

Disability in the Digital Age: Socio-Digital Inclusion, Political Participation, and
Telework

by

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ABSTRACT

Digital technology has become central to contemporary public administration, transforming how governments deliver services and enabling civic participation. However, this transformation has also exacerbated inequalities, particularly for people with disabilities. This dissertation, *Disability in the Digital Age: Socio-Digital Inclusion, Political Participation, and Telework*, examines how disability status shapes access, use, and participation outcomes across three spheres of citizenship: everyday digital inclusion, online political participation, and employment retention through telework. Drawing on social equity theory, the capabilities approach, the civic voluntarism model, and job demands-resources theory, this research conceptualizes digital inclusion as more than access to technology, emphasizing the ability to meaningfully use digital tools to achieve social, civic, and economic outcomes. The study uses nationally representative data from the U.S. Current Population Survey (CPS), specifically the Computer and Internet Use Supplement and the Voluntary and Civic Life Supplement. It employs survey-weighted regression techniques and the Heckman Selection Model to analyze digital inequality. The first essay analyzes trends in internet and device use among people with disabilities, showing increased use in the post-pandemic era but persistent gaps in specific activities and among individuals with multiple or independent living disabilities. The second essay applies the Civic Voluntarism Model to online political participation, using a two-step Heckman selection approach to account for unequal internet access. It finds that while people with disabilities are not inherently less politically engaged online, disparities in resources, psychological engagement, and digital access constrain participation. The third essay examines telework as a mechanism for employment retention, finding that while

telework is generally associated with higher retention, its benefits vary across disability types. Overall, the findings show that digital technologies can promote inclusion but may also introduce new forms of exclusion. Digital inequality operates across interconnected domains, creating compounding disadvantages that may threaten democratic participation and economic inclusion. This dissertation contributes to public administration scholarship by centering disability in digital governance and extending equity-oriented frameworks to inform more inclusive digital policies.

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CHAPTER 1

INTRODUCTION

Public administration is being reshaped by a profound paradox: the same digital technologies that promise efficiency, inclusion, and expanded access have simultaneously exacerbated inequalities for millions of citizens (Damoah, 2025; Dobransky & Hargittai, 2006; Dobransky & Hargittai, 2016; Hargittai, 2022; Mossberger et al., 2017; Goncalves et al., 2018; Scholz et al., 2017). As governments increasingly deliver services and create civic opportunities through digital channels, a significant number of people, particularly marginalized individuals including people with disabilities, rural residents, and low-income households, remain excluded from participation (Mossberger & Damoah, 2024; Pettersson et al., 2023; Zheng et al., 2021). Digital inequality has therefore become not merely a technical problem but a defining equity challenge (Zheng, 2011; Warschauer, 2003; Van Toorn et al., 2024). At its core, digital inequality reflects differences not only in access to technology but also in the ability to meaningfully use it to achieve social, economic, and political participation. This multifaceted exclusion affects how citizens interact with their governments, how workers connect to employment opportunities, and how democracy itself functions in an increasingly digital society (Mossberger & Damoah, forthcoming; Johansson et al., 2021; McClain et al., 2021; Helsper, 2021; Tsatsou, 2021). As a result, public administration, as a profession that bridges both scholarship and practice, must confront this inequality as central to its mission in order to promote effective, equitable, and participatory governance. When digital technologies become the determinant to essential public services, their unequal distribution fundamentally

undermines the democratic and equity commitments that shape public administration as a field.

The COVID-19 pandemic revealed long-standing disparities in internet access and digital literacy, which inhibited efforts to maintain economic stability, educational opportunities, and healthcare services amid extraordinary disruption (Mossberger et al., 2023; Aissaoui, 2022; Lai & Widmar, 2021; Vejmelka & Matković 2021). Even after societies reopened, these disparities continue to pose significant risks to the capacity of people to thrive in an expanding digital society. Also, access to digital devices, content, information, and services has become a necessary condition for citizens to fully exercise their rights as digital citizens (Mossberger & Damoah, forthcoming; Damoah, 2025; Mossberger & Tolbert, 2021; Mossberger et al., 2017; Reglitz, 2020). Digital inequality, consequently, undermines public administration on three interconnected fronts, that is, access to public goods in general, participation in governance, and inclusion in the labor market. These dimensions can be argued to map directly onto the capabilities that enable individuals to live autonomous, dignified, and civically engaged lives (Mossberger et al., 2007). When a significant part of the population lacks the digital tools and skills to access government services, and to voice their concerns through online civic platforms, or compete for employment in digitally mediated labor markets, the foundational promise of democratic governance and equal opportunity for all citizens is fundamentally compromised (Mossberger & Damoah, forthcoming; Mossberger et al., 2007; de Zúñiga, 2018; Mossberger et al., 2012; Mossberger & Tolbert, 2021; Van Toorn & Cox, 2024).

