Ageist Attitudes in Workplace Technology Use

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Ageist Attitudes in Workplace Technology Use: Are We Teaching Older Adults They Cannot Learn?

Abstract

Given the increasing speed at which technology is advancing, even those who are currently comfortable with technology will likely eventually face issues with everyday use. This study examines a group of employees (n=10) in a small, intergenerational workplace, focusing on their perceptions about aging and technology to better understand any potential association between internalized attitudes about adults' age and their misuse or avoided use of technology in the workplace. This workplace is of specific value because they are in the process of adopting a new technological platform that will be essential to their work. Qualitative, semi-structured interviews were completed with the subjects, using existing models regarding technological adoption and perceptions of aging as the theoretical basis. Eliciting focused responses about a subject's specific interaction with technology as well as their views of aging and how it might relate to technology use allows for a narrower examination of how pejorative opinions of aging might impede one's own use of technology. Determining if any of the younger or older employees have negative attitudes toward aging that correspond with resistant or avoided use of technology will yield useful strategies to facilitate future technological training in other workplaces. These results will serve as the basis for a more extended, quantitative study in the future.

Introduction

As the average workplace continues to age, the current workforce retires later on average, and technology use becomes a more ubiquitous part of occupational life, tension in intergenerational workplaces may rise. By qualitatively examining the attitudes surrounding age and the difficulties and successes with technology, this study seeks to find solutions to commonly occurring occupational challenges. This small-scale, qualitative study will yield a workplace-specific intervention based around the subjects' responses, with potential for expansion to other workplaces. Additionally, it will serve as a pilot study for the continued examination of the association between attitudes toward aging and patterns in technology use.

Literature Review

The existing research on intergenerational communication establishes its complexity, layers, and nuance that make it a prime area for further research. Intergenerational workplace communication necessitates better understanding: the average retirement age continues to increase, and U.S. workers between 55 to 64 will grow an annual 0.4% from 2016 to 2026 (Lacey, Toossi, Dubina, & Gensler, 2017). More specifically, the interactions surrounding technology deserve attention because of its role as a ubiquitous tool in many occupations and its continually accelerating pace. The following reviews literature regarding various areas that pertain to intergenerational communication, with a focus on its relationship to technology and the workplace. Through a framework that weaves together communication theories, an argument is posited that justifies a workplace intervention targeted at intergenerational workplaces that experience technological issues.

Age Stereotypes

The hitherto research has yielded consistently complex conclusions on the implications of both positive and negative stereotypes about age. In their 2004 study, Hummert et al established that there are both general negative age stereotypes (e.g. shrew/curmudgeon, forgetful) and general positive age stereotypes (e.g. Golden Ager, wise) that people hold. Others have used these positive and negative stereotypes to examine their effects on adults of all ages (Kotter-Grühn & Hess, 2012; Levy, Zonderman, Slade, & Ferrucci, 2011; Rothermund, 2015). As with many pieces of the intergenerational communication puzzle, the results have been mixed regarding the precise effects of both positive and negative stereotypes. What is clear is that negative age stereotypes—and their corresponding, internalized negative effects on adults of all ages—abound.

There is a plethora of variables that potentially determine the onset, relevance, and exact effects of age stereotypes. Some studies show that early internalization of age stereotypes—before being considered old by society—leads to negative views of aging that then self-perpetuate into negative aging, including poorer physical health and cognitive performance in (Levy & Leifheit-Limson, 2009; Levy, Zonderman, Slade, & Ferrucci, 2011; Ohs & Yamasaki, 2017). The result is a cycle of stereotype-reinforced behaviors: those who most internalize negative stereotypes of aging are more likely to then self-fulfill into exhibiting negative stereotypes of aging. Other studies emphasize the role of self-relevance of aging as central to being affected by negative age stereotypes (Kotter-Grühn & Hess, 2012; Rothermund, 2015). In other words, they posit, until adults see themselves as "old", they are not impacted by negative age stereotypes.

One study (Kotter-Grühn & Hess, 2012) found that negative stereotypes can actually yield feelings of comparative superiority in the older adult subject who is exposed to a negative image of aging. Conversely, they also found that those exposed to positive stereotypes can feel worse about themselves. These reactions have been attributed to the downward and upward comparison effects, where those who see someone worse off than they are feel better by contrast, and vice versa (Markman, Gavanski, Sherman, & McMullen, 1993). Such mixed results from research, like those outlined here, indicate the complex nature of aging stereotypes and the subsequent counterintuitive reactions they can elicit. These results also emphasize the complicated psychology behind aging and age stereotypes in our society. A thorough examination of both the negative and positive responses to all types of age stereotypes will establish the best basis on which to lay a foundation for a workplace intervention.

Kotter-Grühn & Hess (2012) were specifically interested in the self-perceptions of aging by focusing on aging satisfaction and subjective age, before and after exposure to age stereotypes. In their 2012 study, they looked at a wide age range of adults (18-92), and split them into three commonly identifiable age groups: younger, middle-aged, and older. After the respondents completed a questionnaire to indicate their self-perceptions of aging, which included self-reporting their subjective age[1], they were primed with either negative, positive, or neutral visual stereotypes about aging and older adults. Respondents exposed to the stereotypes then repeated the self-perceptions of aging questionnaire.

This study found that middle-aged and older adults felt and wanted to be younger, congruent with the original hypothesis and the authors' theory of age bias in these groups. As age increased, subjects reported subjective ages that were incrementally younger in proportion to their chronological age, indicating a preference toward a younger, ideal age. Positive stereotype priming elicited neither younger subjective ages nor higher age satisfaction for these groups, indicating that the exposure to positive stereotypes does not have a subsequent positive impact on their perception of aging. The middle-aged and older respondents who self-reported good health actually felt older in comparison after positive stereotype exposure, resulting in lower scores for self-views of aging in these groups. This reaction can be credited to the aforementioned social comparison effects. All three age groups, most notably the younger adults, reported younger desired ages after negative stereotype priming, indicating that these negative images encourage an internalization of negative views of aging from an early age. Additionally, all three age groups reported that they looked younger than their chronological age, suggesting a self-bias for younger appearances even in the youngest age group.

[1] Subjective age is examined by the self-reporting of felt age, perceived age, and desired age. For more information on subjective age, see Kastenbaum, Derbin, & Artt, 1972; Montepare, 2009.

