

CATERING TO OUR AGING POPULATION: INCREASING THE OVERALL USABILITY
OF FINANCIAL INFORMATION THROUGH PERSONALIZATION

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ABSTRACT

Older adults are increasing in numbers nationwide at a higher rate than any other age group because of longer life expectancies. As a result, older populations, or those individuals aged 65 and above, have to make increasingly more difficult financial decisions. The purpose of this study was to determine attitudes regarding financial information among a sample of older adults when compared to a younger group. Findings included that older populations prefer to research financial information on their own rather than seek professional help. Thus, technical communicators must begin working closely with the financial and technology sectors to improve usability of financial information, particularly information that's geared for older populations. Personalization of information, as well as deliberately improved readability and legibility, will have a positive effect on the usability on financial information. Finally, eye tracking should be used as a future research tool to further increase personalization of online financial information.

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CHAPTER ONE: INTRODUCTION

Technical information has enjoyed a considerable increase in usability in the past several decades mainly thanks to the work of technical communicators in fields ranging from engineering to medicine to software development. These developments in document usability have led to better consumer understanding of technical information within the context of technical documents. Little attention has been given to the usability of financial documents (Milner and Rosenstreich, 2013); instead, the focus seems to have remained on the medical and engineering fields. While these fields benefit greatly from increased usability of important technical information, the financial industry, too, has the potential to benefit from the improvement of information usability. Especially now, more than ever, financial institutions must turn to technical communicators when addressing the need for increased usability of information for older populations.

A 2013 study conducted by North Dakota State University reported that the population of those aged 65 and older living in North Dakota is projected to double by the year 2025 (NDSU Extension Service, 2013). Similar effects on population of lowered mortality are evident globally. When considering how to best accommodate the needs and desires of this growing global population, researchers must give consideration to studying financial industries and their current practices, and how they are meeting the needs of aging individuals. As aging individuals near retirement, they often seek guidance from financial professionals and/or self-guided technology on how to survive with their life savings and new expenses, such as medical bills, all the while balancing existing obligations such as dependent children or mortgage payments. It's time for financial institutions to begin catering to these special needs of this ever-growing population by working to facilitate better usability of financial information.

The responsibility of saving and investing for retirement is being placed increasingly on the American individual rather than the government or employer-sponsored pensions, as has commonly been the scenario in the past. Interestingly, investment fund researchers have found that older investors today are consistently making financial decisions that go against their best interests (French et al., 2007). Another problem was identified by Lusardi (2015): young people's savings must be sufficient enough to cover longer retirement periods due to higher life expectancies; however, young generations have the advantage of *time* to prepare for their longer lives. Millennials, or those born between 1982 and 2002, are able to work toward becoming more financially literate and experienced as they approach old age and retirement. Foster et al. (2015) define financial literacy as the personal knowledge of how money "works" in real-world situations, such as in regards to income, taxes, investments, etc.; financial capability is the ability to put that knowledge to work through investments. Unsurprisingly, older generations report higher levels of self-perceived financial literacy and capability than younger populations (Xiao et al., 2013). Yet, populations of people 65 and older must plan for higher life expectancies, while the changing world around them is learning how to accommodate their elongated and increased needs. The aging community, and how they interact with financial documents, requires special attention when considering how to provide sustainable individual financial health. These necessary changes include looking at the personalization, of financial planning information texts, such as bank statements and retirement fund statements, in order to improve usability through better legibility and readability.

A basic tenet of usability studies is that the more usable information is, the more successful it is at achieving its goal. If consumers don't understand the technical information that can be found in medical or financial documents, they will have little use for those documents. If

they can't find the information they are looking for, they generally move on to a new site of information. If the information doesn't answer key questions that they are seeking, they look somewhere else for the answers. Thus, the overall usability of technical information is tantamount to the success of the technical sites or documents, which ultimately equates to success of the financial institutions that publish them.

When considering the factors of overall usability of technical information, there are several to consider that have a direct effect on a consumer's uptake of any technical information. These include personalization, or tailoring online information to the specific needs of a particular audience or customer; readability, or assuring that the complexity of the syntax and vocabulary of the document is widely accessible, and that the design of the text provides ease of reading; and legibility, or assuring that the font size and type of the text on the document is usable for all people, including older populations, or those aged 65 and older, who may have lowered vision capabilities. This population, those aged 65 and older, will be the main focus group of this research.

The ultimate purpose of information personalization is to determine how to most efficaciously deliver "the right message to the right person at the right time" (Li, 2016, p. 25). Because personalization is a practice that is often applied to online information, it's often referred to as web-based personalization, or web-based customization (Li and Kalyanaraman, 2013; Li, 2016). Generally speaking, when a piece of information caters to a specific individual, it is considered to be highly personalized; conversely, if a piece of information has no intended target, it is considered non-personalized. Examples of personalization include Amazon's practice of greeting customers by name upon login, and offering product suggestions based on past purchases (Li, 2016), or companies like Facebook, who base their ad choices on individuals'

posting and browser histories (Facebook, 2016). More and more companies are continuing to employ web-based personalization practices in an attempt to raise customer satisfaction (Greer and Murtaza, 2003).

Author Miles A. Tinker largely led legibility studies in the 1960's; Tinker is often credited as having been the biggest driving force behind the standardization of the American print industry. According to Tinker (1966), research on legibility is primarily concerned with which typographical factors, such as font size and letter spacing, affect ease of reading. In his influential work *Bases for Effective Reading* (1966), he concludes, "providing optimal legibility of print is of high importance in our daily lives" (p. 8). Arditi (2004), and Arditi and Cho (2005), have contributed unique research to legibility studies that suggests people with lower vision are particularly affected by legibility. Related to legibility, readability is concerned primarily with the general accessibility of a text's syntax and vocabulary; secondarily, readability is concerned with the aesthetic value of the text. For example, 14 point Times New Roman has been shown to ease readability compared to "noisy" fonts such as Berlin Sans. Several studies have focused on the readability of medical information (Graber, 1999; Patel et al., 2015; Hutchinson et al., 2016), and have found that most medical information found online is written at levels that are inaccessible, or too difficult, for most Internet users.