Among marginalized populations, people with disabilities face particularly critical challenges in the digital society. First, people with disabilities represent a substantial and diverse population. Approximately 26% of the U.S. population reports having a disability (CDC, 2024; Okoro et al., 2018), yet they remain systematically excluded from many aspects of digital life. Additionally, the relationship between disability and digital access is complex. While digital technologies can serve as powerful accommodations that enhance independence and opportunity, inaccessible design and implementation can create new barriers that compound existing disadvantages (Dobransky & Hargittai, 2016; Dobransky & Hargittai, 2021). Again, digital inequality for people with disabilities operates not through a single mechanism but through intersecting barriers related to income, employment, education, and social isolation, factors that public administration interventions must address holistically (Helsper, 2021).

Thus, understanding disability digital inequality exposes critical insights about the design and delivery of public services. If digital government services, civic platforms, and employment systems fail to accommodate people with disabilities, they risk excluding a population that often relies most heavily on public programs and government support. Moreover, the challenges faced by people with disabilities often foreshadow difficulties that will affect broader populations as technologies evolve and as citizens age. By centering disability in analyses of digital inequality, public administration scholarship can develop more inclusive frameworks to understand and address digital exclusion.

Owing to the above, this dissertation, *Disability in the Digital Age: Socio-Digital Inclusion, Political Participation, and Telework*, situates digital inequality within the broader public

administration challenge by examining the intersections of disability status, technology access, and meaningful use across three critical domains; which is everyday digital inclusion for access and a range of activities online, civic participation through online platforms, and employment retention through teleworking. Through three interconnected essays, this work investigates how disability status shapes digital experiences and outcomes, by shedding light on both the barriers and the potential for inclusion in a rapidly changing digital society. It makes several contributions to public administration scholarship.

To begin with, this study provides empirical evidence of digital inequality patterns among people with disabilities using nationally representative data, filling important gaps in our understanding of how digital divides operate across diverse disability populations. Also, it applies and extends theoretical frameworks from capabilities theory, civic participation literature, and organizational studies to explain mechanisms of digital inclusion and exclusion. Again, it examines digital inequality across multiple life domains - personal use, civic engagement and participation, and employment - demonstrating how digital exclusion compounds across contexts to limit overall life opportunities. Finally, it offers actionable insights for policy and practice, identifying places where public administration interventions can promote more equitable digital access and use.

The first essay, *Digital Inclusion or Digital Drift? Internet Use Patterns among People with Disabilities in the U.S.*, examines evolving trends of digital inclusion among people with disabilities in the United States from 2015 to 2023, using repeated cross-sectional data from the Current Population Survey Internet Use Supplements. This essay addresses three core

research questions: (1) How do people with disabilities use the internet, smartphones, computers, and tablets? (2) What are the patterns of internet usage for different online activities? (3) How does digital inequality manifest between and within disability groups, and how do these divides compare to the general U.S. population? To understand patterns of digital inequality, the essay draws on social equity theory and Amartya Sen's Capabilities Approach as theoretical frameworks. These perspectives shift attention from mere resource provision to the actual freedoms and capabilities individuals possess to achieve valued outcomes, a crucial reframing for understanding digital inequality, where simple access to devices or connectivity does not guarantee meaningful participation. The analysis employs survey-weighted binary logistic regressions to investigate the relationship between internet adoption and use and disability status. Survey weights account for the CPS's complex sampling design and ensure nationally representative estimates (Lumley, 2020).

The second essay, *Online Political Participation and Disability: Examining Barriers, Facilitators, and Inclusion through the Civic Voluntarism Model*, applies the Civic Voluntarism Model (CVM) to examine how resources, psychological engagement, and social networks shape online political participation among individuals with disabilities. This essay explores several interrelated questions: (1) How does the online political participation of individuals with disabilities compare to that of individuals without disabilities? (2) How do resources (such as education), psychological engagement (including political interest and efficacy), and recruitment through social networks, contribute to online political participation among people with disabilities? (3) What

differences exist in online political participation among various disability groups? Methodologically, this essay addresses a critical challenge, the potential selection bias in online political participation, given that internet access itself is unevenly distributed. The study employs a two-step Heckman Correction Model to account for this selection mechanism (Ampaw et al., 2020; Morrissey et al., 2016; Goldfarb & Prince, 2008). The first stage models the likelihood of having household internet access, a prerequisite for online political participation, while the second stage examines the participation in politics online, controlling for selection bias through the Inverse Mills Ratio (IMR) generated in the first stage. This approach allows for more accurate estimates of the factors that facilitate or inhibit online civic engagement among people with disabilities.

