with communities of color, the amplification of design scholars and practitioners from marginalized or underrepresented backgrounds, and accountability practices that foreground the raced and classed experiences of users can all contribute to these goals of equity, representation, and (user) design justice. In future work, I aim to take up this call by assessing what Donnie Johnson Sackey (2020) calls "seemingly acultural approaches to design," to better understand how such exclusion widens digital divides, and strategies for bridging this expanse.

However, even though The Villages and Silver Vistas are resource-rich communities, clear access disparities still exist in technology and infrastructure there. As described in Chapter 6, Vistans were often unable to access community Wi-Fi from their apartments, even after lodging several complaints with management that led to the building being re-outfitted with updated routers and equipment. The connection strength and speed were insufficient for streaming video, leading residents like Carl and Judy to purchase additional internet coverage from an external provider so they could watch Netflix in their homes. If this community, with all its money and privilege, is not meeting the technological needs of older adults, then others likely aren't either.

A second limitation to note regards the generalizability of this study's findings. This work relied on interviews with 16 participants and observations with 7 participants, yielding several hundred pages of transcripts and field notes. Though these data provide rich insights into the experiences and motivations of the participants, it is important to recognize that these results are localized to members of this specific community, and do not necessarily represent the experiences of *all* older adults, who are as diverse a population as any. Future work should extend to different types of communities and contexts, such as veterans' homes, assisted living and skilled nursing facilities, "senior villages," older adults who live with children or grandchildren, and of course older individuals living independently outside of age-restricted housing. Moreover, additional research can examine elders' experiences with specific types of

technologies, such as online health portals, or test their learning and adjustment to new-to-them interfaces or devices.

7.2 The Impact of COVID-19 on Older Adults and Technology

As mentioned in Chapter 5, many of the participants in this project highlighted the role of necessity in dictating their learning or adoption of various digital technologies. The COVID-19 pandemic created a clear and precipitous necessity for older adults to engage in digital practices and activities that they otherwise would not have elected to, thanks to social distancing and quarantine mandates. As described in the introduction, COVID-19 encouraged (or, in some cases, forced) older adults to learn new (to them) technologies quickly to maintain healthcare, access essential products and services, and connect with family and friends while physically separated.

However, the virus also illuminated the digital divide between older adults and their younger counterparts, by effectively cutting off those who did not have access to technologies like computers or high-speed internet already, as well as highlighting the role of digital disinformation and misinformation in hindering public health efforts (Xie et al., 2020). Experts in the areas of gerontology and cognitive aging have noted the need for "support systems and digital infrastructure" for helping older adults navigate the global health crisis posed by COVID-19 (Xie et al., 2020) Moreover, as Seifert (2020) notes, access to the internet is merely one of many preconditions for engaging in digital life. Technology skills that are necessary for usage, social support from both on- and offline networks, confidence in one's ability to learn and engage with new technologies, and a sense of belonging in digital society all contribute to an individual's ability to engage in things like Zoom gatherings, social media conversations, and telemedicine appointments.

I hope to address the challenge posed by Xie et al. (2020) in future work by exploring the experiences of the oldest old, particularly those living in retirement communities and group homes that were largely cut off from the outside world during COVID-19 quarantine and social distancing, as they shifted their orientations toward technology due to the necessity posed by the pandemic. Additional research in this area could explore older adults' transitions to telehealth care and eMedicine, online shopping for daily essentials, consumption of streaming entertainment content, videoconferencing software, and digital religion and cultural services

during the same time period. Building infrastructure can help ease the transition and ensure continuation of critical services for these vulnerable groups during future local and international disasters (Baniya, 2019; Potts, 2013).