There have been extensive studies on the effectiveness of personalization and increased legibility of documents designed for aging populations, particularly within the medical field (e.g., Russell-Minda et al., 2007; Chubaty et al., 2009). These documents, which include doctor office pamphlets and telemedicine documents for older in-home patients, are required to meet usability certain standards set by the National Institute of Standards and Technology; however, according to Kaufman et al. (2003), still very little is known about their overall usability.

Kaufman et al. report that poorly designed user interfaces continue to present problems and can result in compromised patient safety. Recent surveys published by major research consultancies have shown that those who regularly used the Internet to self-diagnose medical issues prioritized the usability of the website over trustworthiness of the information. It seems that the ways in which consumers are leveraging online information is changing; because of the surge in technological development, we, as American consumers, are becoming more independent and self-sufficient. This change in consumer trends lends itself well to the notion that technical communicators and financial institutions must work together to create usable online information.

Readability incorporates legibility in that information is unreadable if not legible; however, the issues that surround legibility merit their own attention as well. Russell-Minda et al. (2007) reported a research review on the extant evidence regarding legibility of typefaces (or fonts) for adult readers with low vision. According to the CDC's 2015 National Health Interview Survey (NHIS), Americans 65-74 are more than twice as likely to have vision loss than those aged 18-44, while Americans 75 and older are more than three times as likely to have vision loss than those age 18-44. This type of vision loss studied by the NHIS is defined as being not correctable with glasses, contacts, or surgery. Importantly, these data do not include survey participants residing in senior homes; however, it stands to reason that the percentages of vision loss would be much higher amongst these populations. Personalization, readability, and usability of information mean nothing to older adults who simply can't see the information in the first place. Thus, legibility may appear trivial, but it deserves a level of precedence.

Extant research on legibility suggests that characteristic of typeface have a great impact on the usability of online information (Arditi and Cho, 2005; Russell-Minda et al., 2007). These characteristics range from the presence of absences of serifs, the width of strokes, font size, font

spacing, letter height, contrast, and color. In their research review that was published with the intended audience of those interested in the needs of an older population, Russell-Minda et al. (2007) report that findings suggest standard fonts, such as Times New Roman or Courier, were more legible than others; however, implementing font-adjusting software increased the overall legibility by 75%. Additionally, familiarity with a font type did not correlate to improved legibility. Because range of vision is varied in older adults, a font size range of at least 16- to 18-point type was reported as most successful for the largest population. A consensus on whether or not the presence of serifs has an effect on legibility was inconclusive; however, there were findings that the presence of serifs did seem to have a negative effect on smaller point typeface. The effects of crowded letter and word spacing were conclusively negative. These research findings are considered by financial institutions when seeking to improve the usability of their information.

Finding ways to motivate interest in retirement planning is another area of interest for financial institutions. There have been many studies that examine marketing strategies aimed at aging populations (e.g., Schewe, 1988; Kennett et al., 1995; Myers and Lumbers, 2008; Graffigna et al., 2010; Durkin et al., 2014). Sometimes still considered a neglected target audience, those aged 65 and older account for a majority percentage of financial assets in the American economy; indeed, Baby Boomers will continue to be the wealthiest generation for at least twenty more years (Srinivas and Goradia, 2009). However, Durkin et al. (2014) found that, generally, marketers continue to fail to reach older populations, and opportunities to reach the mature market, particularly the affluent aging market, are vastly underexplored. However, when marketing strategies that target older populations work, the problem of poor usability continues to prevail.

Foster, Ng, and Wee (2015) found that financial literacy, as well as presentation formatting of financial planning information texts, affected participants' ultimate understanding of the information. Foster et al. (2015) state that financial literacy can be understood as the knowledge of financial concepts and products, and having numeracy skills necessary for effective and educated financial planning. However, as Huston addresses in "Measuring Financial Literacy" (2010), "literature has given little attention to how financial literacy is measured" (p. 296). In her meta-analysis of seventy-one studies reporting financial literacy, Huston found that there is no developed definition or conceptualization of "financial literacy"; thus, the problem arises of how to assess financial literacy when there is no method with which to measure it. Importantly, this may be at the heart of what has thwarted the advancement of usability of financial information.

Nonetheless, increasing financial literacy continues to be seen as a means of addressing problems of poor financial decision-making and planning (Huston, 2010; Lusardi and Mitchell 2013). While numerous sites continue to publish "self-help" articles on how to increase financial literacy, the literature on how to increase the usability of this information remains scarce and outdated. Huston (2010) reported that "financial literacy could be defined as measuring how well an individual can understand and use personal finance-related information" (p. 306). It falls upon the individual and the education system to facilitate understanding of financial information; however, for financial information and documentation to be useable, technical communicators must work with financial institutions to direct their attention to facilitating higher values placed on the overall usability of their information.

The purpose of this study is to understand current attitudes towards financial documents, and based on results to suggest ways in which technical communicators can work with financial

institutions to improve the overall usability of financial documents. According to *Solving Problems in Technical Communication* (2013) contributor William Hart-Davidson, it is the job of technical communicators to:

[...] create videos, diagrams, websites, and many other types of information resources. They often create the material for all of these formats at once so users can access them online, on demand, and simultaneously. Technical Communicators advocate for users and work to ensure that information resources meet users' needs. And as more and more workers create information, it falls to the technical communicator to oversee writing and editing practices, helping their coworkers communicate more effectively and ensuring that their organization, as a whole, does so as well (p. 51).

Thus, it is time for financial institutions to turn to technical communicators to begin the process of increasing the usability of financial documents. A special interest should be taken in information that is highly relevant to individuals aged 65 and above for several reasons: first, to put it frankly, financial institutions generally have the most to gain from these populations, as they are the ones with the most money and the highest investments. To further that point, Milner and Rosenstreich (2013) suggest that because older populations generally have a higher need and interest for investing in the financial market than other populations, they should be recognized and respected as a highly attractive segment of the market for financial institutions. On the other hand, for those who belong to this age demographic who are not financially secure have the potential to gain desired stability through increased financial literacy.