The third essay, *Bridging Employment Gaps: The Role of Telework in Employment Retention for Individuals with Disabilities*, examines whether telework serves as an effective employment retention mechanism for workers with disabilities, using nationally representative Current Population Survey data from November 2023. This essay asks: What is the effect of telework on employment retention among individuals with disabilities? The analysis integrates empirical and theoretical insights through Job Demands-Resources (JD-R) Theory and the Social Equity Theory to understand the mechanisms that help with employment retention among individuals with disabilities. Like the first essay, this research employs survey-weighted binary logistic regressions to investigate relationships between employment, disability status, and telework arrangements, with survey weights applied to ensure nationally representative estimates (Lumley, 2020).

These three essays, taken together, advance public administration literature by examining how digital inequality shapes fundamental aspects of citizenship, that is, who participates in democracy, who benefits from public programs, and who sustains employment in an increasingly digital society. For people with disabilities, digital technology operates simultaneously as a potential bridge which enables their inclusion and as a source of new barriers; a duality that challenges public administration to reimagine its role as steward of socio-digital equity. By examining digital inequality across personal, civic, and economic domains, this dissertation brings attention to the fact that addressing digital exclusion requires comprehensive approaches that recognize the interconnected nature of digital capabilities and life opportunities. The findings from this research have important implications for policy and practice. They can inform the design of more accessible government services, the development of targeted digital inclusion programs, and the creation of employment policies that leverage technology to expand opportunities for people with disabilities. More broadly, this work contributes to ongoing conversations about how public administration must evolve to ensure that digital transformation enhances rather than undermines democratic governance and social equity.

The remainder of this dissertation is structured as follows: Chapters 2 through 4 present the three complete essays in the order discussed above. Chapter 5 concludes by integrating the findings across the three essays and discussing the theoretical and policy implications of this research for public administration scholarship and practice.

CHAPTER 2

DIGITAL INCLUSION OR DIGITAL DRIFT? INTERNET USE PATTERNS AMONG PEOPLE WITH DISABILITIES IN THE US

Abstract

This study examines evolving trends of digital inclusion among people with disabilities in the United States from 2015 to 2023. Using repeated cross-sectional data from the Current Population Survey Internet Use Supplements, it draws on almost a decade of nationally representative data. The results reveal a fundamental shift in digital participation patterns, particularly, following the COVID-19 pandemic. While overall internet use among individuals with disabilities increased almost to the level of people without disabilities by 2023, the trend varies across different online activities. Specifically, disabled individuals used telehealth and telework comparably with their non-disabled peers. Conversely, persistent gaps remain in online education, shopping, and social media, suggesting that accessibility barriers continue to constrain full participation in certain online activities. Also, the results from the main regression analysis, together with interactions, reveal that education and gender significantly moderate the relationship between disability and internet use. Post-secondary education provides particularly strong benefits for disabled individuals, while disabled males face distinct disadvantages. The results for technological device use patterns show convergence in mobile phone adoption but persistent gaps in laptop usage. Additionally, the results of different disability types underscore considerable heterogeneity, with individuals experiencing multiple disabilities or independent living disabilities facing the most severe barriers. These findings support a capabilities enhancement framework, which shows that when digital technologies genuinely eliminate

barriers, as with telehealth removing transportation challenges and telework providing schedule flexibility, disabled individuals would engage at high and sustained levels. The study contributes systematic evidence for intersectional digital inclusion policies and emphasizes the need for accessible design and differentiated interventions by disability type.

Keywords: *Digital inclusion, Disability, Social Equity, Capabilities*

Introduction

The world is advancing in digital technology. This advancement shapes nearly every aspect of modern life, from how we communicate and work to how we access healthcare, education, and public services. Yet, this digital transformation has not been universally inclusive. Research shows that instead of enabling people to participate in governance and access services, the uneven growth of internet use has introduced new forms of inequality, particularly for individuals with disabilities (Dobransky & Hargittai, 2016; Goncalves et al., 2018; Damoah, 2025). As digital technologies increasingly mediate civic participation and access to essential services, those without consistent and meaningful access face heightened risks of marginalization. For people with disabilities, this exclusion is often compounded by technological, financial, and structural barriers, which collectively hinder their full engagement in the digital society (Helsper, 2021).

