

Overcoming Age Bias in Technology Instruction:
Empowering Older Adults to Become Self-directed Online Learners

Pamela L. Kemp

December 2, 2020

(rev. May 7, 2023)

Introduction

It is a widely known but not often discussed fact that age bias exists in the tech industry. This paper outlines how ageism in tech industry hiring practices creates a bias in the design of tech products, which encourages bias in product marketing, and, ultimately, affects the training provided for new technologies and the adoption of new technology by older adults.

As discussed during a course lecture, while bias is not always intentional, it can create a technological deck stacked in favor of specific social interests (Cooper, 2020).

As Winner (Winner, 1980, p. 127) states, “technologies” are important in everyday life and contain possibilities for many different ways of ordering human activity. He (Winner, 1980, p. 127) states, “consciously or not, deliberately or inadvertently, societies choose structures for technologies that influence how people are going to work, communicate, travel, consume, and so forth over a very long time.

For example, technology contributes to the preferred mode of communication in an organization’s workplace culture. Should you send an email, use chat, or make a phone call?

There are no longer public payphones on city streets because everyone is assumed to have a mobile. Public transit drivers, who frequently change routes, can no longer be expected to provide passengers with directions. There is an assumption that most individuals can use apps like Google Maps to navigate. And during the current global pandemic, technology has allowed millions of individuals to telework, shop online, participate in religious services, or connect with family and friends, while millions of others could not.

Winner (1980, p. 127) states that when society chooses structure for technology, groups are differently situated and possess unequal degrees of power and levels of awareness.

Dishman cites Karissa Thacker's point that "ageism is rampant," and the narrative that most older adults are more interested in fishing than using technology has been ingrained into our collective consciousness (Dishman et al., 2015).

- What is the origin of these misperceptions about older adults and technology use?
- Does the bias in technology design affect how older adults adapt to new products?
- Is there bias in technology instruction? If so, how can it be addressed?

This paper examines those questions and proposes a research study to determine if a public library program teaching self-directed, online learning skills will benefit older adults.

The Facts about Older Adults and Technology Use

A 2017 Pew Research study found that as the U.S. population aged, the use of ICTs (smartphones, internet, and social media) by older adults' increased. For example, smartphone ownership by older adults aged 65 and older increased from 18% in 2013 to 42% in 2017, and nearly half had home broadband (Pew Research Center, 2017). While this indicates that the

digital divide between older adults and their younger counterparts is narrowing, one-third of older adults said that they have never used the internet, and smartphone ownership in this group was 42 percentage points lower than that for adults ages 18 to 64 (Pew Research Center, 2017).

As evidenced in studies of all age groups, there were substantial differences in technology use by older adults based on education and socio-economic variables. (Pew Research Center, 2017). The study found that:

- 87% of seniors with an annual household income of \$75,000 or more a year said they had home broadband, compared to 27% of seniors whose annual household income was below \$30,000.
- Technology use was higher among college graduates than seniors with lower levels of formal education
- smartphone ownership among seniors with household incomes of \$75,000 or more increased by 39 percentage points since 2013 – 15 points higher than the growth reported among seniors overall.
- 34% of older internet users said they had little to no confidence in using electronic devices to perform online tasks. And 48% of seniors said they needed assistance configuring and using a new device. (Pew Research Center, 2017)

Overall, the Pew study found that 58% of adults age 65 and older have a positive view of technology, three-quarters of internet-using seniors say they go online daily, and nearly one in ten go online almost constantly (Pew Research Center, 2017). However, this is not the image of older adults that is widely portrayed by society.

More than a third of the United States population is older than 50, but the group turns up in only 15 percent of media images, according to research from AARP (Hsu, 2019). According to the Bureau of Labor Statistics, over 53 million people older than 50 are employed, making up a third of the American labor force. But only 13 percent of the images reviewed by AARP showed older people working. (Hsu, 2019). Yet less than 5 percent of the images showed older generations handling technology, even though the Pew Research Center has found that 69 percent of people between 55 and 73 own smartphones. More than a third of the images analyzed by AARP portrayed younger people with technology. (Hsu, 2019)

Problem Statement

As Orlov (2019) reported, age bias permeated advertising and technology design.