Several hypotheses were prepared before research began. Primarily, I expected to find that those belonging to the age range of 65 and above would prefer to seek professional help

rather than do research on their own in order to better understand financial information (H1). This hypothesis is based on the extant literature on trends of mature investors; Milner and Rosenstreich (2013) conducted a study regarding the tendencies and preferences of aging populations regarding their financial inquiries and reported that, “[aging communities] were much more likely to seek financial information from accountants and financial planners than from other types of finance professionals and/or institutions” (p. 253). Secondly, based on research by Xiao et al. (2013; 2015), I hypothesized that those belonging to the age population of 65 and above would report a higher subjective financial literacy than those aged 18-25 (H2). Finally, I hypothesized that above all other variables, participants of both age ranges would rate 1) the language (vocabulary) of financial information and 2) the format of the information (whether it’s online or not) as the most significant variables with the highest impact on their understanding of financial information (H3); this hypothesis is based on my own assumptions and experience with usability testing.

CHAPTER TWO: METHODS

An integral part of this research project was designing a survey that would begin to unveil attitudes felt towards financial documents, particularly attitudes belonging to the populations of those aged 65 and above, or “older” populations, and 18-25 and below, or “younger” populations. While the primary goal of this research was to focus on attitudes felt among older populations, the results of the age group of 18-25 were desired to use as a comparison point for the age group of 65 and above.

Approval was received from the NDSU’s Institutional Review Board prior to surveying. Participants belonging to the age group of 65 and above were chosen at random in multiple public spaces in of Fargo, North Dakota. Participants 18-25 were approached on North Dakota State University’s campus. Participants were approached by the researcher and asked if they would be willing to be involved in a research project. The participants in both age groups were given the exact same survey, and neither group was compensated for their involvement with this research. If participants indicated willingness to volunteer for the interview, this implied consent. The participants who volunteered for this study were all customers of a financial institution; thus, they were not asked to imagine themselves in a situation with which they were unfamiliar. A total of fifty-seven participants willingly completed the survey.

The survey was created on a simple word document format, printed, and physically handed to participants. Willing participants were prompted to answer four questions: the first asked them to identify the range that described their age. They were then asked how they preferred to better understand financial information—by researching on their own or by having the information explained by a professional. Thirdly, they were asked to rate their general understanding of financial information on a range from “not at all,” to “completely.” Finally,

there were given a list of seven factors that can affect understanding of financial information, as reported by Huston (2010), and asked to identify if these factors personally affect their understanding of financial information by using “Y” for yes, and “N” for no.

CHAPTER THREE: RESULTS

Of the total participants (n=57), thirty belonged to the age group of 65 and above, or “older,” and twenty-seven belonged to the age group of 18-25, or “younger.” Of the total participants, 57.9% were female while 42.1% were male. Of the older participants, 56.6% were female while 43.3% were male. Of the younger participants, 59.3% were female while 40.7% were male. Table 1 includes these demographics as well as important results in regards to differences in how older and younger people prefer to better understand financial information—through personal research or through counseling by a finance professional.

Table 1

Characteristics of participants

Age Range	Older participants (n=30)		Younger participants (n=27)		Total (n=57)	
Sex	M	43.3% (n=13)	M	40.7% (n=11)	M	42.1% (n=24)
	F	56.6% (n=17)	F	59.3% (n=16)	F	57.9% (n=33)
Relationship with Financial Institution	Yes	100% (n=30)	Yes	100% (n=27)	Yes 100% (n=57)	
	No	0% (n=0)	No	0% (n=0)		
Prefer to research financial information on their own		63.3% (n=19)		81.5% (n=22)	71.9% (n=41)	
Prefer to seek professional help regarding financial information		36.6% (n=11)		18.5% (n=5)	28.1% (n=16)	

Table 2 represents the levels of self-perceived subjective financial literacy. Subjective financial literacy refers to self-reported attitudes felt about one’s understanding of financial information (Xiao et. al, 2015); i.e., participants were asked to report to what degree they felt they were able to understand the information found in financial documents or websites.

Participants were asked to rate their level of overall understanding of financial information from one the following choices:

Table 2

Levels of self-perceived subjective financial literacy

1. I don't read the information contained in financial texts
2. I read financial texts but I don't understand the information
3. I read financial texts and I understand some the information
4. I read financial texts and I understand most of the information
5. I read financial texts and I understand all of the information

These options were then coded by applying Likert scale with five value points; results can be seen in Table 3. Nineteen older participants reported that they “understand most of the information” in financial documents, with fifteen out of twenty-seven younger participants understanding only “some of the information.” Based on the coded interpretations of these results, the following common estimator of standard deviation, or s , was used to determine the expected deviance in attitudes amongst the different age ranges, where N represents sample size, Σ represents the summation, and x represents each value within the sample:

$$s = \sqrt{\frac{1}{N - 1} \sum_{i=1}^N (x_i - \bar{x})^2},$$

Figure 1. Standard Deviation Equation (Helmenstine, 2015)

After calculating the mean (μ) for each sample (see Table 3), standard deviation was computed. For older participants, a z-score of .0279, or 2.8% was produced, which can be interpreted as the following statement: deviation in attitudes of the older age group are relatively insignificant. For younger participants, results produced a z-score of .3438, or 34.4%, which translates into a much larger deviance. Based on these statistical z-scores, the results represent a larger consensus in attitudes amongst older people than younger people. In other words, attitudes

amongst older people are of a smaller range than those of younger people. These results must be interpreted with the caveat of considering the small sample size (n=30; n=27).