7.3 Implications for Design

Previous book-length publications by experts in behavioral science (Czaja et al., 2019) and user experience design (Johnson & Finn, 2017) have outlined clear and detailed guidelines for designing products and services for aging populations. Assembling research on different characteristics of older adults (vision, motor control, hearing, cognition, etc.) and domains of application for specialized knowledge for these age cohorts (transportation, healthcare, social engagement, leisure, etc.), these resources contribute to user-centered design that accounts for aging. The work in this dissertation extends and augments these guidelines by adding focused inquiry with members of the "oldest old," as well as giving user-specific narratives to guide persona creation that can guide the research and design process. Moreover, the focus of this research on cultural and generational factors shaping user experience provides a humanistic (Miller, 1979) view of the lived experiences of a user group typically under-represented or ignored by TPC scholars and practitioners. Working directly with older adult users affirms that user experience is not merely aesthetic or task-oriented: it is bound up in social interaction, cultural legacies, affective resonances, and access to economic and technological capital. In short, it's complicated. Thus, user narratives shed light on design priorities and interventions just as much as lists of tips or heuristics.

For example, one intervention that would make a clear difference for an older adult population—with lower visual acuity and less familiarity with digital technology icons and interfaces than members of younger age cohorts—is creating clearer visual differentiation between different sites or apps belonging to the same platform (e.g., Microsoft Word versus

Microsoft OneNote), or different functions within the same website (e.g., sorting and filtering options in an online shopping platform, versus the purchasing page for the same). The experiences of multiple Silver Vistans described in Chapters 4–6 demonstrate the confusion and frustration caused by visually similar buttons or icons, like the Google Suite branding redesigned in 2020 (see Figures 18 and 19). As described by critics (Coldewey, 2020; Hofmann, 2020), the logos for Google's "workspace" programs and applications (such as Gmail, Google Calendar, Drive, and Docs) follow a homogeneous color scheme with similar shapes and amounts of white space, posing difficulty for users who are colorblind or farsighted. For older adult users, this could lead to repeated clicks on the incorrect icon, causing users to blame themselves, lose confidence in the site and/or in their own abilities, and even give up or abandon their tasks. In keeping with principles of universal design (UD), making these changes to these kinds of visual designs doesn't just benefit older adults—they benefit *all* users. Blind and low vision users who have difficulty differentiating between colors and shapes can benefit from visually distinct icons, or clearly differentiated alt-text descriptions of such icons.

Figure 19: Original Google Suite icons (top) versus 2020 Google Suite icon redesign (bottom)

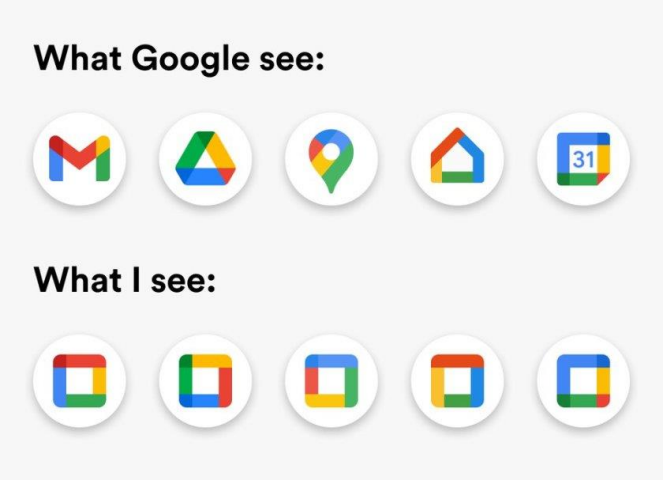


Figure 19: "What Google sees" versus "What I see" graphic (made by Dani Donovan, @danidonovan on Twitter)

Previous research has identified ageism as a barrier to older adults' technology adoption, and participatory design methods as one potential remedy for this situation (Mannheim et al., 2019; Munteanu et al., 2015). By involving older adults in the technology research and design process, UX researchers will be able to observe their interactions with devices and interfaces for themselves, and create personas based in real data, rather than in personal anecdotes or stereotypes. Again, future work in this area could involve comparative studies examining older

and younger adults' experiences with particular devices or interfaces (similar to Kang & Yoon's 2008 study on mp3 players or Roberts et al.'s 2011 evaluation of dashboard infotainment systems), as well as targeted analyses of technological "pain points" for older cohorts (like the Vistans' difficulties with chiclet laptop keyboards or struggles to identify sponsored or malicious content).

