Hallowing vs. Hollowing of Job Skills: The Intersection of Technology,

Disability, and Work

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Abstract

Introduction: Technological innovation in the workplace is a double-edged sword. The development of Artificial Intelligence applications can hallow higher-order cognitive skills like critical and creative thinking. That same technology, when used in smart devices, can hollow lower-order skills like rote memorization and calculation.

Literature review: Research into the effects of technology on job skills of workers with disabilities is scarce. While many scholars have studied which job skills decline as technology advances, and others have studied the overall experiences of people with disabilities in the workplace, much remains undiscovered about the intersections of technology, work, and disability.

Statement of purpose: The purpose of my research is to understand overall involuntary worker displacement trends, and how technology impacts job skills, performance, and overall experiences of workers with disabilities.

Methods: I used a mixed-methods approach. First, I used 10-year data from the Current Population Survey's Displaced Worker Supplement (CPS-DWS) to understand overall employment trends of displaced workers and to identify high-risk industries from which workers were involuntarily displaced. Next, I used ethnographic interviews and journal prompts to understand worker experiences and manager expectations in high-risk industries (N=18). Specifically, I explored prioritization of soft versus technical skills and experiences working alongside technology.

Results: The 2010-18 CPS-DWS data suggests an overall decreasing trend in *displaced workers.* There is a higher percentage of displaced workers "with difficulty" than without, but the overall *trend* of displaced workers of both with and without difficulty has followed a similar decline. The top three industries all workers were displaced from were construction, manufacturing, and retail/trade. Ethnographic interviews yielded five major themes: (1) Technology is now ubiquitous in the workplace; (2) Technology training varies widely across workplaces; for people with disabilities, formal training is typically more effective; (3) Soft skills are prioritized over technical skills by most managers and human interaction (versus interaction with technology) is largely considered the most salient aspect of work for managers and workers; (4) Struggles with technology were made worse by communication issues with coworkers and/or managers or bosses, and compounded by mental health or cognitive limitations; (5) Younger employees and managers expressed more judgement towards older employees around their comfortability with technology than the other way around.

Limitations: Quantitative data was limited to what was available on CPS-DWS, including the ways in which questions were asked. Extrapolations from qualitative data may be difficult as the sample size was small (N=18). Ethnographic methods were limited to remote as this research was conducted during the pandemic.

Conclusion: This study highlighted displaced worker trends, and skills and experiences valued in technology rich environments. For the Social Security Administration, findings have implications in regards to the ubiquity of technology in the workplace and expectations around baseline skills, successful ways in training people with disabilities on technology (e.g. formal rather than informal), the compounding struggle of having a mental health disorder alongside another disability, and how people with disabilities and managers alike are drawn to human interaction in the workplace.

Future research: Future research should focus on the impact of technology in the workplace on those with mental health struggles to parse apart how, why, and when difficulties occur.

Additionally, as job roles among industries vary from office workers, to knowledge workers, to manual labor roles, it may be useful to unpack which job roles are most at risk within industries in decline. Finally, as COVID-19 has potentially altered the trajectory of the economy, the job market, and individual's conceptions of the future, it would be helpful to look at Census data from 2020 and to conduct an ethnography about the impact of the pandemic on workers with disabilities.

Introduction
Statement of purpose
        Technological advances in the workplace can be a double-edged sword; while the creation of some technological advancements hallow high-order cognitive skills such as critical thinking, reasoning, and creativity, that same technology, like automatic check-out counters and artificial intelligence (AI) applications in customer service, can hollow other skills such as rote memorization and manual labor. Technology such as automation, AI, robotics, and software programs, has drastically changed work, particularly over the past ten years (Schallenmueller, 2016; Wisskirchen et al, 2017). Currently, research into the effect of technology on the working lives of those with disabilities is scarce. Articles in popular media suggest that in today's post-industrial, knowledge economy, jobs are less physically strenuous and therefore more accessible to individuals with disabilities (Anna, 2018; Casselman 2019; Goss, 2019). However, it is unclear what type of jobs people with disabilities will have access to and what skills will be required to perform those jobs.
        To my knowledge, there is limited data-driven, empirical research on how technology impacts the work lives of Americans with disabilities. Scotch and McConnel (2017) and Wolbring (2016) offer some speculative ideas on how technology might positively and negatively impact the jobs of those with disabilities. Rapid advances in technology and subsequent changes in the labor market's needs can render past work experience of people with disabilities irrelevant and outdated.
        As technology continues to evolve, SSA will need information about how such changes are impacting workers with disabilities. SSA defines disability as "inability to engage in any substantial gainful activity (SGA) by reason of any medically determinable physical or mental impairment(s) which can be expected to result in death or which has lasted or can be expected to last for a continuous period of not less than 12 months" (Social Security Administration, n.d.). Specifically, technology will have a direct impact on steps 4 and 5 of SSA's disability determination process. Rapid advances in technology and subsequent changes in the labor market's needs can potentially render past work experience of people with disabilities irrelevant and outdated.
        The purpose of my research study is to understand how technology impacts job skills and work performance of workers with disabilities. This research project will contribute to the growing body of knowledge about how future technology and future work will impact the Social Security Administration's (SSA) programs and policies, especially the disability determination process and the Ticket to Work program. I posit that technological advances will result in the consecration or *hallowing* of certain skills such as creativity, critical thinking, and cognitive flexibility, while simultaneously causing deterioration or *hollowing* of other skills, such as data entry, manual labor, and rote memorization (Wisskirchen et al, 2017).
Literature review
        Per the Bureau of Labor Statistics, in 2020, only 17.9 percent of people with a disability were employed compared to 61.8% for those without a disability (Bureau of Labor Statistics, 2020). Even when people with disabilities are employed, they are more likely to be underemployed or in precarious, contract-based work with lower-than average salaries (Bonaccio et al, 2020). Many researchers have posited that lower labor force participation rates are due to employer discrimination (Bonaccio et al, 2020), and others have focused on lower levels of education for people with disabilities as an impact on becoming and staying employed (Mitra et

al, 2013). As technology in the workplace becomes increasingly present, its current and impending effect on the working lives of those with disabilities ought to be explored.

Technology, defined as automation, AI, and robotics, and more colloquially associated with software, too, has drastically changed work, particularly over the past ten years (Schallenmueller, 2016; Wisskirchen et al, 2017). Automation has impacted nearly every industry such as manufacturing, transportation, utilities, defense, communication, and operations (Wisskirchen et al, 2017). AI has allowed us to complete computer-based work more efficiently, communicate with devices, and live in *smart homes* with sensors (McCarthy, and West, 2019; Wisskirchen et al, 2017). Finally, robotics is playing a growing role in a number of areas, including farming, hospitals, space travel, and transportation (Webb, 2019; Wisskirchen et al, 2017). While it is undeniable that on a systems-wide level technology has bolstered the US economy (O'Sullivan, 2019), particularly since as a country we lead the charge in technological innovation (Alva, 2019), researchers hold mixed opinions about how technology is impacting the lives and livelihoods of actual workers, especially people with disabilities.