This study indicates that the issue of positive stereotypes or images of aging does not necessarily offset the negative effects of negative images. Applied to the technology intervention here, these studies suggest an approach that must consider such nuances in how adults are affected by positive and negative age stereotypes. Based on these results, simply presenting positive age stereotypes to older workers is not enough to elicit positive views of aging. These studies underscore the continued study of stereotype effect research, as well as the mixed results that obfuscate the best approach to mitigating such negative reactions to age.

Effects of Age Stereotypes on Performance

Other research has wholly demonstrated the concrete, harmful effects that negative stereotypes about age have on older adults' physical and cognitive performance. The subliminal age stereotype priming done by Levy and colleagues is of particular strength when considering the ecological validity of the research examining explicit stereotype priming (Levy & Leifheit-Limson, 2009; Levy, 2003; Levy, Zonderman, Slade, & Ferrucci, 2011). Since real-world experiences with stereotypes are not always explicitly conveyed or realized, these studies are crucial to the understanding of how older adults may be experiencing unconscious, negative age stereotyping that could potentially affect their performance with technology.

A cross-sectional study about the effects of implicit aging stereotypes found that exposure to positive and negative age stereotypes regarding both physical ability (balance) and cognitive ability (memory recall) impacted the subjects' performance in these areas (Levy, 2009). The study found corresponding results for both the positively and the negatively primed participants. There were four groups each for the cognitive test and for the physical test: positively primed for cognitive, positively primed for physical, negatively primed for cognitive, and negatively primed for physical. For the memory test, those exposed to positive age

stereotypes regarding cognitive ability (e.g. “sage”) performed the best out of the four primed groups. The subsequent rating of the three groups was as follows: positively primed for physical, negatively primed for physical, and negatively primed for cognitive.

Likewise, for the balance test, those exposed to the positive age stereotypes regarding physical ability (e.g. “hardy”) exhibited the same pattern in results, performing the best of the four groups. The subsequent three scores for this test were the following: positively primed for cognitive, negatively primed for cognitive, and, lastly, negatively primed for physical. The study additionally yielded a larger difference between the positive and negative groups for the respective testing area, further indicating that the negative priming exacerbated disproportionate negative reactions and performances for that area. It is vital to emphasize the subliminal nature of this stereotype exposure. The stereotypes were presented in a visual system designed for the specific processing speed of the viewer so they could perceive but not consciously register the stereotype. This subliminal delivery is meant to mimic the way that older adults experience ageist stereotypes, as well as their own internalization of such stereotypes. The significance of these results is paramount for the field of intergenerational communication, as they indicate the significant and measurable effects of implicit stereotypes on one’s physiological abilities.

Extending these results to adults’ use of technology, and to the interactions they experience surrounding technology, would be useful in developing an intervention program. Levy’s work establishes that when adults unconsciously perceive stereotypes about age, their abilities in both physical and cognitive arenas are correspondingly affected. Additionally, her work adds to the research base indicating that older adults internalize positive and negative stereotypes about their age. Levy’s studies on unconscious age stereotype effects can be tied to the patterns of the Communication Predicaments of Aging (CPA) model (Ryan, Hummert, &

Boich, 1995). This model, which integrates the Communication Accommodation Theory (Giles, Mulac, Bradac, & Johnson, 1987), emphasizes the cyclical problems common to intergenerational communication. As Hummert et al (2004) detail in their review, interactions between younger and older communicators can begin with the younger person projecting ageist attitudes onto their older counterpart. Unconsciously, the younger party begins the communication process with preconceived notions about the older respondent. Subsequently, and also unconsciously, the older communicator responds in a way that fulfills this projected stereotype, and the cycle continues.

This same notion of such self-fulfilling prophecies is central to Levy's work, and a technological intervention in the workplace should work to combat this cycle. Based on these models and the demonstrable research by Levy, the often-unperceived negative effects of ageist attitudes toward older employees could be a key piece in supporting workers of all ages. This approach would be especially useful in the realm of older adults' interactions with technology, since many report insecurity and anxiety using computers (Morris & Venkatesh, 2000; Czaja, et al., 2006), as well as with the intergenerational communication in the workplace that results from such technology use. While there are studies that look at older adults' use of and attitudes toward technology (Czaja, et al., 2006; Morris & Venkatesh, 2000), there has not been research done to look at how unconscious age stereotyping may affect their performance with technology. Conducting tests that use Levy's model of implicit stereotyping as it relates to middle-aged and older adults' use of technology in the workplace would be a great contribution to this research.

Another question regarding age stereotypes is if they are internalized at an early age or if they develop at an older age, such as when someone self-identifies as "old". This lack of certainty results from a common issue in the study of aging and the effects of aging stereotypes

on older adults: the lack of longitudinal studies. Due to the relative novelty of the field, few longitudinal data are available for study. However, a study mitigating this dilemma used 38 years of survey data from the Baltimore Longitudinal Study of Aging. The researcher hypothesized that those with negative views of age at a younger age at the initial timepoint would have poorer scores on memory recall tests at an older age (over 60) at the second timepoint (Levy, 2012).

The results were congruous with the hypotheses: the study proved that those with more negative age stereotypes as younger adults in the initial timepoint performed worse in memory tests in the latter timepoint. More specifically, those in this group that were over age 60 at the time of the later 2012 study exhibited a 30.2% higher decline in memory than those who had positive views of aging as young adults in the same age range. Similar to her previously mentioned studies, the significance of this finding should be emphasized. Prior, cross-sectional studies of the same physiological effects of aging stereotypes could not be deemed as ecologically valid due to their limited nature. Levy's longitudinal work firmly suggests the early internalization of stereotypes about age, as well as cementing the measurable, negative effects of such internalization on one's physiological abilities as s/he ages. These results should also be considered for the workplace intervention outlined here. In order to combat the early internalization of negative age stereotyping about technology, a study should examine the attitudes of younger—not just old—workers' attitudes toward aging. The subsequent intervention should focus on correcting the internalization of negative age stereotypes in workers of all ages in order to prevent the deepening of such stereotypes and the eventual poor performance with technology that, according to the studies above, may result.

Both Levy's cross-sectional and longitudinal studies underscore both the short-term and long-term effects of internalizing implicit age stereotypes. The basis of Levy's research around

the effects of implicit age bias is fundamental to the applied study of ageism in workplace technology communication. In the context of this workplace intervention, studies in this realm could prove crucial to supporting older adults' competent use of technology. If an association between the delivery of positive implicit age stereotypes (e.g. wise or more world experience) and competent performance with technology could be established, strategies that focus on the delivery of compassionate, positive messages about aging could be woven into either technology instruction or the daily interactions about technology that older and younger co-workers have.