7.4 Implications for Education and Pedagogy/Andragogy

"Pedagogy" is perpetually a hot term across writing studies, but it doesn't feel appropriate to apply it to the context of older adult technological development for two reasons. First, the root of "pedagogy," the Greek "*paidos*," means "child." While the term "pedagogy" is used across K–16 education and beyond, it hardly feels appropriate to apply it to the older adults of Silver Vistas—particularly when one of the key tenets of older adult literacy practice is refusal to infantilize these age cohorts. Second, education takes a multitude of different forms for adults aged 60+, particularly those who have retired from full-time work, and rarely does it take place in a classroom context like the schoolhouse lessons or university lectures that we are accustomed to talking about. As evidenced by the technology education experiences of the Silver Vistan—in standalone workshops, at libraries and community centers, with spouses or children at home, in brief tutorials from Ray the Repairman, through trial-and-error, or self-taught from "Windows for Dummies" type books—the patchwork of contexts and practices that make up older adults' digital literacy development defy our "traditional" pedagogical expectations. For this reason, the term "andragogy," meaning adult education, may be more appropriate (Forrest & Peterson, 2017; Henschke, 2011; Krajnc, 1989).

Regardless of terminology, the need for a variety of educational programs and resources to bolster older adults' technological learning and usage persists. While motivation and/or necessity (see Section 5.4.1) may be key to initiating 70- and 80-somethings' contact with digital technologies or interfaces, sustaining this contact takes learning, troubleshooting, and support. Technology education and documentation geared towards older adults represents a clear gap in the literature; though Czaja et al. (2019) outline guidelines for "instructional design" (p. 125–144) in their book, they note that "designing training and instructional programs" represents a "long-standing challenge" (p. 125). Technical & professional communication and rhetoric, composition & literacy studies, with their historic focus on pedagogical approaches, are well-

suited to undertake such a challenge, especially in academia, where service learning and community engagement partnerships could be leveraged to enrich local communities of older adults. Working with older adults in the community could dismantle the ageist stereotypes held by students and faculty alike, in addition to building infrastructure for digital learning and participation. This type of work could take many forms: grant writing to improve internet service and connectivity or create community technology centers, designing print or video documentation for various devices and tasks, or direct instruction of individuals or groups in retirement communities. The project-based structure of many TPC courses at both the undergraduate and graduate level corresponds well to creating these types of resources. At the graduate level, as well as for faculty, the creation of reports, help guides, infographics, or instructional videos that circulate online could also be viewed as public scholarship, enhancing the profile of the discipline and the institution.

7.5 Toward the Future: Technology that Supports Aging in Place

As I conducted the field research for this dissertation and wrote up the results, my own parents, both late-stage Baby Boomers born in 1958, retired from full-time work at age 60. At one point my father, who earned one of the first computer engineering degrees ever offered by the University of Michigan in the early 1980s, remarked to me that he was struggling with his devices at times. I watched him grapple with a new iPhone when he turned in his work-issued Android smartphone and contend with problems on a new computer that he did not immediately know how to solve. This frustrated him, as a computer nerd whom neighbors and community members would frequently seek out for advice in the 1990s and 2000s, and as someone who had received a robust technology education both in school and on-the-job. He was used to being the "tech guy" with all the answers. He admitted to me that he couldn't keep up with the breakneck pace of new hardware and software, and that he felt like technology was outpacing him.

As a new generation joins the ranks of the "old[35]," with Generation X not far behind them[36], the question arises: how do we ensure that technology does not pass older adults by? How do we secure the technological futures of the old, as well as their participation in digital life (if they so choose it)? These speculations about the future also dovetail with common critiques of this research project: will this work still be relevant in 10, 20, or 50 years? Will the findings of this research continue to be applicable, even after the Silent Generation is gone? Will we still need to study age and technology when the generations who are "old" grew up with computers?

I argue that the answer to all these questions is, unequivocally, "yes." My father's experience stands as anecdotal evidence that, with the current breakneck pace of technological advancement, even the most credentialed of digital "experts" still reach a point in their lives when they struggle to grasp the function or operation of "new" technology. Moreover, while improvements in medical care has ensured that more adults will reach "old age," with life expectancy more than doubling since 1900 (Roser et al., 2013), the health conditions that accompany aging persist and are even intensified in many cases of older adults aged 70+, who face increasing comorbidities compared to their younger counterparts.