As the most substantial impact that technology has on contemporary work systems is the decline of manufacturing jobs and a shift to knowledge-based work or jobs within the gig economy, many articles in popular media suggest that in today's economy, since jobs are less physically strenuous, they may be more accessible to individuals with disabilities (Anna, 2018; Casselman 2019; Goss, 2019). In 2016, The Pew Research Center reported that the number of jobs requiring advanced education is increasing, that jobs requiring higher levels of social or analytical skills pay more, and that the demand for jobs requiring physical skills is decreasing (Pew Research Center, 2016).

In general, Peng, Wang, and Han (2018) note that jobs that require routine, non-cognitive tasks are at the greatest risk for displacement due to technology and jobs that require abstract thinking are least likely to be in danger. However, the scholar Wu explains that many SSDI applicants hold "middle skill occupations" – jobs involving routine tasks – which are the jobs being replaced by technology. She poses the following questions for further research: How can we help these workers transition to jobs with non-routine tasks? How can we help workers who work in physically laborious jobs become healthier and less prone to accidents or health woes? (Wu, 2018).

Autor (2013, 2015) has also researched which job skills are being replaced by technology. In 2015, findings from the study highlighted the threat of "middle skill" occupations at risk for automation, though perhaps not complete decimation. He posits that workers (and jobs) that will be able to survive and shift alongside the changing landscape of the workplace and increasing usage of technology will be those that develop skills to *complement* technology (e.g. interpersonal skills, non-routine tasks, etc.) He suggests that those who combine technical and interpersonal tasks may perhaps become "the new artisans" (Autor, 2015). Earlier, in 2013, Autor and Price examined how routine cognitive and manual tasks are on the decline for both men and women. Interestingly, women have seen even sharper declines in routine cognitive tasks but also greater increases in non-routine cognitive tasks (Autor and Price, 2013).

Scotch and McConnel (2017) and Wolbring (2016) offer some speculative ideas on how technology might positively and negatively impact the jobs of those with disabilities. One report on disability and automation projected that by 2023, the number of people with disabilities in the workforce will triple as automation reduces barriers to access (Hurst, 2020). However, the report did not define "disability" and instead simply pointed to braille-readers and virtual reality as elements that may help increase work accessibility. Yet, braille-readers and virtual reality only

help those with some disabilities, such as vision problems, learning disabilities, and physical limitations (Chandrashekar, 2018). Wolbring expressed concern about the lack of a critical look into robots replacing disabled workers. Evidently, Wolbring (2016) argued that contemporary evidence offered a monolithic view of technology; one in which technology enhanced the employability of people of disabilities. Wolbring found this troubling and unrealistic given the often-tenuous employment situations that people with disabilities face (Wolbring, 2016).

Mitra and Kruse (2016) showed that people with disabilities are much more vulnerable than those without disabilities since they are likely to be displaced from their jobs at a much higher rate than those without disabilities, even after controlling for personal and job characteristics. The authors contend that people with disabilities may not have the opportunity to utilize their full range of skills and capabilities at work. Underutilization of existing knowledge and skills combined with a shrinking job market pose a dual threat to many people with disabilities.

An SSA/RDRC funded paper from 2019 around mental illness and labor market participation included many interesting findings. For one, men and women with severe psychological distress are less likely to participate in the labor force that those without; men are impacted more than women (Frank et al, 2019, p. 9). Secondly, the share of the population experiencing some type of mental illness is growing and driven by an increase in symptoms of depression and anxiety (Frank et al, 2019, p. 10-11). Thirdly, people with severe psychological distress apply for SSDI benefits in greater numbers than those without (Frank et al, 2019, p. 13-15), and, the total number of people applying for SSDI benefits has increased over the past twenty years (Frank et al, 2019, p. 15). Finally, people with moderate to severe psychological distress are consistently underrepresented in occupations requiring non-routine cognitive analytical and non-routine cognitive interpersonal skills; those skills within those occupations are among the least at risk for being displaced by automation (Frank et al, 2019, p. 20). While this study provides fascinating background information, it does not include the impact of technology in the workplace on those with mental illness.

Importance of research

My research fills in important gaps around the experiences of people with disabilities working alongside technology. Not only does this research examine which job skills are valued by managers, but it also unpacks the preferences and values of those with disabilities when it comes to work, as well as their current and past experiences. Additionally, this research explores the various ways in which physical and mental impairments impact the day-to-day experiences of working alongside technology and others. In part, this research is unique due to the mixed-methods approach of identifying employment trends and then diving into participant experiences through ethnographic journal prompts and interviews. Interestingly, this research happened to be conducted during the COVID-19 pandemic at a time when the economy, the job market, and many people's lives were (and are) drastically changing.

Research questions

My research sought answers to the following questions: How has the percentage of "displaced workers" changed from 2010-2018? How has the percentage of displaced workers experiencing "any difficulty" changed from 2010-2018? Which are the top industries from which workers are being displaced? What types of technology are participants using at work? What types of interpersonal interactions are participants having at work? What is the support system like for workers with disabilities? What is the work history like for workers with disabilities? How do workers with disabilities describe their current job or the job they were let go from?

How do workers with disabilities let go from a job due to difficulties with technology or technology replacing job tasks describe that experience? What do workers with disabilities and managers prioritize in terms of soft skills versus technical skills? What are the ways in which a person's health impacts their work and their experiences with technology? What are workers with disabilities and managers thoughts around the future of their industry and work at large? Please see Appendix B for journal prompts and discussion guides.

Methods, research design, and data analysis

Sample

      I used a mixed-methods approach, beginning with a quantitative phase, looking at trends through the Census Population Survey's Displaced Worker Supplement survey, then employing ethnographic methods via journaling and interviews with managers and with people with work limitations. IRB approval for the study was obtained from University of New Hampshire in July of 2020. The use of publicly available CPS-DWS data was exempt from IRB approval. Informed consent for the ethnographic study was obtained from participants during the screening process using the web-based platform Qualtrics.

      Data from the quantitative portion of my study was publicly available through the Displaced Worker Supplement (DWS) of the Current Population Survey (CPS). I chose to look at data from the DWS rather than the CPS core survey because the CPS core survey includes questions on unemployment from people who *chose* not to participate in the labor market. On the other hand, DWS includes workers displaced involuntarily. From 1998 and on, the Census Bureau has considered a "displaced worker" a respondent who has "lost or left a job due to layoffs or shutdowns within the past 3 years, were not self-employed and did not expect to be recalled to work within the next six months (Flood et al). First, I looked at the U.S. Census Bureau's 2017 industry code list and noted the major industry categories rather than the smaller categories. For example, the larger category of manufacturing involves all types of manufacturing such as beverage, tobacco, textiles, and footwear. Then, I calculated the percentage of displaced workers from the top three industries from which workers were displaced from 2010-2018. I used this information to recruit workers – as much as possible – from those top three identified industries. Next, I looked at data from the biennial survey from years 2010-2018, tracing trends of displaced workers with "no difficulty" vs "any difficulty." Respondents are identified as having "any difficulty" if they respond affirmatively to one of the CPS's six physical or cognitive difficulties around hearing, vision, memory, physical difficulty, mobility, or personal care limitation.

