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[1] 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,

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[1] 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.).

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 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[2], 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

participated in both rounds of data collection for the study[3], making her a noteworthy participant

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[2] The name used here is a pseudonym to protect Holly's anonymity, as are all other names used in write-ups of this research. I let participants select their own pseudonyms for this project—some elected to, while others did not (so I generated an alias for them). Holly chose her name after Holly Golightly from her favorite movie, *Breakfast at Tiffany's*.

[3] 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

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,

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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).

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.

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[4], 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

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[4] 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.

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

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) She is more comfortable with a single, lower-definition (but highly participatory)

communication channel. 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, 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) <u>Her peer influence and cultural upbringing both push her towards telephone, rather than</u>

<u>internet, communication.</u> 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?"[5]

1) <u>Search Strategies & Queries</u>

Holly began the search exercises by trying to find a news story of interest about Donald Trump's finances[6]. 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):

<u>www . info on Trump's finances . com</u>

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

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[5] 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.

[6] 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.

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.
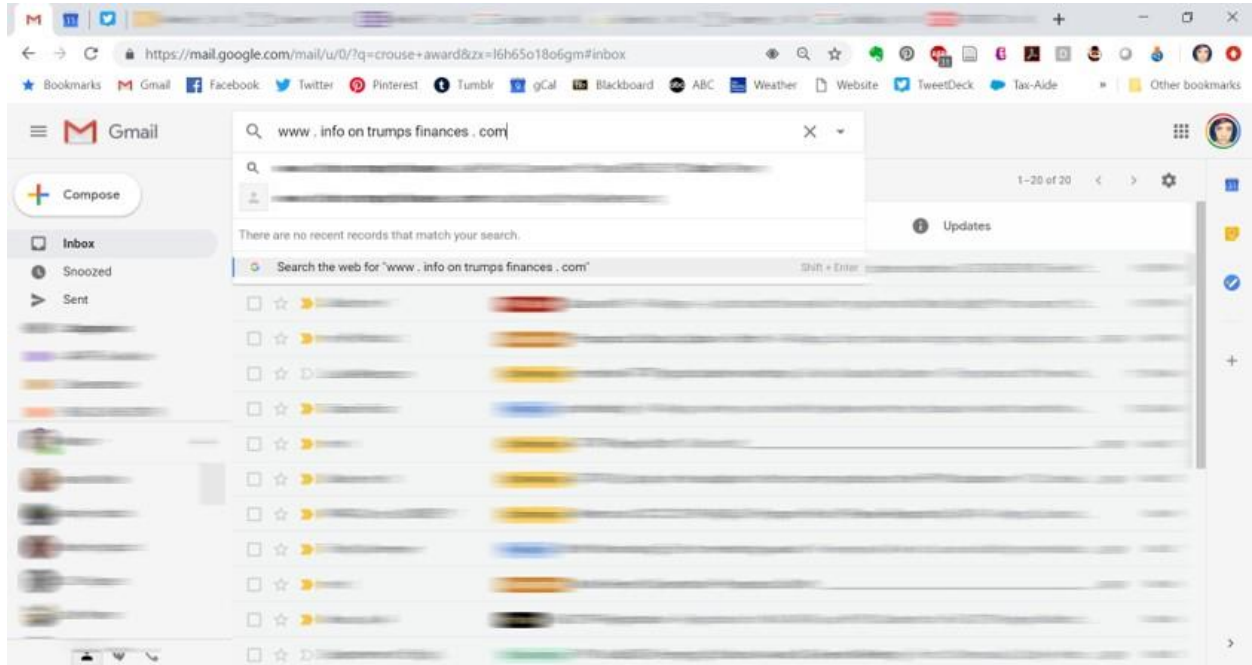
Figure 1: A representation of Holly's search strategy. Note the search terms used (typed as though they were a website URL), as well as the highlighted "search the web for..." text below the suggested results. Note that this is a replication of the search approach that Holly took: she was not searching in Chrome, but Mozilla Firefox. She also did not have any browser plugins installed.

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[7]. She was able

to find the information that she needed and complete the task without trouble: she did not

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

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.

2) <u>Plugin Installation, Potentially Unwanted Programs, & Cybersecurity</u>

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 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[8] 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.

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[8] 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.

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.

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 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, McGrew, Breakstone, & Ortega, 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, Nyhan, & Reifler,

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, Frisicaro-Pawlowski, & Monge, 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 Conclusion: 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.

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