The greater number of older adults, combined with the health concerns unique to their population, has led to a focus on solutions that promote "aging in place:" the ability to live independently and stay in one's home into old age (Iecovich, 2014; Wiles et al., 2012). Technological interventions can help support the mission of aging in place (Peek et al., 2014), from autonomous vehicles to help older adults run errands when they are no longer able to drive (Duncan et al., 2015), to home health care systems to improve wellness through disease detection and treatment compliance (Dishman, 2004), to electronic memory aids like reminder systems and home robotics support (Caprani et al., 2006). However, these innovations cannot make a difference if their target users are intimidated by them, or do not see their value. Attending to needs, desires, and goals is critical—and this should begin with user research.

[35] Remember that "older adults" are typically divided into three age cohorts: the "young old" (65–74 years old), the "old" (75–84 years old), and the "oldest old" (85+ years old). At the time of writing, 2021, the oldest Baby Boomers (born in 1946) were turning 75.

[36] The eldest Gen X-ers, born in 1965, turn 56 in 2021.

Moreover, similar to the emergence of the teenager and youth culture in the mid-20th century[37], the "oldest old" represent a relatively new age cohort and demographic, with preferences and needs that are still emerging, and changing with each successive generation that becomes "old." To address these preferences and needs, additional research should be conducted, and further partnerships should be fostered—for all of us will eventually be in the shoes of today's older adults. Indeed, the experience of feeling "outpaced" by technology—and by life itself!—is not something unique to the Silent Generation or the Baby Boomers. As Grampa says in S7E24 ("Homerpalooza") of *The Simpsons*, "I used to be *with it*, but then they changed what *it* was. Now what I'm with isn't *it*, and what's *it* seems weird and scary to me. It'll happen to you…" Thus, it is not sustainable to merely retrofit technology with each successive generation. To "future-proof" technology, it must age *with* us, and promote our continued physical, cognitive, emotional, educational, and cultural development and participation across the life course.

To facilitate such design of technology that supports aging-in-place, as well as older adults' development of digital skills and usage, a "literate elasticity" is needed—not just on the part of older generations learning new technologies, but also on the part of younger generations seeking to design technology and sponsor the technological literacy development of their older counterparts. Resilience, flexibility, and a positive attitude toward failure and change have all been highlighted as attributes that aid not only older adults' digital skill development, but also the very process of healthy aging. However, to engage in intergenerational connections and learning, these qualities are also necessary for those individuals and communities helping older adults, if they are to devote their expertise to taking down ageism and the digital divide. Addressing the needs of older adults begins with listening, which must be accompanied by a willingness to change and be changed by the stories of others, especially those whose experiences differ from our own.

[37] Prior to the 1940s and 50s, "teenager" wasn't a defined role in the United States—one simple moved from a child to an adult, with no intermediary stage. I would similarly argue that roles like "retiree" or "octogenarian" were not clearly defined, and did not have their own separate markers of identity or culture, until the creation of groups or communities devoted to them. AARP was founded in the late 1950s, but took years to reach its status as the country's largest special interest group. Additional historical, archival, and sociological work should be done in this area to delineate the emergence of "the old role" in American society, as well as to trace the historic parallels between "elders" and "teenagers."

APPENDIX A: INTERVIEW QUESTIONS

1. Demographic questions...
    a. How old are you?
    b. How long have you lived in The Villages?
    c. When did you first learn to use a computer? The internet?
2. Why do you use a computer? (for what purposes)
3. Why do you use the internet? (for what purposes)
4. Who do you communicate with online? (e.g., family, friends, colleagues, groups around hobbies/interests or identities, etc.)
    a. How do you communicate with these individuals and/or groups?
5. Which social media platforms (e.g., Facebook, Twitter, Pinterest, YouTube, etc.) do you use?
    a. Why?
6. Which social media platforms don't you use?
    a. Why?
7. How do you learn how to use a new computer program or website?
8. Tell me about a time when you had a computer or internet problem.
    a. How did you solve your problem?
    b. How did you feel throughout the process?
    c. Could you think of anything that would have made solving your problem easier or less stressful?
9. If you could tell the designer of your computer or a particular website one thing, what would you tell them? *(For example, Rose would tell Yahoo! not to send important alerts by text message because her cell phone can only send and receive calls)*
10. *(If participant has children or grandchildren)* Do your children or grandchildren help you use the computer or internet?
    a. What digital activities, if any, do you engage in with your children or grandchildren?
11. Is there anything else that you would like to tell me about this subject?