Digital inclusion is more than a policy priority; it is a precondition for digital citizenship and participation in society online (Mossberger & Tolbert, 2021; Mossberger et al., 2017; Mossberger & Damoah, forthcoming). While growing scholarship in the U.S. and Europe has brought attention to the digital inequality facing people with disabilities (Hargittai, 2022; Bricout et al., 2021; Johansson et al., 2021), much of this research remains cross-sectional, capturing only a snapshot in time. Consequently, little is known about how digital inequalities have shifted over time, particularly in light of pivotal events such as the COVID-19 pandemic and the policy initiatives that followed it. This gap in the literature is especially concerning given that the pandemic profoundly elevated the role of digital

technologies in everyday life, transforming internet access from a convenience into a necessity and continuing shifts toward technology in its aftermath.

Evidence from past studies reveals that individuals with disabilities were disproportionately affected by digital inequalities during the pandemic, especially in relation to education, employment, healthcare, and social connection (Aissaoui, 2022; Dobransky & Hargittai, 2021; Van Deursen, 2020; Hargittai, 2022). For example, Johansson et al. (2020) found that disability subgroups, particularly those with cognitive, language, and intellectual disabilities faced distinct and often more severe challenges in accessing and using the internet. These challenges are further shaped by intersections with income, education, and gender, with women and individuals with multiple disabilities reporting even greater levels of digital exclusion (McClain et al., 2021; Damoah, 2025).

Such findings point to the urgent need for a more dynamic and disaggregated analysis of digital inequality. Instead of treating people with disabilities as a homogenous group, it is critical to examine within-group differences and how patterns of digital technology access and exclusion have evolved over time. Drawing on social equity theory and Amartya Sen's capabilities approach, this paper conceptualizes digital inclusion not merely as access to devices and connectivity, but as the freedom to achieve valued functionings through technology, the real opportunities individuals have to participate fully in digital society. This paper addresses that gap by drawing on pooled cross-sectional data from 2015 to 2023 to examine how digital inequality among people with disabilities has changed in the U.S. Thus, it aims to contribute to the evolving scholarship on digital inequality by providing a

“longitudinal” perspective on the digital experiences of individuals with disabilities. By tracing patterns from 2015 to 2023, it offers insights into both persistent gaps and emerging shifts in digital technology access and use. In doing so, this paper seeks to inform inclusive digital development strategies and support more equitable policy interventions. The remainder of this paper is structured as follows: the second section reviews the existing literature on digital inequality, with particular attention to disability-related differences. The third section outlines the data and methodology used in the analysis. Additionally, section four presents the key findings, while section five concludes the paper with a discussion of the implications for research, policy, and practice.

Literature Review

The concept of the digital divide has transformed beyond its initial characterization as unequal access to digital technology devices and broadband infrastructure (Vicente & López, 2010), evolving as a multifaceted challenge. As digital technologies increasingly underpin essential aspects of life including education, employment, healthcare, and civic engagement, digital exclusion exacerbates existing structural inequalities (Reisdorf & DeCook, 2022). Scholarship in recent years has moved from focusing solely on infrastructure gaps to embracing a more holistic understanding of digital inequality, which includes differences in digital skills, meaningful engagement, interface usability, and the sociotechnical structures that enable or inhibit inclusion (Damoah, 2025; Hargittai, 2022; Johansson et al., 2021; Dobransky & Hargittai, 2021; Kaur & Saukko, 2022). To understand these patterns of digital inequality, this paper draws on social equity theory and Amartya Sen's capabilities approach as theoretical frameworks. These perspectives shift

attention from mere resource provision to the actual freedoms and capabilities individuals possess to achieve valued outcomes. This section of the paper is organized in two parts: first, a theoretical review and then an empirical literature review.

Theoretical Framework: Social Equity and the Capabilities Approach

Social equity theory, grounded in principles of distributive justice, concerns the fair allocation of resources and opportunities necessary for human flourishing across diverse populations with competing needs and claims (Stivers et al., 2023; Brown & Wright, 2020; Wright & Merritt, 2020; Svara & Brunet, 2020; Blessestt et al., 2019; Gooden & Portillo, 2011; Hart, 1974). In recent years, this framework has been advanced through a human rights approach, which advances that resources necessary for survival and human development should be available to all as a right based on common humanity, requiring broad distribution within a framework that ensures equitable human development and social inclusion for democratic participation (Wright & Merritt, 2020; Wronka, 2017). The United Nations General Assembly declared access to internet as a basic human right in 2016, establishing a normative foundation for digital equity as a social justice imperative (Damoah, 2025; Reglitz, 2020).