      For the qualitative portion of the research, I recruited participants through social media (Facebook, Craigslist, and Reddit), directing respondents to an eligibility survey hosted on Qualtrics. Participants were recruited from October 2020-March 2021. If participants qualified for the study, I screened them via a short telephone conversation to ensure accuracy in their responses and willingness to participate in the study. I recruited three groups of participants – two groups with work limitations who either thrived along technology in the workplace, OR believed they were let go or had their hours reduced at a job due to technological innovation or struggles with technology, and a third group of managers. Workers recruited for group 1 were asked to check reasons they were let go from a job or had hours reduced at work, and must have chosen "technology" as one of those reasons: (1) COVID-19; (2) Family change; (3) Illness/disability/health related; (4) Technology (lack of knowledge of tech and/or tech replacing job responsibilities); (5) Disagreement with coworkers and/or boss; (6) Disagreement with company mission/purpose. Workers recruited for group 2 were asked to identify which

statement best described how they feel about using technology in the workplace: (1) I thrive using technology in my workplace; (2) I do well using technology in my workplace; (3) I do okay using technology in my workplace; (4) I do not do well using technology in my workplace; (5) I struggle using technology in my workplace; (6) I do not have an opinion on how well I do using technology in the workplace.

I defined "work limitation" as having a health condition, illness, injury, or disability that impacted day-day experiences at work. I recruited participants with a range of severity of "work limitations" based on their responses in the eligibility survey and screening call. Both groups of participants with work limitations were required to be living independently without a legal guardian, be between the ages of 18-65, work at least 10 hours a week (or worked at least 10 hours a week at the job they were let go from), and use technology regularly at work that was at least somewhat important to their job. Participants in groups one and two were prioritized if they were currently working or previously working (if they were let go), in the construction, manufacturing, or retail/trade industries. Please see Appendix A for full inclusion and exclusion criteria.

The first group included *people with work limitations who either were let go from a job due to their struggles with technology, or had their hours reduced due to technological innovation at their job.* All of the participants in this group had been let go from their job or had their hours reduced over the last two years, except for Adam who was let go from his job in 2012. These participants had the following demographic characteristics:

Name	Sex	Race	Age	Industry let go from	Job title	Work limitation(s)	Summary of reason(s) let go or had hours reduced
Rose	F	White	58-65	Retail/trade	Front desk worker	Severe PTSD, chronic anxiety and depression, chronic pain	Struggled to use scheduling software and to communicate difficulties
Padam	M	Asian	42-49	Retail/trade	Associate	Chronic pain	Inventory software replaced job duties
Carter	M	Latino	26-33	Professional, Scientific, or Technical Services	Videographer	Chronic anxiety, ADD, chronic pain	Miscommunication with boss around what video editing software was capable of
Adam	M	Latino	42-49	Manufacturing	Project manager	OCD, Bipolar, chronic pain	Severe injuries from accident lead

Name	Sex	Race	Age	Industry	Job title	Work limitation(s)	
						from severe accident, obesity, diabetes	to prolonged absence and exacerbated mental health issues, and company hired someone more experienced
Lucas	M	Latino	34-41	Manufacturing	Engineer	Chronic pain, scoliosis	Robot replaced many job duties; hours reduced
Ruby	F	White	58-65	Retail/trade	Sales person	Cancer, ADD, depression, OCD	Struggled using time tracking software and went "off script" in sales pitches

The second group included *people with work limitations who believed they "thrive" alongside technology in the workplace.* These participants had the following demographic characteristics:

Name	Sex	Race	Age	Industry	Job title	Work limitation(s)
Richard	M	White	26-33	Construction	Project manager	Chronic pain from severe accident, chronic depression
Jennifer	F	White	34-41	Construction	Manager	Chronic pain and mobility issues
Bella	F	Black	42-49	Retail/trade	Cashier	Poly-neuropathy
Dorothy	F	White	50-57	Manufacturing	Production planning procurement manager	Diabetes, chronic pain from degenerative disc disease
Lindsey	F	White	42-49	Manufacturing	Chief compliance officer	Mobility challenges, rheumatoid

						arthritis, cancer
Sarah	F	Pacific Islander	26-33	Manufacturing	Operations lead	Chronic pain

The third group included *managers from a wide-variety of industries who directly supervised people (with or without disabilities), and trained employees on using necessary technology for their job.* These participants had the following demographic characteristics:

Name	**Sex**	**Race**	**Age**	**Industry**	**Job title**
Maureen	F	White	18-25	Professional, scientific, or technical services	Customer success manager
Jim	M	White	26-33	Arts, entertainment, recreation	Employee development coordinator
Janet	F	White	58-65	Health care and social assistance	Volunteer coordinator
Joslyn	F	White	58-65	Professional, scientific, or technical services	CEO
Susie	F	White	26-33	Retail/trade	District manager
Crystal	F	White	26-33	Education	Case manager, special education teacher

Data collection methods

I used a mixed-methods approach, beginning with a quantitative phase, looking at trends through the Census Population Survey's Displaced Worker Supplement survey, then employing ethnographic methods via journaling and interviews with managers and with people with work limitations. The Displaced Worker Supplement collects information on people who have lost or left a job in the past several years. Displaced Worker respondents must be at US citizens aged 20 and older. From 1994 forward, a displaced worker has been defined as someone who "has lost his/her job in the last 3 years due to their company or plant shutting down, their shift or position being eliminated, or having insufficient work." From 1998 forward, respondents must not be self-employed and must not anticipate that they will be recalled to their job sometime over the next 6 months (Flood et al).

After the quantitative portion of my study, I recruited 18 participants to respond to journal prompts around their technology usage and interpersonal interactions at work, and then I interviewed each participant for 1.5-2 hours over Zoom. Please see Appendix B for journal prompts. I chose to ask participants to journal prior to the interview to gain background

information on their job and technology usage so that during the interview I would have a baseline understanding of their circumstances and we could dive deeper into their experiences. For the journal portion, participants responded to prompts three times over the course of a week via email, answering questions around the types of technology they used during the day, if that technology was helpful, and who they interacted with at work. In ethnographic interviews, I probed participants with disabilities their around basic household setup and hobbies, their work history including favorite and least favorite job, their experience with technology overall, their typical use of technology at their current (or former, if let go) job, the training processes around technology at their workplace, the effects of their health condition(s) on their work experiences, and perceptions around the future of technology in the workplace. During interviews with managers, I asked questions about their work history and experiences in management roles, their training processes at work, what they look for when they hire and retain employees, their prioritization of soft skills versus technical skills, and their experiences working with people with disabilities, if applicable. Interview guides can be found in Appendix B.

Quantitative data analysis approach

I created an account on the CPS website, selected data from the CPS-DWS survey, received an email with my data extract, and then loaded the data into SPSS. I viewed the CPS-DWS data in table format and then converted these tables to graphs to view the trends more easily.