As Dishman (Dishman et al., 2015) pointed out in a 2015 article for Fast Company, much of the age bias in tech stems from the infamous 2007 comment by Mark Zuckerberg,

“I want to stress the importance of being young and technical. Young people are just smarter. Why are most chess masters under 30? I don’t know. Young people just have simpler lives. We may not own a car. We may not have family. Simplicity in life allows you to focus on what’s important.” (Kane, n.d.)

Recruiters embraced the Zuckerberg philosophy so much so that a Santa Clara-based firm had a message on their Careers page that read, “We Want People Who Have Their Best Work Ahead of Them, Not Behind Them” (Dishman et al., 2015). Orlov (Orlov, 2019) explains that the average Silicon Valley tech company employee is a millennial (age 20-33), not a boomer between the ages of 52-70, so there is little to no design input from older adults into the

smartphones, tablets, and apps that at least 69% of them use. This creates an implicit bias in the technology design.

Friedman (Friedman & Nissenbaum, 1996, p. 334) explains preexisting bias has its roots in social institutions, practices, and attitudes and can enter a system either through the explicit and conscious efforts of individuals or institutions or implicitly and unconsciously, even despite the best intentions. For example, individual bias originates from individuals who have significant input into the system's design. In contrast, societal bias stems from society at large (e.g., gender biases present in the larger society that lead to the development of educational software that overall appeals more to boys than girls) (1996, p. 334). There is also an emergent bias that develops after a new tech product is rolled out to the public due to changing societal knowledge, population, or cultural values (1996, p. 335). As Friedman (1996, p. 335) notes, user interfaces, such as web pages, application toolbars, and smartphone screens, are prone to emergent bias because they are designed based on perceptions about the intended end-users. Friedman defines the types of bias that frequently impact older adults as:

- Mismatch between Users and System Design - Bias that originates when the population using the system differs significantly from those assumed as users in the design.
- Different Expertise - Bias that originates when the system is used by a population with a different knowledge base from that of those assumed in the design.
- Different Values - Bias that originates when the system is used by a population with different values than those assumed in the design. (1996, p. 335)

For the first time, five generations, Traditionalists (born before 1946), Baby Boomers (1946-64, Gen X (1965-80), Millennials (1981-96), Gen Zs (born after 1997), could be co-workers, and this mix of digital natives and digital immigrants has the potential to become what Dishman termed “hotbeds of generational bias” (Dishman et al., 2015)

“Digital Natives” are individuals born after 1980 who have been exposed to technology since childhood and are the “native speakers” of the digital language (Prensky, 2001). On the other hand, “Digital Immigrants” are individuals born before 1980 who are learning the language and culture of the digital age. Prensky (Prensky, 2001, p. 2) found that Digital Immigrants speak the language of “Digital Natives” but with “an accent and are storing the new language in a different part of the brain. As a result, Digital Natives process information quicker, enjoy multi-tasking and gaming more, and have little patience for the processing style of Digital Immigrants.

Prensky provides a persuasive argument for Digital Immigrant instructors to learn to communicate in their students’ language and style (2001, p. 4). However, it is also crucial for Digital Natives to modify their language and address their biases towards older adults when they are delivering technical instructions to Digital Immigrants.

Cut (Čut, 2017) observed that Digital Immigrants fall into three categories:

- ***Avoiders***: they prefer a relatively minimal technology or technology-free lifestyle. They do not have email accounts and/or smartphones and tend to have deadlines. Social media is too much for them, and they do not see the value in these activities.
- ***Reluctant adopters*** accept technology and are trying to engage with it but find it unintuitive and hard to use. For example, they have a cell phone but do not use

texting, occasionally they use Google but do not have a Facebook account, but they check their emails and use online banking.

- ***Enthusiastic adopters:*** they are digital immigrants who have the potential to keep up with natives. They embrace technology and may be high-tech executives, programmers, and businesspeople. This group sees the value of technology; they use Facebook and check emails regularly, which makes them excited. If they are doing business, they have a website.

Question

The overarching research question is: Can a program designed to teach online learning skills to older adults (age 55+) increase that group's use of self-directed technology training resources, such as TechBoomers and GCFLearnFree, available through public libraries?