Digital equity represents the social justice goal of ensuring that everyone has access to information and technology regardless of their social identity, and recognizing that technology access, especially the internet, is deemed by the UN as an integral part of the fundamental right of freedom of expression (Damoah, 2025; Reglitz, 2020; Ocran, 2019; Tudzi et al., 2017). Thus, digital equity encompasses not only access to devices and

internet, but also the ability to use and benefit from them effectively, enabling full participation in society, democracy, and the economy (Pajuste, 2025; Imran, 2023; Mossberger & Damoah, forthcoming). This conceptualization moves beyond mere technological access to emphasize meaningful participation and capability enhancement.

In addition to the above, traditional theories of distributive justice have focused primarily on the equitable allocation of resources or primary goods such as rights, liberties, opportunities, income, and wealth (Rawls, 2017; 1971). However, Sen's capabilities approach challenges this resource-centered view by arguing that what matters is not simply what resources people have, but what they are able to do and be with those resources, that is, their real freedoms to achieve valued functionings (Sen, 1979; 2015). This distinction is significant for understanding digital inequality among people with disabilities. Sen (1979) advances this point by considering two persons with the same set of resources but different disability status. According to Sen, the disabled person is unequal in what she can do or be with her resources compared to a person without a disability, and may be doubly disadvantaged because she faces higher expenses due to disability while receiving the same resource allocation. Applied to the context of digital technology, this means that simply providing internet access or devices is insufficient; these technologies have both generative and transformative dimensions through which they enable capabilities directly and affect other inputs in the attainment of valued capabilities (Zheng & Walsham, 2008).

Again, when applied to information and communication technologies, the capabilities approach emphasizes that ICTs can serve as tools for improving wellbeing by enhancing

different aspects of freedom, providing educational and work opportunities, and increasing potential for social inclusion and economic development (Zheng & Stahl, 2011; Mossberger et al., 2007). This approach thus focuses on functionings, the states and activities constitutive of a person's being, ranging from basic things like being healthy and having a good job to complex states such as having self-respect and being calm, with capability conceptualized as a reflection of the freedom to achieve valuable functionings (Sen, 2015; Robeyns, 2005). In this sense, the capability approach emphasizes deprivation of capacities, such as using digital technologies to improve healthcare, education, economic participation, and decision-making autonomy, rather than access to ICTs (Zheng & Walsham, 2008).

Digital inequality has been described as a critical topic for social equity and justice, with some scholars considering it a source of poverty, and using the term "digital poverty" (Ragnedda et al., 2022; Allman, 2021). The COVID-19 pandemic made glaringly obvious the role of technology and the importance of access to high-speed broadband, revealing that millions of people in the USA still lack home access to high-speed internet. The pandemic further revealed that low-income individuals, people of color, older adults, Native Americans, and rural residents particularly affected by this structural reality that exacerbates social, economic, and civic participation gaps (Reeves & Acosta, 2021; Mossberger & Damoah, 2024).

The digital economy is increasingly recognized as the economy of the future, yet 2.6 billion people remain offline globally, with digital inequality representing a major barrier to

economic growth and sustainable development. Statistics show that only 27% of the population in low-income countries has internet access compared to 93% in high-income countries (International Telecommunication Union, 2024). In a world where digital access drives opportunity, one third of the global population is excluded from education, jobs, and financial services, making bridging the digital divide essential not only for technology access but as a fundamental driver of economic equality, social inclusion, and political participation (United Nations, 2024; Van Toorn & Cox, 2024, Mossberger et al., 2007). Although these global gaps are striking, digital inequality is also very present within wealthy countries like the United States. Data from the American Community Survey (2024) show that about 90% of U.S. households have some form of internet access. Still, this overall figure hides important differences. According to the 2024 American Community Survey, 80.6% of households earning less than \$20,000 have a broadband Internet subscription. Overall, 12.6% of households rely exclusively on a mobile-only Internet plan, and 6.7% of households have no Internet subscription at all. Together, these patterns show that the digital divide is not just an international problem, it remains a persistent challenge even in the US, deepening existing social and economic inequalities.

Digital technology benefits society in multiple ways by lowering barriers to accessing education, commerce, e-participation, healthcare, social connectedness, and entertainment. Yet, existing inequities stemming from historical injustice and systematic exclusion can be exacerbated by the digital inequality, creating socioeconomic disadvantages that intersect with social stratification based on age, gender, ethnicity, race, educational level, and income (Seifert, 2020; Johansson et al., 2021; McClain et al., 2021; Helsper, 2021). The

extant literature shows that the digital divide exacerbates social inequalities in education, employment, and healthcare primarily due to inequalities in digital access, usage, and literacy, with marginalized groups continuing to face significant barriers in using digital technologies effectively despite technological advancements (Pajuste, 2025).