Technological Use by Age

Technology is increasingly more used by all ages, in and out of the workplace. Adults of all ages are using the Internet at a higher rate than ever before, and 85% of Americans believe that it is very important or extremely important to understand technology for use in the workplace (Pew Research Center, October 2016; Pew Research Center, April 2014). When examining the specific tendencies of different ages, studies have found differences in the way younger, middle-aged, and older adults use computers, how they troubleshoot technological issues, and their self-reported computer anxiety (Czaja, et al., 2006; Morris & Venkatesh, 2000). Cognitive testing has revealed that older adults have higher levels of crystallized intelligence and lower levels of fluid intelligence; the opposite is true for younger adults and middle-aged adults (Czaja, et al., 2006). According to Czaja et al, fluid intelligence is indicated by the ability to reason, and crystallized intelligence is indicated by world knowledge. In this study, tests to measure both types of intelligence showed that younger and middle-aged adults exhibited similar levels of higher fluid intelligence and lower crystallized intelligence when compared to the older adults. Indicators of computer use for the older group in this study were primarily attributed to

prior experience with computers; higher fluid intelligence and crystallized intelligence were both positively related to higher rates of computer use.

These studies are hopeful for the inclusion of middle-aged and older adults in technological use, given that there is evidence that both attitudinal variables and cognitive abilities predict computer use. Prior use of computers may not be enough to support their continued tech use as devices, programs, and applications continue to evolve. As such, technological training intervention should place more emphasis on other areas that predict computer use in middle-aged and older adults, such as their technological self-efficacy. Czaja et al (2006) identified that computer self-efficacy impacted users' computer anxiety, and that fluid intelligence impacted crystallized intelligence. This finding suggests that equipping adults with the skills and confidence to use technology, perhaps by emphasizing their prior use but not limiting them to that, could improve their use of technology.

The emphasis on crystallized intelligence, which is typically higher in older adults, is important when considering a tech intervention program. Crystallized intelligence indicates a larger breadth of knowledge and some scholars have found that this could cause more difficulty with memory recall (Czaja, et al., 2006; Strom & Strom, 2015). As such, what older adults may perceive as their lack of ability in using technology could be the result of slower information processing. Technology instructors and developers of technology platforms should consider this regarding older adults' use and learning of new technology. Additional considerations should be made given the lower rates of computer use and technological experience in Black and Latino populations to examine socioeconomic factors that could contribute to this trend (Czaja, et al., 2006).

Lack of Intergenerational Contact

The lack of intergenerational interaction is exacerbated by the effects of modern communication technology (Strom & Strom, 2015). The same study reiterates that an outcome of such an age-segregated society is that younger adults new to the workforce have often not had regular exposure to older adults outside of family members, a finding in previous literature as well (Signorielli, 2004; Jarrott & McCann, 2013). Lacking such contact, especially in a workplace setting, means not having experience in working alongside or troubleshooting issues with older colleagues. This notion runs parallel to the principal theme of this review. Understanding the widespread problem of age segregation will yield applicable strategies to mitigate similar complications in the workplace.

Allport's (1954) contact theory has previously been employed as a framework to emphasize the impact of negative representations of older adults in the media on subjects who lack intergenerational contact (Jarrott & McCann, 2013). Its application to workplace interactions also stands. Strom & Strom (2015) summarize reports from managers in the United States, who reported that one of the leading causes of not hiring recent graduates was their inability to acclimate to working with people of other ages. Further, the acceleration of communication via technology (i.e. social media) is potentially furthering the age divide. The same review reports on the usage of such technology by different age groups. Older adults tend to spend time on social media to talk with their own peers; likewise, younger adults tend to spend time on social media talking with their own respective peers. Despite the increase in and ease of accessibility, not much interaction occurs among different age groups in these online spaces.

Research has established that media representations of older adults are largely negative, and that these representations can negatively impact the perceptions of adults of all ages (Jarrott & McCann, 2013). These tendencies, combined with the common lack of contact with older

adults, are reason to look further into these perceptions and the negative attitudes toward older adults that might be a self-perpetuating cycle. The added complication of the continued age divide in technology communication warrants specific research into a combined area of intergenerational communication regarding technology in the workplace.

Bias in Research

Strom & Strom (2015) detail the inherent bias in memory recall testing in many empirical studies that is meant to determine cognitive ability. They posit that the kinds of intelligence typical in younger versus older adults skew the cognitive testing in favor of the younger demographic. Younger and middle-aged adults have higher levels of fluid intelligence, and older adults have higher levels of fluid intelligence (Czaja, et al., 2006; Paggi & Jopp, 2015). Since the memory recall testing depends largely on information processing speed, there could be proof that such testing is not wholly indicative of true cognitive ability (Ramscar, Hendrix, Shaoul, Milin, & Baayen, 2014).

Modifying the model to factor in differences in vocabulary and knowledge breadth, high levels of which are both indicators of crystallized intelligence, accounted for 75% of the differences in the younger and older groups. Such bias in alleged cognitive ability testing requires further examination and potential rectification in future studies. Likewise, similar approaches should be made in the technological instruction to middle-aged and older workers, who may exhibit higher levels of crystallized intelligence instead of the fluid intelligence that lends itself to higher rates of tech adoption in adults of all ages (Czaja, et al., 2006; Morris & Venkatesh, 2000). In an instructional context, emphasizing the abilities of certain age groups, in lieu of skewing the pedagogy design to fit the younger age paradigm, will support the adoption and continued use of technology in the older age groups.

Occupational Self-efficacy

Negative self-views of aging are related to lower occupational self-efficacy, which correlates with lower life satisfaction (Paggi & Jopp, 2015). We also know, from the same study, that much of the existing research on workplace psychology centers around the study of younger employees. This bias adulterates the holistic understanding of workers of all ages, thus limiting interventions that could circumvent the very issues central to this review. Studies should continue to reframe the paradigm in occupational studies to focus more on the middle-aged and older adults, as this one proposes to do.

Adults of all ages report higher levels of computer use and proficiency when they feel higher levels of computer self-efficacy (Czaja, et al., 2006). Further, older workers' occupational self-efficacy positively affects their job and life satisfaction (Paggi & Jopp, 2015). The use of computers and technology is increasing across U.S. workplaces (Pew Research Center, October 2016), where the average age continues to climb as the retirement age increases (Lacey, Toossi, Dubina, & Gensler, 2017). Computer anxiety and the negative feelings associated with technology use likely lead to lower feelings of occupational self-efficacy and therefore lower job and life satisfaction. By empowering middle-aged and older adults and equipping them with the confidence to improve their relationship with technology, the research and intended intervention shows strong potential to ameliorate the lives of older adults, in and out of the workplace.