APPENDIX B: OBSERVATION PROTOCOL

Observation #1
Please walk through your "everyday" computer and internet use. How do you use your computer? What tasks are typical? You can consider things like email, news, keeping in touch with family and friends, searching for information, etc.

As you walk through your typical computer and internet use, please try to "think aloud." Say the steps that you are taking and explain what you are doing, why you are doing it this way, what you are thinking, how you feel about it, what you're observing, etc. Just keep talking.

Exit Interview #1

1. How old are you?
2. How long have you been in The Villages?
3. When did you first learn to use a computer? The internet?
4. How did this observation experience go for you?
5. Is there anything else that you'd like to say about this observation, or tell me about your experience?
6. *Follow-up questions may be asked based on the participant's actions in the observation, or their responses to previous questions.*

Observation #2
I am going to ask you to complete a series of tasks for this observation. The tasks will gradually get more complicated and difficult. I cannot tell you how to complete them or give you help—one of the purposes of this study is to see how you troubleshoot problems that you may run into online. You can skip a task and come back to it later or give up on it if you feel unable to complete it. This is not a test, so please try not to feel too self-conscious!

As you complete these tasks, please try to "think aloud." Say the steps that you are taking and explain what you are doing, why you are doing it this way, what you are thinking, how you feel about it, what you're observing, etc. If you are having trouble, try to explain why. Just keep talking.

I will ask you to complete the tasks one by one, in order.

1. Access the internet on your computer
2. Set up a new homepage for your internet browser
3. Find a news story of interest to you about world events
4. Determine the distance between your home and the nearest Kohl's store