The primary concern is not merely the physical access to computers and the internet, but rather people's ability to use these technologies to participate in meaningful social practices. This shifts the focus from merely addressing gaps through equipment provision to tackling skills, accessibility, and well-being via the effective integration of technology within communities, institutions, and societies (Warschauer, 2003). In terms of social justice, social inclusion means equal and fair participation, which means being a part of society and feeling like you belong, considering civic, economic, social, and interpersonal factors. This leads to a participatory, emancipatory form of social inclusion instead of a top-down approach (Stivers et al., 2023; Gidley et al., 2010).

Empirical Evidence on Digital Exclusion and Disability

Despite improvements in global internet penetration and access to digital technologies, individuals with disabilities are still overrepresented among those who face digital inequalities. Research in the past has centered on access to technological devices and connectivity; however, recent scholarship argues for a nuanced comprehension that encapsulates usability, digital literacy and competencies, content creation, and substantive engagement (Hargittai, 2022; Johansson et al., 2021; Dobransky & Hargittai, 2021; Kaur & Saukko, 2022). This broader lens reflects a shift from centering exclusively on

infrastructure gaps to recognizing the social and systemic barriers embedded in the digital society.

Notwithstanding this conceptual evolution, basic access remains a foundational challenge that cannot be ignored. People with disabilities face disproportionately higher barriers to accessing and using digital technologies, barriers that are not merely functional but also rooted in social exclusion, stigma, and policy neglect (Cho & Kim, 2022; Hargittai, 2022; Helsper, 2021; Tsatsou, 2022). In the United States, rural residents face chronic underinvestment in broadband infrastructure, a disparity exacerbated during the COVID-19 pandemic (Mossberger & Damoah, 2024). Lai and Widmar (2021) report that while 94% of urban residents had broadband adequate for moderate usage, only 51.6% of rural residents had comparable access, leaving many people with disabilities in rural areas further marginalized. A lack of affordable access remains a critical barrier for people with disabilities in both urban and rural areas. Because people with disabilities are disproportionately represented among low-income populations, the costs associated with internet subscriptions and digital devices constitute yet another hurdle even in areas where the necessary infrastructure already exists.

Yet, access alone does not equate to equity, and this is perhaps one of the most crucial insights to emerge from contemporary digital inequality research. Even when individuals with disabilities are online, they encounter additional barriers embedded in design, confidence, and skill (Caton et al., 2024; Asmar et al., 2022). Dobransky and Hargittai (2016) found that individuals in five out of six disability categories had significantly lower

internet use and digital skills in the U.S., even after controlling for demographic and socioeconomic factors. This suggests that disability itself, independent of other social characteristics, creates distinct challenges in the digital society.

The usability of digital tools, especially for those with cognitive, intellectual, or communicative disabilities, remains a persistent issue (Caton et al., 2024; Asmar et al., 2022). Persistent gaps in internet skills remain across nearly all disability types, indicating that the challenge is not limited to specific forms of disability but represents a systemic failure to design for diverse needs (Hargittai, 2022). Social media platforms clearly reflect these tensions. While they can advance community and self-expression, they also reproduce exclusion through inaccessible design and digital fatigue (Kaur & Saukko, 2022). The promise of digital connectivity thus becomes a double-edged sword, offering new possibilities for engagement while simultaneously creating new forms of exclusion.

Notwithstanding these significant barriers, research reveals a paradox that challenges deficit-based assumptions about disabled people's digital engagement. Once online, people with disabilities are often just as engaged, or even more engaged, than their non-disabled peers in creating and consuming content, particularly in areas such as content creation and consumption (Dobransky & Hargittai, 2016; Dobransky & Hargittai, 2021). The afore is crucial because it shifts the narrative from one of individual limitation to one of systemic barriers. The challenge is not that people with disabilities lack interest or capacity for digital engagement, but rather that they face disproportionate obstacles in accessing the tools and platforms that would enable such engagement.

In both the U.S. and European contexts, the overarching challenge is not a lack of interest but the enduring inaccessibility of digital tools, interfaces, and skill-building routes (Bricout et al., 2021; Johansson et al., 2021; Robinson et al., 2015; Trevisan, 2022). This body of research fundamentally reframes digital inequality as a problem of design and social justice rather than individual deficit. Achieving digital equity is thus increasingly recognized as a matter of social and economic justice worth pursuing, with digital literacy and broadband connection becoming essential to how individuals participate in society, economy, and civic institutions, and access healthcare, essential services, education, and career opportunities (Congress.gov, 2021).