Proposed Intervention

By identifying common issues in intergenerational communication, along with using existing theories that explain such issues, this paper proposes an intervention aimed specifically at the technology issues experienced in an intergenerational workplace. Research has focused on the occupational self-efficacy of older workers and linked it to higher job and life satisfaction (Paggi & Jopp, 2015). Other studies have examined the motives that drive certain older adults to

adopt technology and others not to (Czaja, et al., 2006; Morris & Venkatesh, 2000). Lacking in the current research tome, however, is the potential link between technological self-efficacy and occupational self-efficacy, which will continue to be an important topic of study as workplace technology remains integral to many jobs (Pew Research Center, October 2016). An additional area that deserves attention is the effects that unconscious age stereotype priming has on technology performance and use in older workers. The data from this intervention would be useful in conducting expanded research to study these effects.

There is significant research about self-views and self-perceptions of both age and technology (Rothermund, 2015; Kotter-Grühn & Hess, 2012; Czaja, et al., 2006). An area with less research is understanding how older and younger co-workers interact around common technological issues. The present proposal seeks, through qualitative interviews and surveys regarding technological interaction in an intergenerational workplace, to better understand these communicative processes and to identify issues common in workplace technology use, focusing on the respondents' perception of age and its role in the adoption and use of technology. By intertwining the empirical studies that prove the long-term internalization and effects of implicit age bias with the Accommodation theory and the Communicative Predicament of Aging models, we will develop an intervention strategy based on the self-reported experiences of employees in the context of using and communicating about workplace technology.

Research Questions

RQ1: Is there an association between negative perceptions of aging and misuse or avoided use of technology?

RQ2: What techniques and strategies can be identified to help support those who experience computer/tech anxiety?

RQ3: What are some of the barriers to learning or using technology?

Methods

Sample

The sample is a purposive sample of ten members of an intergenerational workplace who are all of the same occupational level. These ten employees span in age from 31 to 62 and represent each decade, allowing for a relatively wide examination for the small sample. To categorize the ages, the researchers used the definition in the Age Discrimination in Employment Act of 1967 (ADEA): employees over the age of 40 are considered older workers. As such, the 10-person sample can be split into two equally-sized groups: five subjects fall into the younger group; five subjects fall into the older group. For purposes of the analysis, further description of age (e.g. "lower end of the older group") may be utilized to indicate if a participant falls in the older or younger end of each age category.

The demographics form for this study allowed each participant to self-describe their race/ethnicity in an open text field. The breakdown is as follows: 2 Latino/Hispanic; 4 White/Caucasian; 4 Black/African-American. The highest level of education for all ten participants is a Master's degree. Each participant being of the same occupational level within the organization acts as a control: all subjects have the same job description and expectations. This was purposive in order to examine if there might be different expectations surrounding technology use and proficiency despite having the same job. The researcher selected this workplace because they are currently rolling out a new technological platform that will be required for their work. This provides the opportunity to ask about their specific feelings about this new platform in addition to their general perceptions and use of technology.

Procedures

A semi-structured, in-depth interview was conducted for each participant, who also completed a technological use survey. The interview focused on the subjects' general feelings on

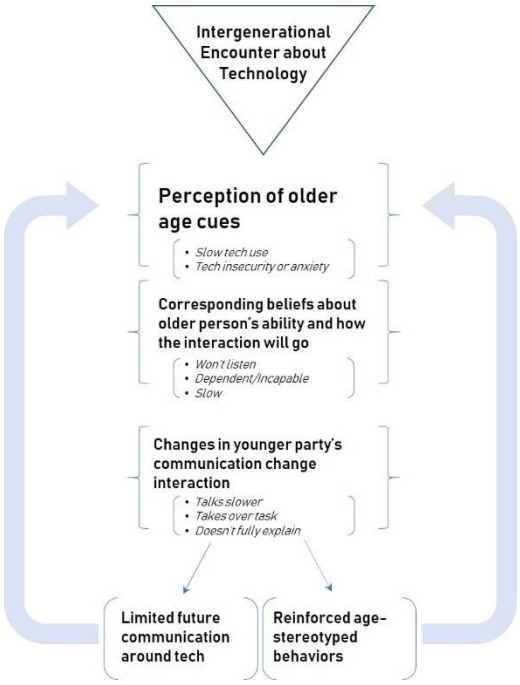
aging, on technology, and any associations they make between growing older and learning new technology. The interviews were audio-recorded and transcribed and are in the process of being coded for further analysis. The survey asked: age of first use, frequency of use, and location of use for a variety of devices, software, and programs. Researchers did not reveal the study's focus on aging until a debriefing session. The technological use survey and demographics form can be found in the appendix.

The qualitative nature of this study and its analysis intends to provide a deep and nuanced understanding of the relationship these individuals have with technology. The semi-structured interviews allowed for a deep, individualized exploration of subjects' responses. A deliverable of this project will be a workplace-specific intervention for technology adoption and use. Additionally, the results will also be pilot data for an extended, survey-based study surrounding the larger-scale rollout of the same technological platform examined here. The qualitative focus is foundational to garnering a holistic understanding of how to best design future studies. Further, qualitative processes have been helpful in other research regarding age; see Wheaton (2017) and Atkinson & Herro (2010).

Theoretical Framework

Components of tech adoption scales were used to develop the interview questions and survey. A guide for the initial interpretation of responses, and for developing an intervention program and future studies is the Communication Predicaments of Aging Model (Ryan, Hummert, & Boich, 1995), which is based on elements of Accommodation Theory (Giles, Mulac, Bradac, & Johnson, 1987). A modified model as it relates to intergenerational communication about technology can be found below.

Conceptual Model



Analysis

The analysis as thus conducted is meant to overview the general, emergent themes that surface from initial reviews of the data. To explore the data, the audio recordings of each interview were examined and salient motifs noted. In the future, a more in-depth, thorough analysis informed by the grounded theory approach of Strauss and Corbin (1998) will inform the subsequent coding process to further categorize the interview responses.

Preliminary Results and Discussion

The interview responses give a wide idea of how one's age—and perception of age—may impact his or her relationship with technology. They yield additional insight into barriers to technology use that will be crucial to designing strategy to encourage tech use in the workplace. More specifically, there is evidence of discrepancies in generational proficiency of technology use that might threaten workplace rapport. Some themes from the data bled across age divisions, while many others had clear distinctions between the two age groups.