GCFLearnFree.org is a free online resource offering training on more than 200 topics ranging from the operating system basics, office productivity applications, smartphones, and tablets, life skills (career planning, job search), creativity applications, digital skills, social media, email, math, reading and more. It is a program of Goodwill Community Foundation® and Goodwill Industries of Eastern North Carolina Inc.® (GIENC®); all GCFLearnFree.org® educational content is designed and produced in the GCF Global headquarters in Durham, N.C.(Goodwill Community Foundation, n.d.)

Techboomers.com is a free educational website designed specifically for older adults that uses video and article tutorials to introduce users to trusted new websites and Internet-based applications (TechBoomers, n.d.).

The research project would use instructional design theory to create a course for “Avoiders” and “Reluctant Adopters” that teaches basic website navigation, information seeking, and self-directed learning. The instruction would be delivered in a small group setting in a public library. Participants could bring their own devices or use the library’s public computers, loanable laptops, or tablets. After the instruction, the participants would be surveyed to answer the following questions:

- Was the course effective in improving the participants’ general awareness of the available resources for self-directed technology instruction?
- Did the course improve the participants’ ability to search for information on the websites?
- Were the participants able to follow the instructions in a technical training tutorial and successfully complete the tasks?
- Were the participants able to complete a tech training outside of the library setting training setting, either at home or without assistance using a library computer?

Literature Review

The following is an excerpt from a literature review on Public Library services for older adults originally compiled for another course. It establishes a foundation for this proposed research project.

Bundy, A. (2005). Community Critical: Australian Public Libraries Serving Seniors.

***APLIS*, 18(4), 158–169. Library Literature & Information Science Full Text (H.W. Wilson).**

<http://ezproxy.uky.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=llf&AN=502966363&site=ehost-live&scope=site>

While this article is slightly dated, the questions included in the Friends of Libraries Australia survey are thoughtfully crafted and provide an excellent framework for evaluating any public library's older adult programming. In addition, the insights provided by the responses to these questions could aid any library in improving its programming.

- For example, question nine asks, “*Do you target seniors in marketing library programs and services?*” For this particular study, 82% of respondents answered “Yes” (Bundy, 2005, p. 161). However, questions six through eight attempted to establish how often “seniors” are being asked for feedback.
- Question six asks, “Do you have a senior advisory group that meets with the library?” 92% of respondents said “no.”
- Question seven asks, “Have you ever surveyed seniors about their library needs?” Again, 57% of respondents answered “no.”
- Question eight asks, “Have you ever held a senior focus group meeting to discuss library needs?” 84% of the respondents answered “no.”

The responses indicate a disconnect between libraries and the group to which they are marketing. This type of disconnect is the equivalent of taking a first date to dinner and ordering their meal without having any idea of their preferences

As the authors (2005, p. 158) point out, librarians should avoid gerontological stereotyping and consider the expectations, cultural background, economic life cycle, and other variables that create unique facets of aging.

Charbonneau, D. H. (2014). Public Library Websites and Adherence to Senior-Friendly Guidelines. *Public Library Quarterly*, 33(2), 121–130.

<https://doi.org/10.1080/01616846.2014.910722>

This article documents a study of the websites of 104 public libraries in Michigan to evaluate whether they conformed to the senior-friendly accessibility principles recommended by the National Institute on Aging and the National Library of Medicine (2009) guidelines. (Charbonneau, 2014, p., 123).

Charbonneau (2014, pp. 122–123) notes that studies prior to 2014 that examined the accessibility of library websites in the United States and Canada tended to focus on the accessibility of academic library websites and revealed numerous barriers to accessibility.

Charbonneau used the senior-friendly recommendations to develop a coding sheet, which they used to document the data collected from the libraries, analyze the responses, and evaluate compliance with the website guidelines (Charbonneau, 2014, p. 124).

The study found that while most public library websites adhered to key accessibility principles such as reserving all capital letters for headlines, avoiding backgrounds with patterns, and avoiding horizontal scrolling, none adhered to all the senior-friendly guidelines (2014, p. 124)

The study also revealed that public library website designers neglected to consider Internet accessibility features such as including a speech function to hear text read aloud, contrast options, and ALT text (alternative text) tags with images (2014, p. 124)

Nelson Decker, E. (2010). Baby Boomers and the United States public library system. *Library Hi Tech*, 28(4), 605–616. <https://doi.org/10.1108/07378831011096268>

This article reviews the programming and services for older adults available in public libraries in the United States in 2010. As Decker (Nelson Decker, 2010, p. 605) states in the introduction, aging is an inevitable biological phenomenon. Yet, in the United States, it is dreaded and often the topic of jokes, negative connotations, and undeserved stereotypes. Baby Boomers constitute the largest group to reach the age of 65 or older at any time in history and, as a result, will significantly reshape library programming and services (Nelson Decker, 2010).