Table 3

Self-reported subjective financial literacy

	Likert Scale Code	Older participants results (n=30)	Younger participants results (n=27)
I don't read the information contained within financial texts	1	0 (n=0)	18.5% (n=5)
I read the information but don't understand it	2	0 (n=0)	14.8% (n=4)
I read the information and understand some of it	3	20% (n=6)	55.5% (n=15)
I read the information and understand most of it	4	63.3% (n=19)	7.4% (n=2)
I read the information and understand all of it	5	16.6% (n=5)	3.7% (n=1)
Mean (μ)		3.96	2.63
Standard deviation (s)		.615	1.01

Figure 2 displays the results of affirmative answers in regards to variables that affect personal understanding of financial information. Participants were asked to simply identify whether or not (“Y” or “N”) the listed variables affected their overall understanding of general financial information found in common texts, like checking account statements, credit card statements, mortgage lender agreements, and tax preparation information.

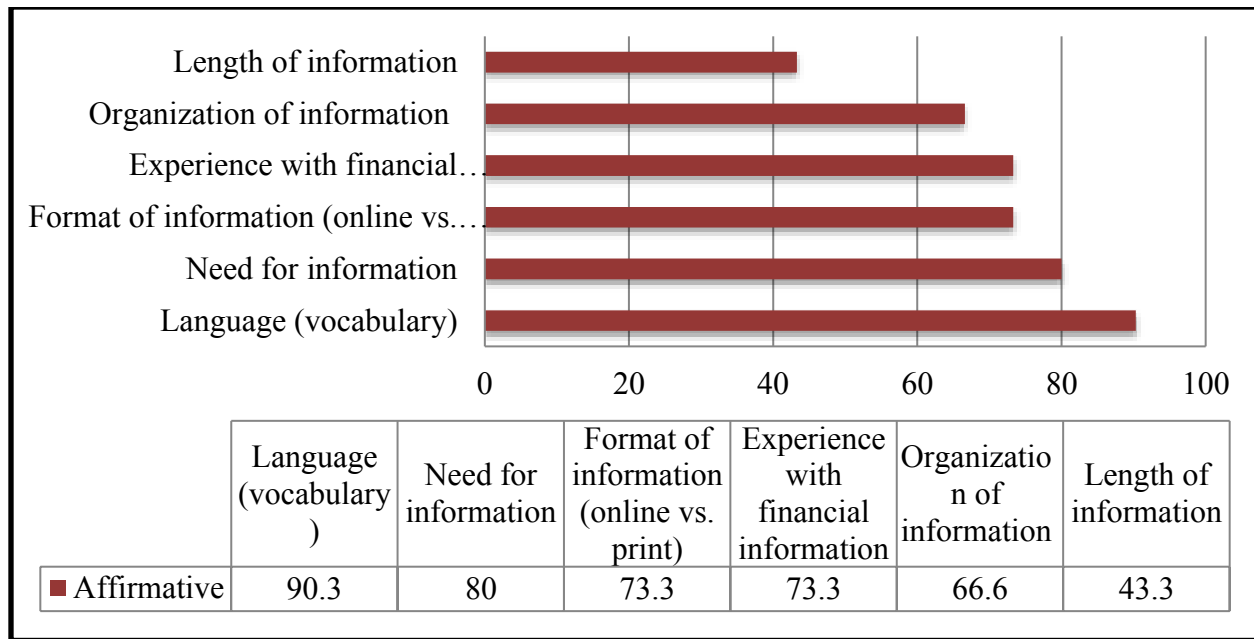


Figure 2. Graph representing percentage of affirmative responses to factors that affect personal understanding of financial information amongst older participants

Older participants, or those aged 65 and above, reported that among the optional variables that affect their understanding of financial information, the language (explained specifically as vocabulary) of the information is most significant, followed by the personal need for the information at the time. Of least importance reported is the length of the information. Results of the same questions for younger participants, or those aged 18-25, can be found in Figure 3. Of most importance to younger participants was having experience with financial information, followed by the language as well as the personal need for the information at the time. Interestingly, of least importance to younger participants was the format in which the information was delivered—a major difference from the older participants.

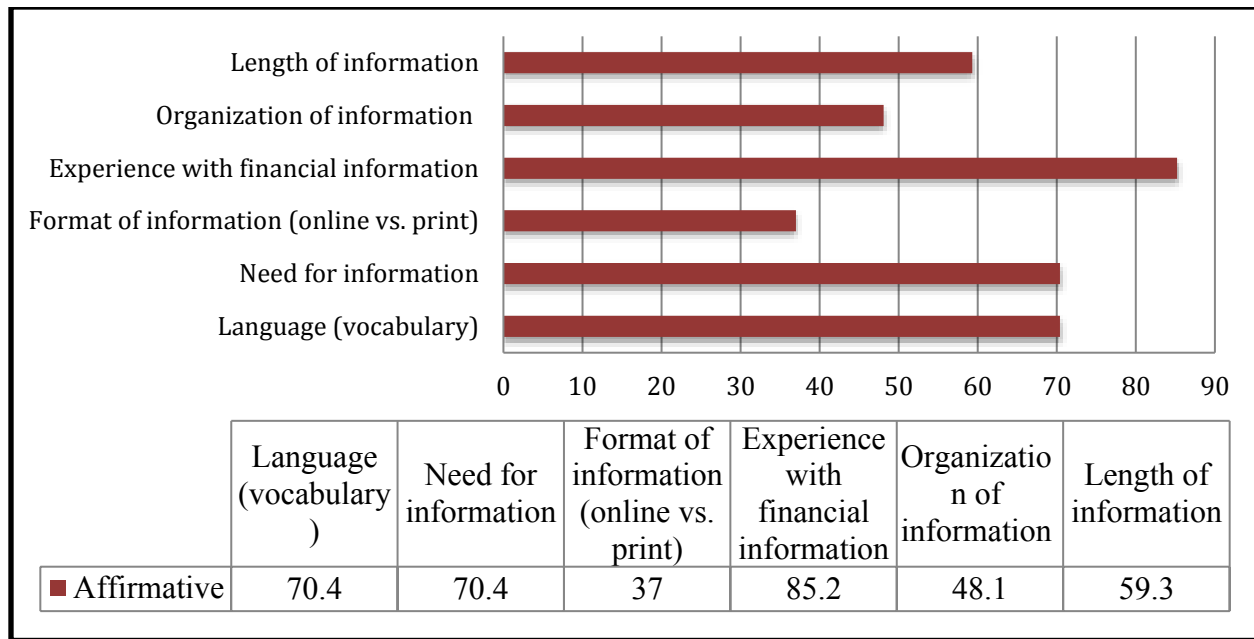


Figure 3. Graph representing percentage of affirmative responses to factors that affect personal understanding of financial information amongst younger participants