Troubleshooting Tech Issues

A key piece of the study is the communicative relationship among intergenerational co-workers as it relates to their interactions with and about technology. The results indicate differences between the older and younger workers when troubleshooting technological issues. Of the younger subjects, four out of five responded that they first try to find information online (e.g. Google), and only ask someone as a final step. One of the younger respondents, age 31, simply said, "I Google it." Three others in the younger group answered similarly. The only younger subject to first reach out said s/he contacts the IT department, not a co-worker, saying "I'm always e-mailing them for something." Two respondents on the lower end of the older group both indicated that they lean toward the younger group's troubleshooting steps:

> "If I couldn't find it on YouTube, I would probably ask someone who did it, like if I saw it done by somebody I would probably go ask…I know the first thing wouldn't be to ask, the first thing would be to figure it out myself and then ask." (age 41)
>
> "I'll just keep rooting around until I figure it out…I make the assumption that there isn't anything I can click on that will break this." (age 42)

Two older respondents tend to reach out to co-workers or others around. One, age 49, indicated that s/he gets "someone to assist" before Googling. The oldest respondent, age 62, answered that s/he calls "someone who knows more," and when asked who that usually is, s/he said, "[I]f there's a colleague I have who I know is more proficient, because they're younger, I call them." An interesting point was made by a younger employee, who acknowledged both needing occasional help from co-workers and the tension when approached by a co-worker for tech assistance:

> "I know when I've been on the receiving end of help for technology, I know I'm kind of rolling my eyes inside. Like, ok, you know, what seems simple to me is not maybe simple to someone else…I think my first response [to the person] is just look it up on Google, figure out how to use it, but I know not everyone does that so I think it's...I feel like there's some tension about going to each other for help with technology." (age 35)

This point indicates a threat to workplace rapport. The intervention meant to help all ages in the workplace adopt and use technology should focus on how all employees can first attempt to troubleshoot on their own technological issues. Additionally, it should include compassionate strategies for communicating with older employees about their technological mishaps and concerns. However, not all answers in the older cohort were consistent with reaching out to co-workers for help as an initial step in the tech troubleshooting process. One older worker said:

> "I try to figure it out myself by clicking on everything, then I try to Google it, and then I try to access younger folks that are tech—if it's very particular to my work, I e-mail a co-worker, and then I set up a time to talk to them." (age 51)

This is hopeful evidence that the tendency to first reach out to a co-worker before searching on the Internet for help is not limited to age. Another older worker indicated both a willingness to look for an answer alone yet a fear of the jargon that tech professionals use:

> "I will try to play around with it myself for a little bit. And if I can't get it, I will ask a colleague if one is available. My last resort is usually calling for tech support and that's because they talk very fast-paced. I don't usually understand their language and I feel dumb!…They mean well but if you don't really understand what they're talking about, and I have to say to them, 'Ok, I don't really understand technology like you do and I don't know your terminology at all...I don't wanna be bothered with that." (age 54)

It is worth pointing out that in addition to the avoidance of communicating with tech professionals, this last respondent indicated insecurity in asking co-workers for help, which may explain this avoided communication on both levels, as well as the overall insecurity s/he feels around technology. An additional comment from this same respondent:

> "I get frustrated with having to ask so many times, especially when there are people who move faster than you do. And they may not think that, but to me they're thinking, 'Ugh what's wrong with her? She can't get that?' and so that makes you—I don't really ask when I need to ask. I try not to bother when I don't have to." (age 54)

This last commentary indicates a potentially harmful tendency that resembles elements of the CPA model. The limited scope of this project, and of this conversation, does not allow for a

clear explanation of what makes this respondent feel that others are assuming she is slow or behind. What is clear, however, is an association between this subject's insecurity about asking for help and an impeded relationship with technology. Such insecurity in asking leads to the lack of feeling proficient with technology, which could be a cyclical relationship that will perpetuate without intervention.

Technology Anxiety

The interviewer asked a direct question about if the subjects ever experienced tech anxiety[2]. Younger respondents primarily distinguished that they experience frustration but not anxiety with technology. To resolve such feelings, one subject, age 35, said s/he "take[s] a deep breath and get[s] started and then it usually goes away." Regarding the anxiety that stems from the fast pace of technology, one younger participant answered:

> "Rapid progression of the expectations around technology even in the last 10 years and the last 5 years, it's just changed so much. I don't know that our brain—we're still humans. The technology is able to do all of this stuff but we're still human and only able to—like our capacity is not that of a machine…So I don't know that we are sort of matched up to the abilities of a machine, if that makes sense." (age 34)

Feeling overwhelmed about technology's pace, and of the heightened expectations about technology in the workplace, is an area that needs attention when considering an intervention. If younger employees like this one, who otherwise exhibited tech competence, are indicating exasperation, measures to assuage such anxious feelings should be incorporated.

The older participants had more extended answers regarding such technological anxiety, particularly related to their insecurities about age and fear of not being able to undo a mistake. One said:

> "I feel my anxiety comes from feeling like people think that I'm an idiot because I'm older or I'm not getting it or I'm not with technology and I'm thinking no, because I try to

[2] The interviewer defined tech anxiety as "the degree to which the usage or idea of using technology arouses unfavorable feelings and fear."

> explore it. And so that's my anxiety. That I feel like I need to do things and that I feel like sometimes technology doesn't work with me…" (age 51)

Again, we see an association between assumptions a person is making about how others are viewing age and the lack of proficiency with technology. There is not consistent evidence within this study population that there are clear projections being put on to any of the older subjects; nevertheless, there is self-reported anxiety that stems from this perception.

Though not in direct response to the question about tech anxiety, one older subject gave an example of tech anxiety regarding experiencing tech issues:

> "My fear is always that I'm going to do something and then lose it and I won't be able to get it back…it makes me a little hesitant to explore because then I'm thinking I'm going to do something to mess it up." (age 62)

The most emphatic, thorough example of tech anxiety came from the 54-year-old participant:

> "All the time. I do. I mean, physically. I can feel my heart beating faster, and I get really anxious and it's like I'm shaking but I'm not shaking…especially if I'm in a group and I need to catch up, or keep up. It's like, this is not working." (age 54)

This participant repeatedly indicated anxiety with technology, technical issues, communicating about technology, and age as it related to technological ability. Though the only subject to consistently relate these themes in such an overt, physiological way, strategies specific to this workplace and beyond should be implemented to explore, understand, and mitigate such heightened anxiety in some individuals.