The author (2010, p. 605) notes that many Baby Boomers self-identify with the term “older adult” rather than the stereotypical labels of “senior,” “elderly,” “aged,” and “old”; therefore, this is the identifier that she uses in her paper. Decker provides a profile of older adults of this era that addresses some of the widely held stereotypes about this group and provides recommendations on how public libraries can better serve this constituency. The author focuses on three specific ways libraries can meet Baby Boomers’ needs: social, programming, and technological.

In his explanation of public libraries’ value as social infrastructure, Klinenberg (Klinenberg, 2018, p. 31) states that more people live alone, either by choice or circumstance, than at any other point in history. Many of these solitary dwellers are older adults who are at particular risk of becoming isolated (Klinenberg, 2018, p. 31). Public libraries have played a role

as social gathering places since the 1700s. Decker (2010, p. 606) recommends that public libraries redesign their physical spaces in ways that meet the needs of older adults and note that these accommodations bear little difference to those made for all citizens with disabilities and special needs.

Decker (2010, p. 610) emphasizes the importance of including older adults in the program planning process, providing volunteer opportunities, or retraining and hiring older librarians. In addition, the article explains Baby Boomers frequently research health-related topics and exhibit interest in health clubs, seminars, and similar programming.

In terms of technological needs, Decker (2010, p. 611) views Baby Boomers as the most technologically literate group of older adults to date and advises librarians not to over-generalize or make assumptions about their experience and level of competency. However, differences in education, work experience, and interest level will undoubtedly impact older adults' technological literacy. An understanding of basic instructional design will aid librarians in evaluating if and for whom technology training is needed, as well as what the best method of training might be

Decker outlines specific recommendations for facilities, services, technology, and library staff.

Xie, B. (2012). Improving older adults' e-health literacy through computer training using NIH online resources. Library & Information Science Research, 34(1), 63–71.

<https://doi.org/10.1016/j.lisr.2011.07.006>

This article reports the findings from the first two years of the Electronic Health Information for Lifelong Learners (eHiLL) research project: an e-health literacy intervention program for older adults that was conducted in the Prince George's County Memorial Library System. This phase of the research project focused specifically on training older adults to use two particular NIH resources, NIHSeniorHealth.gov and MedlinePlus.gov, to access reliable Internet health information (Xie, 2012, p. 3).

The library programs were conducted at the Hyattsville and New Carrollton branches, which provided networked computers, space, and staff support to facilitate this study's implementation. Xie (2012, p. 4) explains that these specific branches were selected as the research sites because of their ethnic diversity and sizeable African American population.

Xie (2012, p. 4) cites earlier studies that established that the vast majority of American adults have lower than proficient levels of health literacy, and health illiteracy is even more severe among older adults (2012, p. 1). That author (Xie, 2012, p. 3) proposes that in order to be effective, e-health literacy intervention needs to integrate and use the existing public infrastructure such as public library systems and credible internet-based sources like the NIH, NNLM, or CDC. An example of this type of public and medical library collaboration is Health InfoNet of Alabama, a free consumer health information service of the Alabama public and medical libraries. Health InfoNet of Alabama started in 1999 as a local service to Jefferson County residents the subsequently expanded to another county, the entire state, until in 2018, the site management was transferred from the University of Alabama at Birmingham (UAB) Lister Hill Library of the Health Sciences to the Alabama Public Library Service (APLS) in Montgomery (Health InfoNet of Alabama Project – ALHeLA, n.d.).