Study results disproved H1 (that older people would prefer to seek professional help with financial information). Instead, 63.3% older participants (n=19) identified that they prefer to research financial information on their own. H2 (that older participants would report a higher subjective financial literacy than younger participants) was proven. Older participants reported a subjective financial literacy statistical mean (μ) of 3.96 out of 5, while younger participants reported a mean (μ) of 2.63 out of 5. Results also disproved H3 (that older participants would most highly rate the language of financial information, followed by the formatting of financial information, to be most highly impactful of their understanding), although results were not surprising. 90% of older participants (n=27) reported that the language (vocabulary) of financial information affects their understanding, supporting the notion that readability research of financial information warrants attention.

CHAPTER FOUR: DISCUSSION

The goal of the current study was to better understand the attitudes felt towards financial documents, particularly by those aged 65 and older, and to suggest ways that financial institutions should react to these attitudes. The sample group of specific interest was older populations, or those belonging to the age group 65 and above, because they are a rapidly changing and underrepresented demographic for whom the personalization of financial documents would be significantly beneficial. Reflection on the results of this research that suggest older populations prefer to become financially literate on their own should encourage financial institutions to improve the overall usability of their documents. If most of their customer base is doing their own research and making self-informed decisions, it's in the best interest of financial institutions to put forth every possible resource to improve the usability of the information that is available.

Based on presumptions that older populations would prefer to seek professional help with financial decisions rather than do research on their own, results of the survey were surprising. Results of the survey showed that a majority of the population 65 and above preferred to research financial documentation on their own. Despite the fact that the sample size of those 65 and above was relatively small, the findings are still significant. Perhaps a contributing factor to these attitudes felt by those aged 65 and above could be what the National Council of Aging (NCOA) calls the “Crime of the 21st Century”: financial scams targeting seniors (2016). Among the list of these scams includes health insurance scams and investment scheme scams in which older people are targeted and asked to release personal information.

The results confirmed the hypothesis that people aged 65 and above would report a higher subjective financial literacy were not surprising; however, the results are still meaningful.

Despite French et al.'s (2007) findings that mature investors consistently make choices that go against their best interests, it is the aging population that reports a higher subjective financial literacy. Probably this perception of higher financial knowledge is directly connected to the state of a person's finances (Xiao et al., 2015), but financial institutions can use this information to their benefit by responding to their customer's needs and wants through personalization of information.

Technical writers and information technical professionals alike agree that personalization of information is crucial to improving usability of information (Greer and Murtaza, 2003). Although the concept of personalization is easily understood, the word itself remains somewhat ambiguous. Greer and Murtaza (2003) define personalization of information as a technique used to create content that is individualized for each customer and suggest that institutions and organizations can strengthen their overall value by implementing practices of personalization of their information. According to Greer and Murtaza (2003) in their groundwork report "Web Personalization: The Impact of Perceived Innovation Characteristics on the Intention to Use Personalization," in which they examined the factors that impacted personalization of a financial institution's website, "63% of survey respondents would find personalization on a financial services website useful" (p. 50). With an overall increase of Americans who use computers from 63% in 2003 to 84% in 2015 (Perrin and Duggan, 2015), it would stand to reason that the number of respondents who would find personalization of information useful would be dramatically higher.

Kambil and Nunes (2001) refer to personalization as the use of artificial intelligence to analyze customer behaviors in order to produce software recommendations, while S. Ramnarayan (2005) suggests its significance comes from building customer relationships by

responding to their online needs. Sometimes referred to as one-to-one marketing, the overall goal of information personalization is to increase customer satisfaction by facilitating faster and easier interactions with technical information. Simplified, personalization of information consists of three parts: first, customer behaviors and information is considered; second, business practices and objectives are evaluated; lastly, in accordance with the first two factors, informational content is drafted for output (Greer and Murtaza, 2003). Thus, before any personalization can be implemented in a successful fashion, data-collection is paramount. Greer and Murtaza suggest several ways in which this data-collection can occur: data can be collected during the site registration process or it can be inferred through analysis of customer-click data as they browse the website (2003). They suggest that the latter is more difficult but much more advantageous in the long run because of specific software needs.

Huang and Lin (2005) suggest that personalization can increase revenue and profit for financial institutions because it creates stronger customer relationships and enhances customer loyalty. However, personalization is not easily attained; the most difficult aspect of personalization is the process of real-time incorporation and maintenance of personalized information without the presence of human intervention, while attempting to reach the needs of myriad customers (Greer and Murtaza, 2003; Huang and Lin, 2005). Huang and Ling (2005) provide an anecdotal example of what the process of personalization of financial information might look like in their article “Customer-oriented financial service personalization”:

[...] a new user logs onto the web site and makes several selections to customize the site as he desires. These choices he makes are saved as the first batch of information in his individual profile. Information in his profile accumulates gradually every time he logs on using his ID. As the analytical engine behind the

web site observes and learns enough about the user, personalization can be applied by predicting his needs and offering products and services that he most likely needs (p. 29).

Huang and Lin (2005) continue to urge readers to remain pragmatic and realize that personalization of financial information can never be completely successful, especially as people's preferences and interest change over time. However, I believe that, in addition to personalization of online financial information, improved readability and legibility of this information would strengthen the overall success of financial institutions and increase customer satisfaction.

Where personalization of information attempts to cater information to individuals to make the information more usable, improved readability measures attempt to make information more easily understood through accessible language and typeface. Martin and Gottron (2012) report that a major problem with readability testing is that the differences between standard print media and web media are often overlooked. As gathered from my survey, the ways that consumers interact with information differs based upon the format of the information (digital or not). Based on my results, along with Martin and Gottron's finding, it stands to reason that specific readability testing of online-specific financial information deserves further research.