Qualitative data analysis approach

To begin analysis, all interviews were transcribed using AI software. Next, transcripts were uploaded into the qualitative analytic platform Dedoose. Then, I condensed the discussion guide questions into a list of research questions for reference. After, I carefully read through transcripts, using the constant comparison method to create a list of codes that corresponded to research questions (Cohen and Crabtree, 2006). I defined the codes using an iterative process as analysis progressed. After coding all the data, I looked through each code using an inductive thematic analysis to see patterns and themes among interviews (Cohen and Crabtree, 2006). Finally, I conducted "member checks" by contacting participants with the major themes that surfaced from analysis and asking if these themes accurately reflected the participant's experiences. I reached out to all eighteen participants and thirteen responded: twelve agreed that the major themes reflected their experiences, and one misunderstood the question and did not reply to my follow-up email.

Results

From 2010-2018, the % of "displaced workers" declined from 4.7% in 2010 to 1.8% in 2018.

% of Displaced Workers from 2010-2018

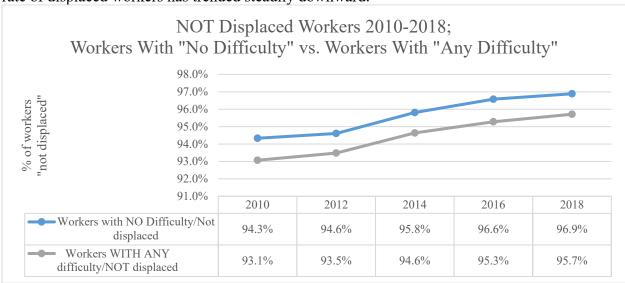| Year	% Displaced Workers
2010	4.7%
2012	3.8%
2014	2.7%
2016	2.0%
2018	1.8%

The top three industries from which workers were displaced between 2010-2018 were manufacturing, construction, and retail/trade. This finding served as the basis for recruitment for participants with and without work limitations. For the qualitative portion of my study, I
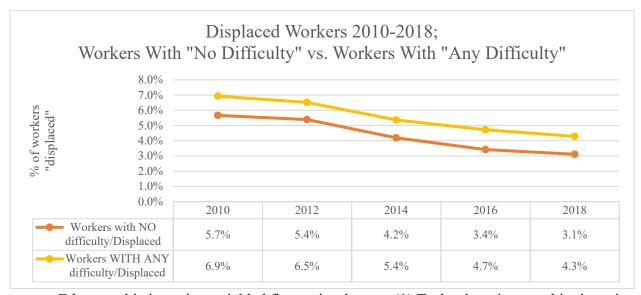
attempted to recruit folks from the manufacturing, construction, and retail/trade industries. Below, the percentage of displaced workers biennially is listed from these top three industries:

% of Displaced Workers from 2010-2018 in Top 3 Industries with Displaced Workers

	Manufacturing	Construction	Retail/trade
2010	19.2%	15.0%	11.4%
2012	16.1%	14.1%	11.8%
2014	15.1%	12.9%	11.7%
2016	15.1%	10.3%	12.4%
2018	14.2%	11.2%	12.5%

   Trends in the charts below suggest that while a higher percentage of "workers with difficulty" are displaced than "workers without difficulty," employment trends for workers with and without difficulties have followed nearly identical trends from 2010-2018. In both cases, the rate of displaced workers has trended steadily downward.

NOT Displaced Workers 2010-2018; Workers With "No Difficulty" vs. Workers With "Any Difficulty"

	2010	2012	2014	2016	2018
Workers with NO Difficulty/Not displaced	94.3%	94.6%	95.8%	96.6%	96.9%
Workers WITH ANY difficulty/NOT displaced	93.1%	93.5%	94.6%	95.3%	95.7%

Displaced Workers 2010-2018; Workers With "No Difficulty" vs. Workers With "Any Difficulty"

	2010	2012	2014	2016	2018
Workers with NO difficulty/Displaced	5.7%	5.4%	4.2%	3.4%	3.1%
Workers WITH ANY difficulty/Displaced	6.9%	6.5%	5.4%	4.7%	4.3%

   Ethnographic interviews yielded five major themes: (1) Technology is now ubiquitous in the workplace; (2) Technology training varies widely across workplaces; for people with

disabilities, formal training is typically more effective; (3) Soft skills are prioritized over technical skills by most managers, and human interaction (versus interaction with technology) is largely considered the most salient aspect of work for managers and workers; (4) Struggles with technology are made worse by communication issues with coworkers and/or managers or bosses, and compounded by mental health or cognitive limitations; (5) Younger employees and managers express more judgement towards older employees around their comfortability with technology than the other way around.

(1) Technology is now ubiquitous in the workplace; reactions to and knowledge of technology varies.

Every participant – managers and people with disabilities alike – interacted with multiple types of technology at work in a typical day. The most commonly used pieces of hardware were a laptop, desktop, and smartphone. The most commonly used software was Google Suites. Although the definition of "technology" generally refers to hardware, most participants included software in their comments and stories around technology, stating that software cannot function without hardware.

Most managers expect potential hires to have a baseline level of technology skills. One manager (Jim) described assessing someone's technology skills by asking them to look up the score of the Superbowl 7 years ago, to describe how they would explain to a customer how to retrieve a forgotten password on Amazon, and to explain if they are capable of answering technology questions from their parents and grandparents. A manager (Susie) who worked in retail selling smartphones phrased her assessment of others' technology skills as such: "I basically want to know if you can work a smartphone or use a computer." She continued in saying that most of the people she interviews are in their 20s and 30s where technology knowledge is "pretty much expected." Another manager (Maureen) who worked for a web design company stated, "You have to be technology savvy… we do go through a lot of training, but you can't really apply that training if you don't know how to use your email or Google or anything like that." Another manager (Joslyn) offered a slightly more nuanced perspective, saying that although she expects some level of technological know-how, "technology changes all the time [so] you're not going to find someone who's got 30 years' experience."

Some workers (Adam, Padam, Lucas) whose employment was ultimately impacted by technology in the workplace reflected on the fear, anxiety, or uncertainty that they felt when this technology was introduced. One worker (Adam) described his thought process as such: "The panic button lights up... what happens if I can't learn this software? Are they gonna let me go?" Padam, who was let go due the implementation of inventory management software that replaced his duties at a food and beverage shop, decided to use the experience – and his fear – as an opportunity to embrace technology. He opened his own shop with a former coworker, using the very same inventory software that led to his job loss. He explained his mentality as "…acceptance and understanding [of] the future… that this is how the world is shaping around us." Another one of these workers (Lucas) had his hours reduced when his workplace invested in a robot that replaced many of the lab processing tasks for him and his coworkers. He explained that after an initial bout of frustration and uncertainty, he decided to act by solidifying his hobby in programming to diversify his work skillset.