In addition to the above, intersectionality surfaces as a crucial lens for understanding the depth and contours of digital inequality among people with disabilities, revealing how multiple forms of marginalization compound to create distinct patterns of exclusion. Disability intersects with gender, age, race/ethnicity, class, and geography, producing layered experiences of exclusion that cannot be understood by examining a single dimension in isolation (Helsper, 2021; Zheng & Walsham, 2021). These barriers often intersect with key demographic factors, compounding digital inequalities in ways that amplify vulnerability. For instance, age and education are strong predictors of digital exclusion, older adults with disabilities and those with lower educational attainment are less likely to use the internet, often due to a combination of limited access to assistive technology, digital skills, and supportive environments (Duplaga, 2017; Scholz et al., 2017). Older women with disabilities, for example, are particularly disadvantaged due to the combined effects of financial insecurity, social isolation, and lower levels of digital

literacy (Scholz et al., 2017). This intersectional disadvantage demonstrates how categories of identity and social position do not simply add to one another but interact to create qualitatively distinct experiences of exclusion.

Further, the intersection of gender and incarceration status introduce compounded layers of exclusion that show the full complexity of digital inequality. Studies examining formerly incarcerated women reveals a third-level digital divide where access alone does not translate into meaningful use due to the compounding challenges of gender, incarceration history, and disability (Blomberg et al., 2021; Reisdorf & DeCook, 2022). This highlights how stigmatized identities can create barriers that persist even when technical access is achieved, as social marginalization shapes both opportunities for digital skill development, and the subjective experience of navigating online spaces. Also, race and economic disadvantages often intersect with disability to inhibit participation in digital life, exacerbating persistent inequalities that have deep historical roots (Brown et al., 2020; Longoria et al., 2022; Wang, 2022). These intersecting disadvantages create cumulative barriers that are greater than the sum of their parts, making digital inclusion particularly elusive for those experiencing multiple forms of marginalization.

Household structure also matters in ways that show the social dimensions of digital access and use. Individuals with disabilities who live alone may have few opportunities for assistance with navigating digital platforms, whereas those in shared households may benefit from informal support (Scholz et al., 2017). Social support plays a critical role in shaping digital engagement; informal assistance from household members significantly

increases the likelihood of digital participation among people with disabilities (Damoah, 2025; Scholz et al., 2017; Correa et al., 2017). This aligns with broader insights into how social capital and caregiving dynamics affect digital inclusion, suggesting that digital inequality is not solely about individual characteristics or technical infrastructure but also about the social contexts in which people are embedded. The availability of informal support networks can partially compensate for inaccessible design and limited formal assistance.

In addition to the above, Johansson et al. (2021) underscore the diversity within disability communities, arguing that individuals with invisible or communicative disabilities often face dilemmas about self-disclosure that shape their digital behaviors in distinctive ways. The decision of whether and how to disclose disability in online spaces carries significant consequences for how individuals are perceived and treated, yet accessible design often requires such disclosure in order to access accommodations. Without disaggregated data and nuanced approaches, policies risk treating disability as a homogeneous category, masking critical intra-group differences (Johansson et al., 2021; Tsatsou, 2021; 2022; Chordiya et al., 2024). This homogenization can lead to one-size-fits-all interventions that fail to address the specific needs of different disability communities, eventually reproducing the very exclusions they aim to address.

The pandemic served as a stress test for digital technologies, revealing and intensifying existing gaps in ways that made digital inequality impossible to ignore. The cost of digital inequalities became especially evident during the COVID-19 pandemic, although their

impact extends well beyond that period. The pandemic exacerbated existing educational inequalities, especially for disabled youth from racially minoritized and low-income households, as remote learning exposed the limits of accessibility and caregiving support (Golden et al., 2023). Schools and universities rapidly transitioned to online platforms that were often poorly designed for accessibility, assuming that all students could seamlessly adapt to digital learning environments (Mustafa et al., 2024; Golden et al., 2023). Moreover, Pettersson et al. (2023) found that people with disabilities experience disproportionate difficulty accessing e-health services as a result of inaccessible interfaces and reduced digital self-efficacy. The rapid digitization of healthcare during the pandemic created new barriers for many disabled individuals even as it ostensibly expanded access, revealing tensions between efficiency and equity in digital service delivery.