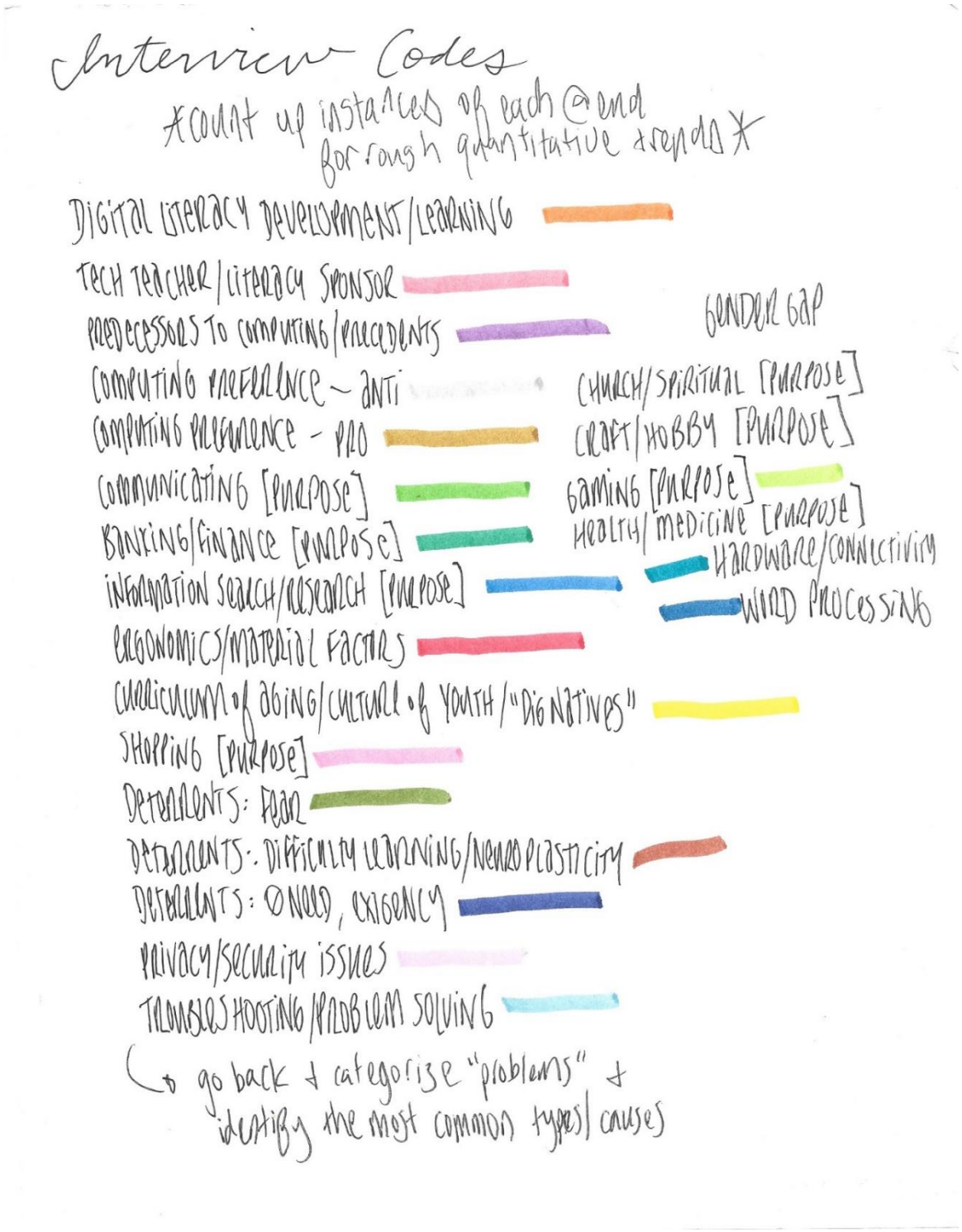
5. Find a government document that answers the question, “how do I deduct medical expenses for transportation to and from doctor’s appointments on my taxes?”
6. Register for an account on Pinterest.com and create a private board
7. Create and validate an account on Venmo.com

Exit Interview #2

1. How did this observation experience go for you?
2. Which tasks were easy for you? Which were difficult? Why do you think that is?
3. Have you had to complete any tasks like these before? How did they go for you then?
4. When you don’t know how to do something on the computer or internet, how do you figure out how to do it?
5. Is there anything else that you’d like to say about this observation, or tell me about your experience?
6. *Follow-up questions may be asked based on the participant’s actions in the observation, or their responses to previous questions.*

APPENDIX C: INTERVIEW CODES AND SAMPLE CODED TRANSCRIPT

For a screen-readable version of this transcript, email allegra.w.smith@gmail.com.



3/9/2016

Participant #9: Gerald (14:06)

AWS: Thank you for speaking with me today.

G: You're welcome.

AWS: I'm quite excited! Uh... first I have a couple of demographic questions...

G: Okay.

AWS: To get some background and make sure I'm getting a good cross-section of the population here.

G: Okay.

AWS: So, first off, how old are you?

G: 80.

AWS: 80. And how long have you been in The Villages?

G: 17 years.

AWS: 17 years. And before then, you were from...?

G: [redacted], New York. I worked with the [redacted] schools for 38 years.

AWS: Ah, did you teach?

G: I taught for five years, and then I was a director of a special project, and then I became personnel director, and then I was director of staff development and personnel, so.

AWS: Fantastic. Alright. And when did you first learn to use a computer?

G: About 1975.

AWS: Wow. That's going way back.

G: Yeah.

AWS: And then when did you first learn to use the internet?

G: Probably the internet in the 90s.

AWS: Okay. And when you first started to learn to use a computer, were you doing programming or word processing, or...?

G: Word processing, pretty much. And communicating with... when I first started, there wasn't any connection with anybody, so I just used it as a typewriter basically... to write documents and to print them and to make copies for groups that I met with, that I did things with. And I had one computer at work and one at home.