Two of the workers (Richard, Jennifer) who "thrived" alongside technology and worked in the construction industry acknowledged that their tech-savviness was the exception rather than the rule within their industry. One of these tech-savvy workers built computers in his spare-time, clearly displaying a personal interest in technology. He explained, "I started playing video games

at five or six… and then it just kind of evolved from there." His coworkers see his interest in technology as a "defining feature" and many ask him for advice on things like purchasing personal laptops. He described the average level of technology skills at his work as "very low," saying that most contractors struggle to figure out how to answer messages via WhatsApp or Slack. Among office workers at his company, technological know-how is slightly higher, but still "low." For example, he said, "one of the other project coordinators couldn't sign in to her email [because] she had caps lock on." The other tech-savvy construction industry worker (Jennifer) credited her teenage son for introducing her to software programs that she ended up using in her workplace, such as Adobe Reader. She explained that keeping abreast of useful technology is "easy for me, because my kid is growing up with this technology."

Two workers who were over 60 and in in managerial positions appeared unworried about the future of technological innovation and jobs, drawing on past work experiences and life wisdom. One (Janet) mentioned that she was working at a real estate agency right around when the ability to put photos of houses online for viewing came about. She explained that while many of her coworkers were worried that they would be out of a job if prospective buyers could simply look at photos of houses online rather than needing to visit a house in person, she was not worried, since she had a feeling that people would still want to tour a house in person since it is such a vital purchase. In relation to current and future technological innovation in the workplace, an older manager (Joslyn) said "technology will take away the jobs that will go on to get nobody anywhere… Now's the time for you to own what you're great at and find who's willing to pay for that." She continued in saying, "Go to globalproblems.org and pick one. Throughout history, that's how this [finding a job] has worked."

(2) Technology training varies widely across workplaces; for people with disabilities, formal training is typically more effective.

Many managers approach training with the philosophy that personalization and adaptation is important. One manager (Maureen) who was working full-time while pursuing a degree in education online explained, "I love teaching people… I really love having the tools to teach the new hires in a way that they will understand and retain and in a way where they can feel confident going in." Another (Jim) mentioned "I try to adapt to the extent that I can adapt" when training new employees. Another (Susie) said, "I always think of it as like, be a leader, not a boss… people want to feel appreciated and cared about." To these participants, part of the joy of being a manager was witnessing employees learn and absorb new information.

Training on technology at work is often conducted both formally and informally. For jobs that required extensive technology interaction (e.g., especially those that operate almost exclusively remotely), technology skills were often taught through training modules and assessed through quizzes. Workplaces that used special software for things like tracking inventory or making notes on student progress often hired that software company to conduct a training for employees, or used pre-made trainings online for programs such as Google analytics. One manager (Crystal) explained how technology training at her workplace was largely informal due to the infrequency of official workshops: "If you were to start off the beginning of the year, you wouldn't have any training on how to use any of the systems we use. You'd have to wait until one of those workshop days."

Many managers view technical skills as largely trainable, especially in comparison to interpersonal skills. One manager (Janet) articulated the trainability of technology skills versus people skills as such "…most of the time, if the people skills were there, the piece of the technology someone could help you log into the training or print out your certificate if you

couldn't figure it out." Another manager (Crystal) said that if someone is struggling greatly with technology on the job, her company provides more training for that individual rather than letting them go right away. Another mentioned that she fields a lot of questions from trainees early on, but that "this is normal." There were a couple of instances where a manager could recall letting go an employee due to their struggles with technology, but those were the exception rather than the rule. One manager (Jim) said that "we've had some uncomfortable talks about… someone having a hard time with technology… and that is something that would… [cause us to] show you the door," in other words, get fired. However, he explained while some employees require more mentorship, most are set to go after training.

Most workers with disabilities who had been let go due to their struggles with technology were trained more informally on technology (Carter, Ruby, Rose, Adam). One of these workers (Carter) who worked at a small advertising agency explained that his boss had unrealistic expectations for how fast he could make videos with a specific type of editing software. The worker said, "you could compare it to the idea of someone thinking that just because you're a graphic designer doesn't mean you're a magician… doesn't mean that you can put an elephant in a giraffe's body and make it look realistic in five minutes." Carter was never offered additional or advanced training on this type of software, and the mismatch between expectations and reality created a fissure that ultimately led to the participant getting fired. Another worker (Ruby) explained that the technology training for a scheduling program she was required to use was insufficient for her needs. She ended up calling a technology-savvy friend for advice. When asked in the interview why she didn't contact someone at her workplace for more support, she said "I could tell by calling the company, they have very little bandwidth of patience for me." Another worker (Rose) similarly felt frustrated with the lack of training on necessary software which ultimately led to her getting fired. She said, "I always felt like, if I would have had better training in the actual technology of that application, I probably would have been much better at it."

Two workers who were let go due to their struggles with technology expressed boredom around learning to use the software programs necessary to do their jobs, and they linked this boredom to their mental health issues. One (Ruby) explained, "Now, I'm disabled too, so that will factor in. I've got some cognitive issues, when you have attention deficit disorder, or some of these other things, you can excel beyond in something that interests you… But when it comes to the technology… I hate it." She continued in saying, "the couple times that I did call someone [to help me], once again, with my cognitive [issues] that stuff was all boring to me. So when it's boring to me… that has something to do with my retention to I'm sure." Another (Rose) who repeatedly mentioned in the interview how her PTSD causes her to self-sabotage, said, "I just think that's kind of the way it's my own fault. Because I come off that way. Like, oh, I'm good. You know, okay. You don't have to teach me anymore."

(3) Soft skills are prioritized over technical skills by most managers and human interaction (versus interaction with technology) is largely considered the most salient aspect of work for managers and workers

Most managers prioritize an applicant's or employee's people skills in hiring or retaining their workforce. Though not all managers used the phrases "soft skills" or "people skills," most pointed to the same. One (Susie) said, "I hire off personality" and that she wants to hear someone articulate why they are interested in a job, and sense if they are "open to learning." Another manager (Crystal) who works as a special education teacher and hires paraprofessionals said that "soft skills are definitely important, probably a little more important [than technical skills]."

Another (Joslyn) said that the number one thing she looks for in hiring people is emotional intelligence. Another manager (Jim) described the difficulty in even teaching soft skills, saying that "…interpersonal communication is really important… it's something that I personally have a hard time teaching." Another manager (Maureen) said that among everything she looks for in hiring, "The one requirement is, are you good at holding a conversation? Can you build a relationship?"

Beyond people skills, many managers view the personal qualities of openness and adaptability as key for applicants and employees to possess to be successful in getting hired and learning on the job. One (Susie) described this by saying, "sometimes you can't teach an old dog new tricks… I'd rather just kind of start fresh with someone and train them the way I want to, versus having to try to go back." In other words, she prefers hiring and training people who have fewer skills but are less stuck in their ways than the other way around. Another (Crystal) said one of the most difficult aspects of her job is when people she manages are resistant to learning new technical skills. Another manager (Jim) explained the difficulty in hiring people who have worked in a more traditional customer service role, since the company operates exclusively online and involves sports betting. He said it can be a challenging for folks used to a more traditional model to transition to working remotely and across many clients, rather than with an assigned set.