One self-described "tech savvy" member of the older group, reported that s/he has overcome tech anxiety in one specific area:

> "So, I used to. I don't have it anymore. But where I used to was with my calendar. I was always like a paper calendar, everything was written, and I could not get into having an electronic calendar. I was like scared, like it was bad—I couldn't do it. And even if I had it electronically I'm still gonna write it down…I slowly just came out of that and now I have a purely electronic calendar, I don't write anything down anymore." (age 41)

Having members of workplaces like this participant could be an interesting technique in bridging the gaps between generations. At 41, this subject is on the lower end of the older age group, reports little to no difficulty and high confidence with familiar and new technologies, and understands the utility of switching over from analog to digital mechanisms. Potential “bridges” like this individual could be identified and appointed as a kind of peer support to help the older workers understand the use and function of new systems and technology. This appointment would need to be built into the business model of the workplace to ensure correspondingly appropriate compensation.

Tech Avoidance

The interviews demonstrate a wide variety of tech avoidance in many ages. Some respondents indicated a sweeping avoidance of any technology they did not understand or feel comfortable with:

> “I think I do it a lot. I'll avoid it but then I have to do it.” (age 49)
>
> "If I could, I probably would not use technology so much. Not that that's a good thing, but I just don't want to be bothered because it is anxiety-inducing. So I would rather get my information another way. I really would." (age 54)

This same 54-year-old subject admitted to avoiding technology “as often as possible.” Avoidance of technology also surfaced in the younger group:

> “I have been known to procrastinate and avoid [new technology]." (age 35)

One younger respondent admitted to avoiding the landline conference phone in the office, saying it was less intuitive than conferencing on an iPhone. Of the iPhone conferencing:

> "Anyone can do it. And I say that, I'm sure there's someone who's like I don't know how to do this but it's just so intuitive." (age 34)

This is an interesting example, as a younger employee avoids an older form of technology that is similarly unfamiliar as new technology may be to the older workers. Examples

like this could be utilized in instructional moments to remind older workers that the devices they grew up with are similarly unfamiliar to younger adults. Likewise, these moments could remind the younger workers that unfamiliar technology is hard for anyone, regardless of age, and to be patient and compassionate when considering a co-worker's struggle with technology. Other members of the younger group avoid social media:

> "I don't tweet, I'm hardly on Facebook, I don't use my Instagram account, I have a Pinterest board floating somewhere." (age 35)
>
> "I don't really like Snapchat because I feel like I'm a little too old for that." (age 34)

One member of the older cohort gave an example of being a reformed avoider of technology, explaining that for years s/he did not trust the digital calendar, but did not report any other avoided technology. The automatic reminders on the digital calendar were key to this decision to switch:

> "I'm like OK, like this really is…my paper planner can't give me a reminder. If it's closed I'll forget about it. So it's just all the reminders and everything." (age 41)

In some instances, the reported avoidance resulted in disappointment with not being able to perform the desired task:

> "And it's frustrating because I did the same thing I did before, but it's not doing it. So instead of getting frustrated, which I wanted to, I just decided, ok I won't do that. I just won't use that picture, which is disappointing to me." (62)

This employee exhibits not only a knowledge of technology that is inconsistent, but one that undermines the potential of interactive, digital work technologies. Such negative experiences could affect employees' occupational self-efficacy, thus negatively affecting their overall happiness (Czaja, et al., 2006; Paggi & Jopp, 2015). In the older group, there were also patterns of strategic avoidance of technological elements when not crucial to their job or project, sometimes leaving a burden on the more tech savvy colleagues:

> "When we do projects, I always volunteer for things that don't have to do with technology so I don't have to deal with that. So if there's somebody on the team that knows how to deal with it, I'm like…go for it. Cause I'm always nervous it's not gonna come through." (age 51)

> "At this stage I want to start slowing down, not speeding up…I'll learn something when I really want to learn it, but if it's not a deep desire, it's like I just don't wanna be bothered. I don't wanna think that hard." (age 54)

Such strategic avoidance of unfamiliar technology, while a temporary solution for the older workers, might be creating an uneven workload for younger workers who receive the subsequent tasks. Obligation from managers, and providing training for these employees, could even out this reported inequitable use of technology, whether for those who are simply not completing tasks because they are not necessary, or requiring other, likely younger, workers to complete the technological components of group projects.

Generational Tech Use

Another recurring theme in the interviews is generational differences as they relate to use of technology. At times this was self-relevant, as it related to respondents' peers and their views on and use of technology, in both the older and younger groups:

> "Older people are more rebellious… I think it's fear. It's, you know, it's difficult in the beginning so you shy away from it, and we feel like usually people that are teaching you, their language is too different and they move too fast, and you don't get it so you don't wanna be bothered because it's gonna take way too much energy and time and you don't feel like your brain can absorb all this stuff so it's like no, if I can't get somebody to do it for me, I'm just not gonna do it. It's scary." (age 54)

Again, this respondent suggests that fear of judgment by those conducting the instruction of technology. This might mean either IT professionals or fellow co-workers. In either case, it displays a deep need for a compassionate, intelligible instructional format that considers the discrepant knowledge base of many ages, personalities, and experience levels. In the younger cohort, we also see acknowledgement of how negative attitudes toward technology changes can lead to misuse or nonuse:

> “My age group is more comfortable with the pace of technology, just like a person who was 31 in 1960 would have been more comfortable with the pace of technology then. It's just a matter of like being young and having adapted along the way to those technological changes. And then you become stagnant just naturally because you have other priorities that take over your life.” (age 31)

> "Sometimes you have people in a generation who go, ‘But this is where it stops, this is really just too much technology’…And I even find myself doing it. Like I remember when smart phones came out. I was like…I can't imagine, like why do you need that? And I was probably in my early 20's at the time and now at age 34 I have a smart phone and I can't put it down!" (age 34)

Here we see two examples of how people in every generation can be stubborn in adapting to evolving technological demands. Even though both respondents believe this is an unhealthy outlook, the first implies that it is natural to become stagnant due to “other priorities.” The second admits to being part of that way of thinking, while acknowledging the eventual opinion reversal. Hedging these tendencies, perhaps by consistent training and assessments, should be a large part of the technological intervention.