Anton et al. (2004) found that the readability of nine major financial institutions' online privacy policy information was, at best, "questionable." These institutions, which included Bank of America, Goldman Sachs, and Morgan Stanley, are required by the US Federal Trade Commission (FTC) to comply with legislation that dictates that the language of their policies must be "clear and conspicuous" (in accordance with the Gramm-Leach-Bliley Act, or GLBA). However, results of Anton et al.'s study found that "a full understanding of what two-thirds of

these organizations are doing is perhaps only available to one-sixth of those U.S. adults who are online” (p. 37). These results are staggering considering the increased numbers of access to online information since 2004.

Studies on readability have found that poor readability, or complex language and vocabulary, of financial information discourages customers from investing in financial institutions (Lawrence, 2013; Ajina et al., 2016). Shockingly, Anjina et al. found that financial institutions purposefully use complex language to obfuscate profit margins, which results in seemingly-smaller reported yearly earnings, or “big bath accounting,” in which financial institutions “take one big bath” in one year so that future years will appear to have achieved positive growth. This method is usually used during a year of low profit. This deliberate obfuscation of financial information isn’t a new concept to consumers, but the significance of these findings to my research is that, in the case of Anjina et al.’s research, financial institutions were taking advantage of their customer base through language—a particular frightening aspect to a population who is already targeted because of their purported vulnerabilities.

Limitations

This study was not realized without its shortfalls. The next stage of this research project would be to rewrite the survey in order to produce more meaningful results. Based on the results that older populations prefer to research financial information on their own, researchers must next figure out *why*. As I stated earlier, it is my presumption that it’s due to a dramatic increase in scams that target older people. Additionally, researchers must dig deeper to begin to understand the ways in which variables affect results. For instance, how do different economic and educational backgrounds affect attitudes towards financial information? Does gender play a role? How does marital status and number of dependents affect financial decision-making? What

about occupation? At what age do older people stop interacting with financial information, and how does that affect personalization? These questions and more must become part of this research endeavor in order to facilitate the highest quality personalization and increase in usability of financial information. Finally, and perhaps most importantly, researchers would ideally acquire many more participants than were attained for this study.

Suggestions for Software Development Using Eye Tracking

More and more financial institutions are going further than just providing important financial information online; banks like Bank of America and American Express have created highly rated phone apps that grant customers access to their accounts, as well as provide financial decision-making advice. Intuit Mint, a free online finance management website and app, gained quick success after its debut in 2007 and currently enjoys a user base of about ten million Americans and Canadians. There is a healthy number of studies that look at the different ways in which different age populations interact with information online (Fox, 2004; Hough, 2011); however, the research has largely neglected the world of finance and its growing relationship with the technology sector. I suggest now that developing and utilizing eye tracking software has the important potential of building a strong bridge between financial institutions, technology sectors, and technical communicators.

Eye tracking isn't a new field; its history dates back to the 1800s when researchers noticed that reading doesn't involve a smooth motion of the eyes but instead consists of fixations, or short stops of the eyes, and saccades, or quick movements of the eyes (Duchowski, 2003). In 1980, Just and Carpenter developed the highly influential "Strong eye-mind hypothesis" that suggests that no lag exists between what eyes see and what the mind processes; instead, it is a simultaneous process. Duchowski (2003) describes the benefits of eye tracking

methodology as facilitating a richer understanding of what visual information users find interesting and helpful. Although the hypothesis has been debated, as has the entire notion of eye-tracking methods, researchers continue to use eye tracking to better understand how consumers utilize online information.

Romano Bergstrom et al. (2013) studied age-related differences in website usability of five different websites for older populations by using eye tracking software and found that younger participants utilized peripheral webpage information significantly more than older populations. Additionally, older populations spent more time looking at the information in the center of the webpage and less time looking at the peripheral elements of the webpage; not only do older populations choose to use information in the center of the screen more often than peripheral information, they also spend less time looking at peripheral information. Doherty and O'Brien (2014) explicate the importance of such a finding in "Usability of Raw Machine Translated Output," in which they report, "Longer task times, higher fixation counts, and their average durations have been shown to be reliable indicators of cognitive efforts" (p. 45). Bergstrom et al. (2013) urge usability researchers to begin testing for age-related differences in preferences of location of webpage elements. Romano Bergstrom et al. (2013) do not state this notion explicitly, but I would argue that their suggestion is *directly* targeted at technical communicators.

Using eye tracking to develop financial programming that caters directly to older populations would depend on the collaboration between financial subject matter experts to provide the financial information, computer software developers to design and build the financial software, and technical communicators to improve the usability of the information provided to the customers through the software; this improvability would ultimately be achieved through

implementing practices of personalization and high-standard readability and legibility. While this endeavor would not be inexpensive, the benefits far outweigh the costs.

CHAPTER FIVE: CONCLUSION

The populations of older people living in developed countries are experiencing growth. On top of that, Wagner et al. (2014) report that older people are now making up the fastest increasing segment of Internet consumers, and access to the Internet has greatly improved in the last five years. While usability studies abound in fields such as medicine and engineering, research in the financial world is comparatively lacking and lackluster. Relationships between technical communicators, technology sectors, and financial institutions have the potential to redefine what it means to produce successful and useful information for aging populations—a demographic that needs useable financial information more than ever.

The extant literature on the usability of information for older populations is wide ranging, but it seems to have mostly stagnated. The need for more current research is growing ever quickly as older populations continue to increase in size, especially within the financial industry, where the research is most lacking. Results from my research demonstrate that there is a need to consider the different ways that people are leveraging online information, and to use that consideration to develop more usable financial information. Along with software developers and financial subject matter experts, technical communicators must continue to meet the high expectations that are often set of them. Selfe and Selfe (2013) describe these expectations that often emerge from the dynamic essence of technical communicators' multifaceted work: "Technical communicators are continually required to develop new and different skills—to produce, manipulate, and deploy linguistic and visual elements in different ways, for different purposes, and for different audiences" (p. 19). Technical communicators have the opportunity to use these skills to better the lives in aging populations through improved usability of financial information.