The study was conducted from September 2007 to June 2009 with 218 older adults aged 60–89 (M = 70.0, SD = 8.7). The demographic make-up of the group was: 61% were women, 62% were African Americans, 55% had at least some college education, 42% had no prior computer experience, 26% had yearly household incomes of less than \$20,000 /year, 8% were non-native English speakers, the majority had never or rarely used the internet for health information, and few had used the NIHSeniorHealth.gov or MedlinePlus.gov site (2012, p. 5)

The e-health literacy training used the free resource, The Helping Older Adults Search for Health Information Online: A Toolkit for Trainers tutorial developed by the National Institute on Aging (NIA) of the NIH as the curriculum (2012, p.5). While the NIHSeniorHealth.gov website no longer exists, a copy of the website along with the toolkit has been saved in the Internet Archive's Wayback Machine and can be accessed at

<https://web.archive.org/web/20170730135212/https://nihseniorhealth.gov/toolkit/toolkit.html>

The study evaluated the effectiveness of e-health literacy intervention based on the following criteria:

- the participants' basic knowledge about computers and the internet as well as their overall attitudes about computer use
- changes in the participants' ability to seek, find, understand, and appraise health information from NIHSeniorHealth.gov and MedlinePlus.gov sites after the health literacy instruction
- The extent to which the participants were able to locate needed health information and use the information to guide their health decision-making, and
- the participants' perceptions of and satisfaction with the e-health literacy intervention (2012, pp. 3–4)

The study concluded that the pre-and post-intervention testing reflected that the e-health literacy intervention had been successful on all four levels.

Conclusion

This research project aims to add to the body of work on developing technical training for older adults. As the Baby Boomer generation ages, there will be a greater need to help older adults aged 60 years and older develop the skills to improve their computer literacy by using self-directed online training resources. In addition, self-directed technical learning skills will be needed by all generations in order to keep pace with advances in automation and artificial intelligence.

Works Cited

- Bundy, A. (2005). Community Critical: Australian Public Libraries Serving Seniors. *APLIS*, 18(4), 158–169. Library Literature & Information Science Full Text (H.W. Wilson).
<http://ezproxy.uky.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=llf&AN=502966363&site=ehost-live&scope=site>
- Cooper, T. (2020, September 14). *Bias in Design—ICTs in Society* [Course Lecture]. ICT600-201 - Information Comm Tech in Society - Week 5, University of Kentucky.
- Čut, M. (2017, November 16). *Digital natives and digital immigrants—How are they different*. Medium. <https://medium.com/digital-reflections/digital-natives-and-digital-immigrants-how-are-they-different-e849b0a8a1d3>
- Dishman, L., Dishman, L., & Dishman, L. (2015, December 10). *Is Ageism In Tech An Under-The-Radar Diversity Issue?* Fast Company. <https://www.fastcompany.com/3054204/is-ageism-in-tech-an-under-the-radar-diversity-issue>
- Friedman, B., & Nissenbaum, H. (1996). Bias in Computer Systems. *ACM Transactions on Information Systems*, 14(3), 330–347.
- Goodwill Community Foundation. (n.d.). *GCFLearnFree—Info: Who We Are*. GCFGlobal.Org. Retrieved December 1, 2020, from <https://edu.gcfglobal.org/en/info/who-we-are/1/>
- Hsu, T. (2019, September 23). Older People Are Ignored and Distorted in Ageist Marketing, Report Finds (Published 2019). *The New York Times*.
<https://www.nytimes.com/2019/09/23/business/ageism-advertising-aarp.html>
- Kane, M. (n.d.). *Say what? “Young people are just smarter.”* CNET. Retrieved December 3, 2020, from <https://www.cnet.com/news/say-what-young-people-are-just-smarter/>

Orlov, L. (2019, September 25). *Age bias permeates ads—And technology design* | *Aging and Health Technology Watch*. Aging and Health Technology Watch.

<https://www.ageinplacetechnology.com/blog/age-bias-permeates-ads-and-technology-design>

Pew Research Center. (2017). *Tech Adoption Climbs Among Older Adults*.

<https://www.pewresearch.org/internet/2017/05/17/technology-use-among-seniors/>

Prensky, Marc. (2001). Digital natives, digital immigrants. In *On the Horizon* (5th ed., Vol. 9).

MCB University Press.

<https://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf>

TechBoomers. (n.d.). *Who We Are*. TechBoomers.Com. Retrieved December 1, 2020, from

<https://techboomers.com/who-we-are>

Winner, L. (1980). Do Artifacts Have Politics? *Daedalus*, 109(1), 121–136. JSTOR.

<http://www.jstor.org/stable/20024652>