In the older group, there are two instances of individuals on the younger end of this group both feeling left out by technology advances and wanting to stay included:

> “I'm right in the middle age-wise, so I'm not young anymore. Like so I used to say, like, I feel like it's always the young people that are gonna know how to do more. So I'm getting old (laughs), so I'm getting to a place where I'm like, ok let me figure this out whereas young people just do it naturally so I'm in the middle.” (age 41)

> “I don't get [Snapchat] and I'm not supposed to get it… but I kind of get it because then I want to figure it out and I don't want to get left on the side.” (age 42)

Both of these individuals self-described as technologically competent and reported little to no anxiety with most new technology. However, when discussing their use of other forms of technology, they both reveal feeling excluded as it comes to tech advances, particularly in relation to their age.

In the end of the interview, when discussing the generational differences in technology use, respondents gave a variety of answers:

> "When I have to create PowerPoints…and I can't figure out how to do it. So with my 20-year-old daughter I was like I need help with this, this is what I want, this is what I did, I can't get to point B. Help me, show me how to do this. So even if she doesn't know, because she grew up with that, she can usually figure it out and then I have to get her to show me how she did it so that now I can do it...for the laptop, for the phone, ask your kids. Even my 13-year-old, 'Hey! Can you figure out this,' and usually they can!" (age 54)

Again, there is a notion that younger people can use complex technology due to intuition or natural abilities. This suggests bias in both the younger and older age that the natural ability of younger people is higher when it comes to technology. Other times the generational differences related to issues that surface within the workforce from the discrepancy of tech abilities:

> "We don't have a huge age range within the center but we still face challenges with some people being more or less familiar with programs." (age 35)

> "Yeah, in general I would think that old people are less willing to learn and learn at a slower pace. So like if I was, if I had like say a company, you kind of want the younger folks because I feel like they would be able to be on it, like if you have a company that's real tech savvy, you probably would want to hire young people, like you would think that in your head. Not saying the older person couldn't, but in your head, you're like let's do the new generation, and get younger folks in here." (age 41)

> "I've heard people my age say things like, 'I just can't believe that teenagers use Instagram to communicate.' Well, why not? And we always complain about our parents doing that and what our parents complained about their parents doing. So…that I think indicates that yes, there will be a lot of people who are now 31, 32, and when they are 62 and they're an upper level manager or something, they're gonna be eating their words because they're gonna be left behind because they were dismissing things as silly or...just because they were different from how they did things." (age 31)

As a young employee, this last individual suggests that other members of the same generation, based on the dismissive patterns that surface in every generation, will fall behind in future years as it comes to technology.

One question asked about the individual characteristics that will determine if a person will be good or bad at using the company's new technology platform. Age was a consistent characteristic that surfaced in the young group and old group alike:

> "Well I hate to say it but I think age is going to be…an easy…generalization or guess." (age 34)
>
> "I hate saying this but I think age plays a factor." (age 49)
>
> "Younger people are much more comfortable just diving in and just playing around with it…older people have more fear and anxiety about messing things up or breaking something and want a formal introduction." (age 35)

Of note here is the hesitance or resistance in the first two responses to list age as a determining characteristic. All three responses indicate the perception that younger adults are generally better with adopting new technology. This line of thinking could be a self-perpetuation that is contributing to the continued perception that there are innate differences in technological competence by age. Another question asked if the respondents saw their age as an advantage, a disadvantage, or both when it came to technology. The responses varied in the older group, but leaned toward negative:

> "Disadvantage. Total disadvantage I think. Because I see my kids for example that were born with technology and they can figure out things that I'm thinking how did you know that?! And they just intuitively know things I don't. But, because it's been part of their lives and they were born with it and I wasn't." (age 51)
>
> "Age. Like me. These younger ones are more accustomed to figuring stuff out because they have, their knowledge base is more as far as what they're accustomed to. If you're older, you're just gonna follow the instructions just like it's laid out and if it doesn't work you're gonna be like I don't know what to do." (age 54)

The self-relevance of these responses is crucial. Both respondents express the negative experience they believe their age gives them as it comes to technology. As such, steps in the intervention should challenge these conceptions about the association between one's age and adopting new technology. Interestingly, the oldest respondent had mixed feelings about age as it related to abilities with technology:

> "Probably both. A disadvantage because it's not part of my generation. An advantage because maybe I'm not as impatient as expecting things to happen like that (snaps)…My expectations are a little bit different." (age 62)

This commentary provides interesting insight into how this individual's age may actually work in a favorable way when it comes to the use of unfamiliar technology.

Improved Technological Competence over Time

Among all ages and self-reported tech proficiency, all respondents perceived that they had improved competence with technology. Among the older group were the following responses:

> "I think I'm proficient on the computer than I used to be, and I'm old." (age 62)
>
> "Maybe the first couple years I worked here because I hadn't worked in 14 years…I didn't really have any intellectual interest in technology. But then I got forced into having to do stuff so I just figured it out…I've gotten better and better as time's gone by." (age 49)
>
> "Some of the basic concepts of technology I think you can transport from one to the other and so it's just the amazing thing of how you can make that better versus oh, now we have something that's completely different from a laptop…But learning all that...that new learning curve when all that started I think was hard for me." (age 51)

These respondents, expressing the self-relevance of old age and the difficulty of re-entering the workforce, unanimously believe that their skills in technology have increased over time. Similarly, frustration, while still a regular part of the following participant's interactions with technology, seems to be waning over time:

> "You have to practice, and practice, I guess do it over and over again until it starts to flow so that part tends to frustrate me, it's like if I don't get it the first time I don't wanna be bothered. I just shy away from it. It's a hurdle, but I'm getting better at it." (age 54)

The same respondent, when asked about using new technology, initially responded staying away from it out of fear, but then paused and changed the answer:

> "I don't use it! I just stay away from it. (pauses) Well no I take that back. The latest thing that I've actually tried to broaden my horizon with is the technology with TVs that I'm really, really bad at! Nobody was there so if I didn't figure it out I wasn't gonna be able to watch what I wanted to so I'm like, you can do this just—it took me a minute but I figured it out!" (age 54)

In this last instance, we also see that the two-pronged motivation for setting up the TV was necessity, since no one else was home to help, and the sheer desire to watch desired

programming. A younger respondent reflected this same notion of feeling better at technology now than in the past:

> "Maybe this interview has helped me realize that I'm so much more comfortable than I used to be. Maybe I have changed a lot, especially since, I don't know…over the last 5 years maybe. So I'm hoping I'll be more comfortable with learning new things. And I feel like that's the biggest lesson I'm learning is just to dive in and try and be more comfortable with that and I don't have as much anxiety around that." (age 35)

This gives strong evidence that time, training, and exposure to technology all contribute to feeling more competent with technology, regardless of age. This finding is an optimistic aspect of this study. Reminding older and younger employees that they have improved their technological abilities with time, regardless of their initial experience level, could encourage further confidence when adopting and learning new technology.