REFERENCES

- Ajina, A., Laouiti, M., & Msolli, B. (2016). Guiding through the fog: does annual report readability reveal earnings management? *Research in International Business and Finance*, 38, 509-516. doi: 10.1016/j.ribaf.2016.07.021
- Anton, A. I., Earp, J. B., He, Q., Stufflebeam, W., Bolchini, D., & Jensen, C. (2004). Financial privacy policies and the need for standardization. *IEEE Computer Society*, 4, 36-45. doi: 10.1109/MSECP.2004.1281243
- Arditi, A. (2004). Adjustable typography: an approach to enhancing low vision text accessibility. *Ergonomics*, 47(5), 469-482. doi: 10.1080/0014013031000085680
- Arditi, A & Cho, J. (2005). Serifs and font legibility. *Vision Research*, 45(23). 2926-2933.
- Chubaty, A., Sadowski, C., & Carrie, A. (2009). Typeface legibility of patient information leaflets. *Age and Ageing*, 38(4), 441-447.
- Centers for Disease Control. (2015). "Vision Health Initiative." *National Health Interview Survey*. Retrieved from <http://www.cdc.gov/visionhealth/data/national.htm>.
- Doherty, S., & O'Brien, S. (2014). Assessing the usability of raw machine translated output: a user-centered study using eye tracking. *International Journal of Human-Computer Interaction*, 30(1), 40-51. doi: 10.1080/10447318.2013.802199
- Duchowski, A. (2003). *Eye Tracking Methodology: Theory and Practice*. London: Springer Publications.
- Durkin, M., Filbey, D., & McCartan-Quinn, D. (2014). Marketing to the mature learner: exploring the role of web communications. *The Service Industries Journal*, 34(1), 56-70. doi: 10.1080/02642069.2013.763342
- Facebook. (2016). How does Facebook decide which ads to show me and how can I control the ads I see? Retrieved from <https://facebook.com/help/>

- Foster, F.D., Ng, J., & Wee, M. (2015). Presentation format and financial literacy: accessibility and assessability of retirement savings statements. *The Journal of Consumer Affairs*, 49(3), 519-549.
- Fox, S. (2004). *Older Americans and the Internet*. Pew Internet & American Life Project. www.pewinternet.org.
- French, E., Doctor, P., & Baker, O. (2007). Asset rundown after retirement: the importance of rate of return shocks. *Economic perspectives*, 31 (2), 48-65. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=984942
- Gambetti, R. & Graffigna, G. (2010). The concept of engagement: a systematic analysis of the ongoing marketing debate. *International Journal of Market Research*, 52(6), 801-826. doi: 10.2501/S1470785310201661
- Gonzalez, M.P., Lores, J., & Granollers, A. (2008). Enhancing usability testing through datamining techniques: a novel approach to detecting usability problem patterns for a context of use. *Information and Software Technology* 50(6), 547-468. doi: 10.1016/j.infsof.2007.06.001
- Graber, M. A., Roller, C. M., & Kaeble, B. (1999). Readability levels of patient education material on the World Wide Web. *The Journal of family practice* (48)1, 58-61.
- Greer, T. H. & Murtaza, M. B. (2003). Web personalization: the impact of perceived innovation characteristics of the intention to use personalization. *Journal of Computer Information Systems*, 43(3), 50-55. Retrieved from <https://ezproxy.lib.ndsu.nodak.edu/login?url=http://search.proquest.com.ezproxy.lib.ndsu.nodak.edu/docview/232576576?accountid=6766>

- Hart-Davidson, W. (2013). What are the work patterns of technical communicators? In Johnson-Eilola, J. & Selber, S.A. (Ed.), *Solving Problems in Technical Communication* (pp. 50-74). Chicago: The University of Chicago Press.
- Hartley, J. (1994). Designing instructional text for older readers: a literature review. *British Journal of Educational Technology*, 25(3), 172-188. doi: 10.1111/j.1467-8535.1994.tb00105.x
- Helmenstine, A. M. (2016). "Standard Deviation Equations." Retrieved from: <http://chemistry.about.com/od/mathsciencefundamentals/ss/Standard-Deviation-Equations.htm>
- Hough, M. (2011). Exploring elder consumers' interactions with information technology. *Journal of Business & Economics Research* 2 (6), 61-66. doi: 10.19030/jber.v2i6.2893
- Huang, E. Y. & Lin, C. (2005). Customer-oriented financial service personalization. *Industrial Management & Data Systems*, 105(2), 26- 44. Retrieved from <https://ezproxy.lib.ndsu.nodak.edu/login?url=http://search.proquest.com.ezproxy.lib.ndsu.nodak.edu/docview/234908986?accountid=6766>
- Huston, S. J. (2010). Measuring financial literacy. *The Journal of Consumer Affairs*, (44)2, 296-315.
- Hutchinson, N., Baird, G. L., & Garg, M. (2016). Examining the reading level of Internet medical information for common internal medicine diagnoses. *American Journal of Medicine* 129(6), 637-639. doi: 10.1016/j.amjmed.2016.01.008
- Just, M. & Carpenter, P.A. (1980). A theory of reading: From eye fixations to comprehension. *Psychological Review*, 87(4), 329-354.