STRONG/PREVALENT computer use for work PRE-2000s!

AWS: Mm-hmm.

G: There wasn't any connection between the two.

AWS: Right. And as time progressed, did the way that you used computers differ... did it change?

G: I think it did, because I used the internet to send copies of notes from meetings to people, and to communicate about, uh... I never texted anybody, but I just... used it as a means of linkage to follow up on meetings that we had, notes, questions, agendas for future meetings... things like that.

AWS: Sort of replacing the interdepartmental memo, in a way?

G: Right, yeah.

AWS: Mm-hmm. And so... do you use a computer now?

G: Not as much as I did when I was working.

Maybe the only participant who used the computer less in retirement than in the workplace

AWS: Mm-hmm.

G: I, uh... I use the internet to communicate, but I don't use it as much as I did before.

AWS: Okay. And so how frequently would you say you use the internet now?

G: I get about 50 emails a day.

AWS: Alright!

G: So I still have an AOL address, and I kept that; I didn't change to Gmail even though the kids said, "Dad, it's cheaper." I decided to stay with it, so I get a lot of advertising on it that... since I've been on, I've had the same email address since 1995. So I get quite a bit of mail. Some of it I answer, some of it I don't. Um... I'm not particularly happy when somebody says, "You have to send this on, because it's so good that if you don't..." you know, somebody's not gonna find out about it. So I make a judgement about whether I think something's worth sharing, and I know the people who I share it with... so I figure whether they'll like it or not.

AWS: Mm-hmm.

G: There's a lot of political stuff now, so I'm... not as anxious to share all that as people are to have me share it.

AWS: And that always increases when we are in an election year.

G: Oh yeah.

AWS: I feel like I want to use the internet less and less and less as 2016 rolls on.

G: Yeah, that's it.

AWS: So... who do you typically communicate with online now?

G: I communicate with the family. Um, with some old friends from White Plains that I know. But that's basically it... some of the old neighborhood people. We have a card game tonight—we play poker on Wednesday night, once a month, second Wednesday—so we'll play cards and we communicate sometimes by reminding people about the meetings and so on. So I have a

email groups/ lists

poker group that I can send it to just by pushing a button, and it goes to them. I have them set up as a group.

AWS: Good.

G: That's about it: the family and uh... some old friends from Stony Point Conference Center in New York that I know, but not... I'm not a computer whiz. Ø advanced expertise

AWS: Alright. So... primarily email then. Do you use the computer at all for other purposes like gathering information, catching up on news, banking, shopping, or is it primarily...

G: I do banking and credit cards on the internet. Uh... I don't do much with communicating with people that I can call on the phone, if I can do that without bothering them too much. So I do that. The kids all text, all the time, 3–4 times a day they text each other. And I've just seen that as being very intrusive into the quality of life. When you're sitting down to dinner and everybody's on their smartphone, it's a little distracting not to be able to have a conversation. Or somebody gets up from the table because somebody called them while they're eating... those kind of things bother me a little bit. I think... I may be paraphrasing Einstein in a little... but I think he said at one point, something to the effect of, "When technology supersedes communication between people, we will have raised a bunch of idiots."

* intrusive computing/ tech! *

dinner table →

AWS: Mm-hmm. CULTURAL CONCERNS

G: So, uh... I'm concerned about the quality of interactions between people. And I don't see the text as being the best way to do it. Even though it's cultural, I understand, because if you're a millennial you will use the internet all the time. And if you're over 70 years old, you probably won't use it so much.

TL; dr of whole study ...

AWS: Mm-hmm. generational

G: So it's a product of experience as well. TL;DR

AWS: Mm-hmm.

(a pause)

AWS: Tell me about a time when you had a computer or an internet problem. From the moment that you realized you were having a technical... or an issue with the interface... to when you solved it, when you resolved the issue.

G: Uh... a couple months ago, I had a glitch. It said that I needed to call a certain number to get it straightened out. And I didn't do it right away, because I was suspicious. But it was an AOL service, so eventually I called the number... I think I was talking to somebody in India, I'm not sure. It wasn't a speaker of English that was really clear. And uh, he ran me through a whole series of exercises with the computer, which fixed it so that it worked and the message went away. So I have his number, and he put a little logo on my toolbar so I can call him back if I need... I assume he was an honest linkage, that he wasn't somebody who was hacking my computer, even though I am very suspicious about things like that.