Limitations and Future Directions

Since these results are preliminary and the project is still underway, the analysis and concurrent discussion of results is intended to give an overview sketch of what a potential intervention in this workplace might look like. The emergent themes discussed here provide a foundational basis on which to build a strategic plan that considers the nuances and complex layers of this workplace sociology, while allowing room for more general application to other workplaces in the future.

The future steps for this pilot data include thorough coding and categorization. This coding will be informed by grounded theory, a reliable form of qualitative data interpretation (Strauss & Corbin, 1998). A specific example of how coding might further the exploration of attitudes toward age is how mentions of age surface. For example, respondents commonly mentioned age in various contexts, both before and after the researcher asked questions about age. Additionally, coding the positive, negative, or neutral context in which age is mentioned will yield more helpful and structured answers to Research Question 1, which aims to find an association

between negative views of aging and misuse of technology. A final example is how respondents self-describe regarding their technological ability; some self-reported as “technologically challenged” or “tech savvy”. Understanding these self-perceptions will permit a more profound analysis of how they may relate to concrete technology use and adoption. NVivo qualitative data analysis software will be used to conduct an examination of the themes, word use, and contextual mentions of age. Another objective is to analyze the technological use studies to examine the potential association between subjects’ age of first use of a variety of technology with their competence in new, unfamiliar technology. Such analyses will elucidate the as yet fleshed out results in this paper for future analysis.

The goal of this initial project is a strategic intervention specially designed for the workplace at hand. Amidst this breakdown of the emergent themes discovered from this first, general analysis, clear patterns and tendencies within and across age groups have surfaced. With a more thorough, scientific analysis, the researcher will design a strategic proposal for this workplace that will bridge discrepancies in tech adoption and use through compassionate, comprehensive pedagogy. Such technological instruction will mitigate the reported insecurities in older workers, ease the tension around technology communication among generations, and encourage efficient and equitable technology use for workers of all ages.

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Age first used		*How often do you use…*					*Where do you use… (check all that apply)*		
	Devices	*Never*	*Rarely*	*Sometimes*	*Usually*	*Always*	*Work*	*Home*	*Other (specify)*
____	1. Smart phone	☐	☐	☐	☐	☐	☐	☐	____
____	2. Laptop computer	☐	☐	☐	☐	☐	☐	☐	____
____	3. Desktop computer	☐	☐	☐	☐	☐	☐	☐	____
____	4. Fax machine	☐	☐	☐	☐	☐	☐	☐	____
____	5. USB/Flash drive (storage)	☐	☐	☐	☐	☐	☐	☐	____
____	6. iPad/Tablet	☐	☐	☐	☐	☐	☐	☐	____
____	7. Kindle or other eBook reading device	☐	☐	☐	☐	☐	☐	☐	____
	Others (specify below):	☐	☐	☐	☐	☐	☐	☐	____
____	8. _____	☐	☐	☐	☐	☐	☐	☐	____
____	9. _____	☐	☐	☐	☐	☐	☐	☐	____
	Social Media/Apps								
____	10. Twitter	☐	☐	☐	☐	☐	☐	☐	____
____	11. Instagram	☐	☐	☐	☐	☐	☐	☐	____
____	12. Facebook	☐	☐	☐	☐	☐	☐	☐	____
____	13. Pinterest	☐	☐	☐	☐	☐	☐	☐	____
____	14. News app	☐	☐	☐	☐	☐	☐	☐	____
____	15. Snapchat	☐	☐	☐	☐	☐	☐	☐	____
____	16. Rideshare app (e.g. Uber)	☐	☐	☐	☐	☐	☐	☐	____
____	17. Payment app (e.g. Venmo)	☐	☐	☐	☐	☐	☐	☐	____
____	18. YouTube	☐	☐	☐	☐	☐	☐	☐	____
____	19. Banking app	☐	☐	☐	☐	☐	☐	☐	____
____	20. Weather app	☐	☐	☐	☐	☐	☐	☐	____
	Others (specify below)								____
____	21. _____								____
	22. _____								____

Age first used		*How often do you use…*					*Where do you use… (check all that apply)*		
		Never	*Rarely*	*Sometimes*	*Usually*	*Always*	*Work*	*Home*	*Other (specify)*
____	23. Podcasts	☐	☐	☐	☐	☐	☐	☐	____

	24. Restaurant app	☐	☐	☐	☐	☐	☐	☐	
	25. Streaming services (e.g. Hulu, Netflix)	☐	☐	☐	☐	☐	☐	☐	
	26. Shopping apps	☐	☐	☐	☐	☐	☐	☐	
	Others (specify below):	☐	☐	☐	☐	☐	☐	☐	
	27. _____	☐	☐	☐	☐	☐	☐	☐	
	28. _____	☐	☐	☐	☐	☐	☐	☐	
	Software Programs								
	29. Microsoft Word	☐	☐	☐	☐	☐	☐	☐	
	30. Microsoft Excel	☐	☐	☐	☐	☐	☐	☐	
	31. Microsoft PowerPoint	☐	☐	☐	☐	☐	☐	☐	
	32. Acrobat Adobe	☐	☐	☐	☐	☐	☐	☐	
	Others (specify below):	☐	☐	☐	☐	☐	☐	☐	
	33. _____	☐	☐	☐	☐	☐	☐	☐	
	34. _____	☐	☐	☐	☐	☐	☐	☐	
	Communication								
	35. E-mail	☐	☐	☐	☐	☐	☐	☐	
	36. Skype/FaceTime or other video calling app	☐	☐	☐	☐	☐	☐	☐	
	37. Texting/Messaging	☐	☐	☐	☐	☐	☐	☐	
	38. Webinar (e.g. ClickWebinar)	☐	☐	☐	☐	☐	☐	☐	
	Others (specify below):	☐	☐	☐	☐	☐	☐	☐	
	39. _____	☐	☐	☐	☐	☐	☐	☐	
	40. _____	☐	☐	☐	☐	☐	☐	☐	

Highest Level of Education: *(circle one)*

Less than high school
High school diploma (or GED)
Some college but no degree
Undergraduate degree
Graduate degree

Race/Ethnicity: _____

Year of Birth: _____

Gender: *(circle one)*

Male Female Transgender GenderQueer
Other: _____