Most participants – managers and people with disabilities– have a work history that involves extensive interpersonal interactions in industries such as retail, hospitality, or childcare. Nearly all of participant's most memorable and emotionally charged stories from work involved interacting with people, rather than technology. One manager (Maureen) explained that her first job had a "toxic" and judgmental atmosphere, and that in general the people she works with contribute greatly to her overall enjoyment of a job. Another manager (Joslyn) described how her people skills saved her in her early years working in the technology industry despite not having a lot of detailed technical knowledge. She recounted, "I would go into total strangers [offices] and start doing business and talking straight… I understood enough about the technology to talk intelligently and not say things that weren't true." Another manager (Crystal) said that her least favorite job was working at an afterschool program since her manager was "ineffective." Another manager (Susie) described how much she loved her side-job as being an Airbnb host because she met people from all over the world. One worker (Jennifer) spoke about her early days canvassing for a construction company, saying that she excelled by smiling when meeting with potential clients. One worker (Bella) recounted a vivid story of being held up at gunpoint when working at a fast food restaurant because a person didn't like their order. Perhaps unsurprisingly, this job was this participant's least favorite job. Another worker (Lindsey) spoke about being let go from a job she described as having a "belittling" and "nasty" atmosphere where one of her supervisors made her cry. When she interviewed, the doorman downstairs warned her of the work culture saying "be careful up there, that place is a revolving door."

Interestingly, many PWD expressed an innate desire to help others, whether that was a professional goal (e.g. becoming a teacher or counselor), or something they aspired to or worked to maintain at their current job. One worker (Lucas) articulated his work culture as "we all get together and try to help each other… we have a team spirit in the lab." Another worker (Adam) explained that as he is looking for new jobs, he wants to find positions where he will deal more with humans rather than machines. He elaborated in saying that he wants to find a position where "I'll be able to help my fellow humans." In the job that he was let go from right before a new type of software was fully implemented, he said that one of his regrets is that he "wanted to be

there when that happened… I wanted to be so bad that person… that would have made their life easier in the transition… of teaching them that software." Another worker (Carter) felt attracted to the education field as a way of "passing on knowledge" to others. Another (Dorothy) said that her ideal job would be to run a local small business to help support her community.

(4) Struggles with technology are made worse by communication issues with coworkers and/or managers or bosses, and compounded by mental health or cognitive limitations.

For three of five workers (Ruby, Carter, Rose) let go due to difficulties with technology, struggles with technology were made worse by interpersonal communication issues. These workers became notably flustered when talking about their challenges with technology in the workplace, and often recounted stories that were both vague and chronic rather than an acute instance of having struggled. As mentioned earlier, one (Ruby) spoke about how her cognitive limitations make it difficult for her to focus on topics or tasks she finds uninteresting, such as learning about specific types of software or sticking to a verbal script at work. Another participant (Carter) with both cognitive and mental health limitations (ADD and anxiety) was fired not only from lack of training, but also because of a series of miscommunications with his boss around the capabilities of a specific video editing. Another, (Rose), who struggled to use scheduling software at a pet grooming store, did not give a straightforward answer when asked if she felt comfortable asking her managers for more training on the software. She said "…it probably wasn't really that difficult… it's just not feeling like I could do it. They all knew the program already." She specifically struggled with "the interruptions, the constant interruptions" and explained that while technology was about two-thirds of the reason the job didn't work out, the other third was the customer service piece which she was required to perform alongside using the software system.

Two workers explicitly blamed their struggle with mental illness as a major factor in getting fired. One worker (Adam) who suffered physical injuries from a severe car accident described how his OCD made it difficult for him to feel confident in his role. He said he knew he wouldn't be able to be as productive as he was pre-accident, but that the OCD especially "didn't help" as it was constantly creating self-doubt in his head. Another (Rose) blamed her PTSD in leading her to feel flustered. She said, "I would I would get all bogged down with the phone ringing and trying to do too many things at one time, and I just couldn't, couldn't do it… I'm answering the phone that's ringing off the hook of the time, and there's three people standing around me at the desk and they're all talking really loud and the dog is barking and over here… I'm writing it down as fast as I can… I can't remember it because there's too much going on." She explained that "I've had a lot of traumas, past trauma, so we [me and my therapist] kept noticing that this pattern of, of working, and then sabotaging, without realizing that I'm sabotaging."

(5) Younger workers express more judgement towards older workers around technology than the other way around.

Many younger managers and employees showed judgement towards older workers in a few different ways in relation to technology. Two younger managers, one age 22 and the other 31, identified an age or age range for which they believed employees are typically tech-savvy, or not. One stated that while there are occasionally outliers, "if they're over, like, 42, they're struggling in some aspect." Another said, "if you asked me to generalize, younger people tend to be better at technology… I would say that [people who are] 50, 60 are more likely to struggle." Two other managers lamented the difficulties in teaching newer technology to older workers. One (Crystal) mentioned that when COVID hit, some employees nearing retirement quit because they didn't want to deal with the technology involved in remote teaching. However, when asked

if anyone had been let go due to their struggles with technology, she responded "I think we're very wary of that. It would go along with some kind of, you know, ageism." Another explained that she worked with an older employee who would ask the "tiniest little questions," things she considered "basic stuff that if you're a normal human being and you have a smartphone… you should know how to do." Another (Jim) considered using the word "disability" when talking about older workers' struggles with technology then stopped himself, saying "We've had some uncomfortable talks about, like, you know, someone having a hard time with technology…. I wouldn't use the word disability around this, but someone who is who is considerably older than our average [employee]."

Two older participants with disabilities who were both former small business owners commented on how their own technology skills had declined in recent years. One (Rose) explained, "I used to be more technology savvy, technology savvier than most of my friends. But something changed." She continued on, saying, "I have, you know, my laptop, I'd like to be more efficient on it… it's a vast world of what you can do on your laptop, or your computer or even your phone… it's a vast, you know, learning curve to what is at your fingertips. And sometimes it's overwhelming, because I think there's so much you can learn. And I need to take baby steps and maybe extract the most important things that would benefit me at this point to what I would learn moving forward." However, she said that she didn't blame younger managers for not understanding how to train older employees on technology since they have used these things since "coming out of the womb." Another (Ruby) explained, "I can tell on the other end that somebody isn't real patient with me. And they're frustrated, and I could pick up on that. And everybody in the company that I had to answer to they were considerably younger than me and it just felt like it was that generational thing."