Cultural issues - outsourcing tech support. Rose talkd abt this too in her interview.

AWS: Yeah.

G: That's about the only time that I've had trouble.

AWS: Mm-hmm.

G: I have a laptop now... a Dell laptop. Before I had a Hewlett-Packard I had for... I guess ten years. I never had any trouble with it at all. Since I've had the laptop, I've had a lot more trouble.

AWS: Huh, that's interesting.

G: Keyboard had to be replaced, the motor board.

AWS: Mm-hmm.

G: And uh... it was purchased as a rebuilt computer. My kids bought it for me so that I would get out of the idea of having a large computer on a desk, so I

could carry the... the laptop with me anywhere I went. Keyboard is a little harder to use for me than the other one was. Uh... and I'm not quite as happy with it as I was with the other one. It's faster—it does a lot of things quicker—but uh, as far as word processing, it's not the best document to have.

AWS: Yeah. Because of the keyboard design, you think?

G: Yeah, the keyboard. I had a separate keyboard on the other one, and I could bring the keyboard up close to the edge and so on. Part of it is I don't have as nice an area to work in here as I do... so some of it just has to do with space... isn't as large as I had in the house. Because I had a computer room in the laundry room: the laundry room was where the computer was, and that's about all we did was laundry and the computer in there. Now I have the computer in the den, which is also a second bedroom. So it serves a different purpose than that.

AWS: Right. Okay. The last question I've been asking folks is if they could tell the designer of their computer or their favorite website or maybe their email client one thing... what they'd tell them. So something... a change that could be made, or something that could be taken into consideration to make computing easier for you.

G: I think probably the computer's a lot easier to use than I use it. I feel ignorant about 95% of what the computer can do, because I haven't taken classes... I haven't been interested enough to go to workshops or do anything, because it's not a high priority for me even though I realize the family would like it to be. I still use the conference call as my most sophisticated communication technique with the family.

AWS: Yeah.

G: My wife is in memory care: she's over there full time. Kids are very concerned about her, so they come down every couple... three months. They take turns coming down to see her. But uh... they're interested in knowing the last-

Space - computing environment

How many participants had a separate computer room/ home office?

Ø formalized computer learning - contributing to the language, advanced knowledge deficit

Gerald, [redacted]

minute things that are going on with her, so we have frequent conference calls on Sunday night at 8:00, where we all talk.

AWS: On the telephone?

G: And they share their concerns. On the regular hardwired phone. Yeah. Even though mine's hardwired, two of my four kids don't have hardwired phones anymore.

AWS: Right, just cellphones? No landlines?

G: Just cellphones. Yeah. So that's what they do, but uh... I just don't uh... jump up and down with excitement to get on the computer.

AWS: Mm-hmm.

G: I still buy most of my things in local stores from ads. I haven't gone to Amazon to do that, and I'm comfortable with it even though I realize I'm an old-fashioned guy. Ø online shopping — he reiterated this two years later in his observation

AWS: I don't know how old-fashioned that is. I feel like that's more normal.

G: Really, among people of my age group I think it is. If I were half as old, it would be... I'd be way out of beat with what everybody else is doing.

AWS: I feel that way often as well. I have lots of friends who buy their groceries online or get their prescriptions online, and... it's very strange these days to go to a brick-and-mortar store, but there's something to be said about seeing humans when you get your groceries.

G: Yeah. *(laughs)*

AWS: Do you have anything else you'd like to add about this topic for my research, before I close out the interview?

G: No, not really, I just realize that it's uh... something that if you're 75 or 80 years old, you can do other things with your time except become proficient in the computer. And probably enjoy them more, you know. I'm a fairly spiritual

guy: I spend a lot of time reading and writing religious stuff, and I don't find the computer as much fun as I do an old book to read. So that's kind of where I am.

AWS: Okay. I think that's an excellent note to close it out on.

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