- Kambil, A & Nunes, P. (2001). Personalization? No thanks. *Harvard Business Review*, 79(4), 32-34. Retrieved from <https://hbr.org/2001/04/personalization-no-thanks>
- Kaufman, D. R., Patel, V. L., Hilliman, C., Morin, P.C., Pevzner, J., Weinstock, R. S., Goland, R., Shea, S., & Starren, J. (2003). Usability in the real world: assessing medical information technologies in patients' homes. *Journal of Biomedical Informatics*, 36, 45-60. doi: 10.1016/S1532-0464(03)00056-X
- Kennett, P.A., Moschis, G.P., & Bellenger, D.N. (1995). Marketing financial services to mature customers. *The Journal of Services Marketing*, 9(2), 62-72. doi: 10.1108/08876049510086026
- Lawrence, A. (2013). Individual investors and financial disclosure. *Journal of Accounting and Economics*, 56(1), 130-147. doi: 10.1016/j.jacceco.2013.05.001
- Li, C. (2016). When does web-based personalization really work? The distinction between actual personalization and perceived personalization. *Computers in Human Behavior*, 54, 25-33. doi: 10.1016/j.chb.2015.07.049
- Li, C. & Kalyanaraman, S. (2013). "I, me, mine" or "Us, we, ours?": The influence of cultural psychology on web-based customization. *Media Psychology*, 16(3), 272-294. doi: 10.1080/15213269.2013.815049
- Lusardi, A. (2015). Financial literacy: do people know the ABCs of finance? *Public Understanding of Finance*, 24(3), 260-271.
- Lusardi, A. & Mitchell, O. (2013). The economic importance of financial literacy: theory and evidence. *The National Bureau of Economic Research* [Working Paper No. 18952].
- Martin, L. & T. Gottron. (2012). Readability and the web. *Future Internet*, 4, 238-353. doi: 10.3390/fi4010238

- Milner, T. & Rosenstreich, D. (2013). Insights into mature consumers of financial services. *Journal of Consumer Marketing*, 30(3), 248-257.
- Myers, H. & Lumbers, M. (2008). Understanding older shoppers: a phenomenological investigation. *The Journal of Consumer Marketing*, 25(5), 294-301.
- National Council of Aging. Top 10 Financial Scams Targeting Seniors. Retrieved from <https://www.ncoa.org/economic-security/money-management/scams-security/top-10-scams-targeting-seniors/>
- NDSU Extension Service. (2013, June). North Dakota's aging population: profile and trends of seniors ages 65 and older [Brochure]. Fargo, ND: Ramona Danielson.
- Patel, S. K., Gordon, E. J., Wong, C. A., Grobman, W. A., Goucher, H. A., & Toledo, P. A. (2015). Readability, content, and quality assessment of web-based education materials addressing neuraxial labor analgesia. *Anesthesia & Analgesia*, 121(5), 1295-1300. doi: 10.1213/ANE.0000000000000888
- Perrin, A. & Duggan, M. (2015). Americans' Internet Access: 2000-2015. *Pew Research Center*. June, 1-13.
- Ramnarayan, S. (2005). Perceived effectiveness of personalization. *Journal of Business & Economics Research*, 3(9), 41-50. doi: 10.19030/jber.v3i9.2807
- Romano, J. C. (2010.) Using eye tracking to examine age-related differences in web site performance. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting 54*, 1360-1364.

- Romano Bergstrom, J. C., Olmstead-Hawala, E. L., & Jans, M. E. (2013). Age-related differences in eye tracking and usability performance: website usability for older adults. *International Journal of Human-Computer Interaction, 29*(8), 541-548. doi: 10.1080/10447318.2012.728493
- Russell-Minda, E., Jutai, J. W., Strong, J. G., Campbell, K. A., Gold, D., Pretty, L., & Wilmot, L. (2007). The legibility of typefaces for readers with low vision: a research review. *Journal of Visual Impairment & Blindness, 101*(7), 402-415. Retrieved from <http://www.cnib.ca/en/services/resources/Clearprint/Documents/jvib010703.pdf>
- Schewe, C. (1988). Marketing to our aging population: responding to physiological changes. *The Journal of Consumer Marketing, 5*(3), 61-73. doi: 10.1108/eb008232
- Selfe, R. & Selfe, C (2013). What are the boundaries, artifacts, and identities of technical communication? In Johnson-Eilola, J. & Selber, S.A. (Ed.), *Solving Problems in Technical Communication* (pp. 19-49). Chicago: The University of Chicago Press.
- Srinivas, V. & Goradia, U. (2009). The future of wealth in the United States: mapping trends in generational wealth. *Deloitte University Press*. Retrieved from <https://dupress.deloitte.com/dup-us-en/industry/investment-management/us-generational-wealth-trends.html>
- Tinker, Miles. (1966). *Bases for Effective Reading*. Minneapolis: University of Minnesota.
- Wagner, N., Hassanein, K., & Head, M. (2014). The impact of age on website usability. *Computers in Human Behavior, 37*, 270-282. doi: 10.1016/j.chb.2014.05.003
- Xiao, J. J., Chen, C., & Chen, F. (2013). Consumer financial capability and financial satisfaction. *Social Indicators Research, 118*, 415-432. doi: 10.1007/s11205-013-0414-8
- Xiao, J. J., Chen, C., & Sun, L. (2015). Age differences in consumer financial capability. *International Journal of Consumer Studies, 39*, 387-395.

APPENDIX: SURVEY

1. Please circle your current age range:
 - a. <25
 - b. 25-34
 - c. 35-44
 - d. 45-54
 - e. 55-64
 - f. 65+

2. Think about your interaction with financial documents: bank statements, credit card statements and agreements, retirement and savings information, financial advice, mortgage agreement documents, etc. Do you prefer to research and understand these documents on your own, or do you prefer to have them explained to you from someone such as a bank teller, or financial adviser?
 - a. I prefer to research them on my own
 - b. I prefer to have someone explain them to me

3. Please indicate your general understanding of financial documents, in general:
 - a. I generally don't read the documents at all
 - b. I read them but don't understand them
 - c. I only understand some of the information
 - d. I understand a majority of the information
 - e. I understand the documents perfectly

4. Using "Y" for yes, and "N" for no, please identify what affects your understanding of financial documents:
 - ___ The length of the documents
 - ___ The language (vocabulary) used in the documents
 - ___ The organization of the document
 - ___ My background and experience with financial information
 - ___ My personal need at the time for the particular document
 - ___ The format in which the document is being delivered to me; i.e., whether the document is digital or not

Thank you for your time!