Discussion and Strategic Implications for SSA

The purpose of this study was to examine employment trends for displaced workers from 2010-2018, as well as to understand how technology impacts job skills, performance, and overall experiences of workers with disabilities. Quantitative results from census data indicate that the overall number of involuntarily displaced workers from 2010-2018 declined, that the number of involuntarily displaced workers was higher for workers "with difficulty," but that the decline has been nearly identical for workers with and without difficulty. Finally, the top three industries workers are being involuntarily displaced from are construction, manufacturing, and retail/trade. Qualitative results via ethnographic methods show the omnipresence of technology in the workplace, the complexity of how training on technology is approached, and how mental health issues exacerbate struggles with technology in the workplace. Results also show that human interaction, often a foil to the more technical aspects of a job, is often the most salient aspect of work for most people. Although baseline technical skills are often expected of job applicants, managers view interpersonal skills and adaptability as more complex and valuable when hiring and working with employees. Results from this study indeed show that some job skills are being *hallowed* and others *hollowed.* As technological innovation accelerates and more industries begin to automate tasks or implement new technology, it will be ever the more important to remember what *humans* both excel at and enjoy doing, as job satisfaction often helps with job retention (Sabbagha et al, 2018).

Research findings also point to strategic implications for SSA, the disability determination process, and the Ticket to Work program moving forward. In regards to quantitative findings, if the overall number of involuntarily displaced workers with difficulty is declining at nearly the same pace as involuntarily displaced workers without difficulty, perhaps

SSA ought to champion the unique gifts that workers with disabilities bring to the workplace to both ride this momentum and help close the employment gap (Aquinos, 2021).

The five major qualitative themes also point to many strategic implications:

(1) Technology is now ubiquitous in the workplace.

As technology is now rampant in workplaces and across industries, job seekers likely need basic computer skills to be considered for employment, as evident from this study and prior research (Leahy, 2014). If possible, vocational rehabilitation training should focus on getting job applicants up to speed on operating a laptop, receiving and sending emails, and using basic software such as Google suites. The possibility for Ticket Program participants to receive services remotely may secondarily serve to help some folks practice the technological skills mentioned above.

Furthermore, in our post-pandemic work world, technology may be more critical (Lund et al, 2021) in the workplace. As people with disabilities return to work, there might be an increased demand for technological skills and some may be even further behind, if they lack technology skills *and* have mental health disorders *and* have poor adaptability. These risk factors may need to be noted in the disability determination process.

(2) Technology training varies widely across workplaces, though formal training is more effective for people with disabilities.

Since workplaces, work styles, and types of technology used varies widely, training does, too. Consider advising applicants or vocational rehabilitation agencies to explore whether job sites have a thorough and formal onboarding or training process. Supplemental training may be necessary for people with disabilities – particularly for persons with mental health or emotional impairments – to feel comfortable completing job tasks where technology is necessary. This may be important to include in the goal section of a participant's Individual Work Plan (IWP), or to note in the Job Accommodation section of the Job Placement Assistance section. Additionally, it may be useful to gather information not only about an individuals' technological skills, but perhaps more importantly, their *adaptability* to working with new technology during the disability determination process and in job placement. Past research has also made an argument for the importance of career adaptability for people with disabilities. (Ferrari et al, 2017).

(3) Human interaction (versus interaction with technology) is largely considered the most salient aspect of work, and "soft skills" are prioritized by most managers.

If technology and automation is project to continue replacing more and more jobs as time goes on, if people tend to find jobs that involve human interaction more interesting, and if most managers prioritize "soft skills," then emphasizing interpersonal skills and more "human" skills such as adaptability (rather than rote memorization) should be prioritized in programs such as Ticket to Work. A report from Pearson and Nesta makes similar claims, as does the author Roose in his recent book *Futureproof* (Roose, 2021 and Bakashi et al, 2017).

Additionally, while switching to telework is often less physically strenuous, it is likely not a perfect option for people with disabilities as most crave some level of human interaction and many struggle with communication, which is made more complicated in a remote setting. While the remote options for discussion and training in Ticket Program may be useful for *an aspect* of accessibility (e.g., safety during a pandemic), it may not be helpful for people with disabilities who thrive off in-person interactions.

Furthermore, many participants explained how they have an innate drive to help others whether within a job (i.e. helping to train someone) or as a job (i.e. the desire to become a teacher or counselor). It may be useful identify worker interests and strengths, and to guide

people with disabilities towards positions where they may have a direct impact on other humans. Research from 2016 makes similar claims around the desire for people with disabilities to offer – rather than just receive – help (Liu et al, 2016).

 (4) Struggles with technology are made worse by communication issues with coworkers and/or managers or bosses, and compounded by mental health or cognitive limitations.

Mental health issues – often a comorbidity for those with physical impairments or chronic conditions – oftentimes have a more complex and long-lasting effect on someone's experiences in the workplace. Despite claims that people with disabilities are aided by technological innovation (Anna, 2018; Casselman 2019; Goss, 2019), *mental health* struggles may not fit this simplistic analysis, as evident from this study as well as an SSA funded paper from 2019 (Frank et al, 2019).

Many people in temporary, hourly, or contract employment situations do not have access to affordable healthcare and subsequently do not have access to mental health resources. If SSA is intent on helping people with disabilities become and stay employed, they must also continuously advocate for the mental health needs of people with disabilities. While this may be considered outside the scope of SSA's work, if the goal is to help people with disabilities get hired and stay working, promoting mental health is imperative. Research from Brucker and Garrison report that 32% of non-elderly DI or SSI participants could not afford health services in the past year, and SSA's Mental Health Treatment Study found significant improvement in mental health status among participants when they were provided with better access to mental health treatment and employment supports (Brucker and Garrison, 2021).

Furthermore, in our post-pandemic world, many are dealing with reverberating mental health struggles either directly from the COVID virus or as a secondary effect from isolation (Panchal et al, 2021). Some COVID-19 long-haulers are advocating for social security benefits due to the crippling and persistent side effects from COVID-19. (Abrams, 2021). Championing the importance of mental health and helping people gain access to resources may very well help with employment.

 (5) Younger employees and managers express more judgement towards older employees around technology than the other way around.

Finally, age may be another "risk factor" to consider in the disability determination process for people with disabilities in the workplace, perhaps compounded if one has a mental health disorder, struggles with adaptability, or lacks technology skills. This may be particularly important as half of all persons with a disability in 2020 were age 65 or above (Bureau of Labor Statistics, 2020), and the overall employment of workers aged 65 and older has grown by 117% in the past 20 years (Bureau of Labor Statistics, 2020).

Ageism exists in the work world – as evident from this study and past studies – and is something that applicants should be aware of when applying for jobs (Dennis and Thomas, 2007). However, older participants (managers and people with disabilities), had a wealth of life experience and wisdom to draw upon, as evident in the stories they told during the interviews. Consider advising older job applicants how to leverage their wisdom as a marketable skill in the workforce and when thinking through their Individual Work Plan (IWP). Perhaps there is an opportunity in the disability determination process to consider which types of jobs that may actually be *seeking* older workers.

Limitations

For the quantitative portion of the study, the Displaced Worker Supplement sample sizes were too small to look at the trends of "displaced workers" who had a "work limitation" *within*

individual industries – construction, manufacturing, and retail/trade. Therefore, trends were noted for displaced workers overall but not those who had a "work limitation" and worked within a specific industry. Additionally, the reason for these workers' displacement is unknown and not necessarily related to technology. Furthermore, as this portion of the study was secondary research, analysis was limited to how others conducted this research, such as how questions were asked on the survey and who responded to the survey.

For the qualitative portion of the study, as with most ethnographic research, the sample size was small (N=18) so generalizations to the overall population may be difficult to extrapolate. For example, chronic pain as a work limitation was perhaps over-represented, and all managers interviewed were White. Additionally, the managers recruited and interviewed were not the managers of the people with disabilities who were interviewed, nor did they hail exclusively from construction, manufacturing or retail/trade due to time constraints on recruiting. Therefore, experiences were not or directly parallel or corroborated. Additionally, due to COVID-19, the ethnographic method was limited to what was possible to do remotely – journaling and interviews. While ideally participants would have been observed at their jobs, this was not feasible during the pandemic.

Conclusion

This study highlighted overall displaced worker trends, as well as skills and experiences valued in technology rich environments. For the Social Security Administration, findings have implications in regards to the ubiquity of technology in the workplace and expectations around baseline skills, successful ways in training people with disabilities on technology (e.g. formal rather than informal), the compounding struggle of having a mental health disorder alongside another disability, how people with disabilities and managers alike are drawn to human interaction in the workplace, and the skills which managers value (i.e. interpersonal abilities, adaptability).

Future research

Future research should focus more narrowly on the impact of technology in the workplace on those with mental health struggles to parse apart how, why, and when difficulties occur. Additionally, as job roles among industries varies from office workers, to knowledge workers, to manual labor roles, it may be useful to unpack which job roles are most at risk within industries in decline. Finally, as COVID-19 has potentially altered the trajectory of the economy, the job market, and individuals' conceptions of the future and priorities, it would be helpful to look at census data from 2020 and to conduct an ethnography about the impact of the pandemic on workers with disabilities.

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Appendix A

Group 1 Inclusion Criteria:

- Living without a legal guardian
- Living independently
- Aged 18-65
- Experience one or more work limitations (that may be due to a disability or health condition)
- Working at least 10 hours a week
- *Ideally working* in either construction, manufacturing, or retail/trade
- Working at current job 6 months or longer
- Use of technology at work at least somewhat integral to completing job tasks
- Identifies as "thriving" alongside technology in the workplace

Group 2 Inclusion Criteria:

- Living without a legal guardian
- Living independently
- Aged 18-65
- Experience one or more work limitations (that may be due to a disability or health condition)
- Let go or had hours reduced at job *ideally* from either construction, manufacturing, or retail/trade
- Worked at job mentioned above for at least 10 hours/week
- Believes they were let go or had hours reduced due in part to technology (lack of knowledge or tech replacing job responsibilities)

Group 3 Inclusion Criteria:

- Aged 18-65
- Working at least 10 hours a week
- Working in a managerial position for at least 6 months
- In a direct supervision role
- Part of job involves training people on technology necessary for work

Appendix B

Journal Prompts, All Groups

For one week, please journal at least 3X (more if possible) answering each of the following prompts via writing, photos, or video. Please email your responses or call me at (978) 561-6276 if you would prefer to mail your responses by post. For each response, please ensure that you do not include any personal identifiable information of yourself or others (e.g. medical records, license plates, passwords, last names of colleagues, etc.)

Prompt (1): Please take a photo of your work space/place. You only have to do this once during the week you journal, unless your work space/place changes during the week. Understandably, you may be working from home – so please take a photo of wherever at home it is that you work.

Prompt (2): What types of technology did you use today in your personal life or life outside of work? What did you use that technology for specifically?

Prompt (3): What specific types of technology did you use in your professional/work life? How did using that technology during work go? (e.g. Did it make your job easier? Harder? More interesting? More efficient? More confusing? Less confusing?) Did anything differ today from your normal usage or interactions with technology?

Prompt (4): Who did you interact with at work today? Did you interact with people at work over technology or in person? How did those interactions go? When describing your interactions, please only use first names.

Prompt (5): Tell me about how you felt today at work overall. What went well? What did not go well?

Groups 1 & 2 Discussion Guide:

Introduce study &confirm consent for recording.

Tell me a bit about yourself – where do you live? How long have you lived in [insert city or state] for?

Who is in your household?

What do you like to do for fun? Hobbies?

What is a typical day like for you nowadays?

[If they mentioned work – rephrase] Tell me a bit about what you do for work.

Tell me about your work history – what was your favorite job and why was it your favorite?

What about your least favorite job? What made it difficult/challenging?

Tell me about your experience with technology in general. Walk me through a typical day including which types of technology you use, and how you use them. *[Modify as necessary based on journal responses]*

[If on camera] Can you show me your technology set up at home? Work set up?

Walk me through a typical day at your current (or previous...) job.

What types of technology you use while working? *[Modify as necessary based on journal responses]*

What was the training process like for your current or most recent job? Were you trained on the technology that the company uses/used? If so, how?

Tell me about your experiences with learning to use new technology at work – how were you trained? What did you think of the training process?

Does your experience with *(insert disability or limitation)* affect your experience at work? How so? *(Note: probe gently)*

If you could create the ideal job for yourself, what would it be? What would the pace of your day be like? What types of technology would your job include or not include?

What do you see as the future of your industry?

What would an ideal day be like for you (could include work, or not)?

Group 3 Discussion Guide:

Introduce study & confirm consent

Tell me a bit about yourself – where do you live? How long have you lived in XXX?

Who is in your household?

What do you like to do for fun or when you're not working?

Tell me about your work history – what was your first job? what was your favorite job and why was it your favorite?

What about your least favorite job? What made it challenging/difficult?

How did you find out about the current company you work for? What the process like in applying and getting hired?

 How did you get into management? What do you like/dislike about managing people? Can you tell me a story that illustrates why you [like/dislike] that particular aspect?

Tell me about your process in hiring employees? What do you look for? What questions do you ask? Why?

If you were advising a friend of yours on getting a job in a similar industry that you hire for, how would you advise them to present themselves in the interview?

What type of "skills" specifically are you looking for when you interview or hire someone? How do you know if someone possesses those skills?

Have you ever interviewed, hired, or managed an employee who had a disability or work condition?

Tell me about your experience interviewing, hiring, and working with someone who you knew had a disability? Did anything surprise you?

[Ask add'l questions if applicable]

 Walk me through the various technologies used in your organization and their purpose. Which ones do you personally interact with on a daily, weekly, monthly basis?

Has your workplace recently added or purchased any new pieces of technology?

Tell me about your personal experiences when it comes to learning to use new technology. How would you characterize your ability to learn new technology, software, etc.?

When an employee starts working for your organization, what is the training process like?

What is the training process on various tech that is used?

Tell me about a time where you had to "correct" an employee on how they were using technology – what was happening and what did you say?

Tell me about a time where you let someone go/fired someone, or reduced their hours. What was the reason or reasons for doing so? How did you handle it?

 How has your own role at XXX company evolved? Do you like the direction you're headed at your job?

What do you see as the future of your company?

Any thoughts on the future of your industry at large?

What about the future of work as a whole?