While some individuals with disabilities increased their use of social media and digital tools during lockdowns as a way of finding new forms of connection and community, they also encountered heightened exposure to misinformation and fewer trustworthy sources (Dobransky & Hargittai, 2021; Hargittai, 2022). This information vulnerability reflects broader challenges in digital literacy and critical evaluation skills and also points to how marginalized communities may have fewer resources for verifying information and less access to authoritative sources. Furthermore, automated systems implemented in public services often failed to account for the complex needs of disabled users, particularly at the intersections of age, disability type, and socioeconomic vulnerability (Goggin & Soldatic, 2022). The pandemic thus accelerated digital transformation in ways that prioritized speed

and convenience over accessibility and inclusion, deepening existing inequalities even as digital technologies became more central to daily life.

Digital participation also extends to civic and political life, where exclusion has far-reaching implications for democratic representation and collective self-determination. Van Toorn and Cox (2024), Mossberger et al. (2007), and Mossberger & Damoah (forthcoming) argue that digital citizenship, a person's ability to participate fully in society through digital means, is not possible without equitable access and inclusive design. As civic engagement increasingly moves online, from voter registration to political organizing to public comments on digital platforms, digital exclusion translates directly into political marginalization. Many digital platforms continue to assume a normative user, overlooking the diverse cognitive, sensory, and physical needs of the population (Mason et al., 2021). This assumption of “normalcy” in design creates barriers that are often invisible to those who do not experience them, making it difficult to build political will for change. Asmar et al. (2022) and Reisdorf and DeCook (2022) emphasize that without inclusive and participatory approaches to design, digital democracy risks exacerbating the same barriers present in offline civic life, perpetuating the exclusion of disabled voices from political processes and policy debates.

Qualitative research provides valuable insights into how digital content and platforms can be better designed to promote genuine inclusion. Studies have shown that simplified navigation, visual cues, and multimedia support enhance accessibility for users with cognitive impairments (Kennedy et al., 2013; Sevilla et al., 2007), while targeted tools

improve usability for older smartphone users and individuals with aphasia (Carmien & Manzanares, 2014; Greig et al., 2008, cited in Johansson et al., 2021). These studies demonstrate that accessible design is not only possible but can enhance usability for all users, not just those with disabilities. While these qualitative studies provide valuable insights, including user heuristics and personal experiences, they often lack generalizability due to their small sample sizes and limited contexts (Golafshani, 2015). Nonetheless, they underscore the critical need for inclusive design and targeted interventions to address the compounded barriers faced by individuals with disabilities in the digital age.

Finally, addressing disability digital inequality requires a paradigm shift in how we conceptualize both the problem and its solutions. Technical solutions alone, such as increased infrastructure are insufficient to address the deeply social and structural nature of digital inequality. Researchers advocate for a rights-based approach that centers digital citizenship and participatory co-creation with individuals with disabilities (Van Toorn & Cox, 2024; Mossberger & Damoah, forthcoming). A dynamic, intersectional, and user-informed understanding of digital inclusion rooted in social justice rather than technical parity, is essential for achieving digital equity for people with disabilities. Without such an approach, digital society will continue to replicate and even intensify the social exclusions that many disabled individuals already face offline, perpetuating cycles of marginalization that undermine the promise of digital technologies as tools for inclusion and empowerment.

Given the above, critical questions arise about how disability status has influenced internet adoption and use in the U.S. over the years. Additionally, disaggregating the disability data

to uncover the nuanced digital experiences of individuals with different disabilities is necessary. This approach not only exposes within-group differences but also provides a foundation for targeted interventions aimed at advancing digital equity in a post-pandemic world. Consequently, the study seeks to explore patterns of internet use and digital inclusion among people with disabilities in the United States from 2015 to 2023. Thus, this study asks the following questions: (1) How do people with disabilities in the U.S. use the internet, smartphones, computers, and tablets? (2) What are the patterns of internet usage for different activities online? (3) How does digital inequality exist between and within disability groups, and how do these divides compare to the general population in the U.S.?

Research Design

This section explores three key dimensions of internet use among people with and without disabilities. First, it examines overall internet use in any location. Next, it looks at how device use has changed over time, highlighting shifts in the technologies people use to go online. Finally, it analyzes trends in online activities, showing how patterns of digital participation have evolved. Drawing on data from the Current Population Survey (CPS), these analyses together provide a comprehensive picture of the digital lives of people with and without disabilities in the U.S., and how those experiences have changed in recent years.

Data Source

This study employs the Current Population Survey (CPS) as its data source. The CPS is a monthly survey of households conducted by the U.S. Bureau of the Census for purposes of tracking employment and other issues. The CPS's basic monthly sample offers

demographic data for household members, encompassing age, race & ethnicity, educational attainment, and job status from interviews obtained from about 60,000 households (National Telecommunications and Information Administration, 2023). The CPS uses a multistage stratified probability sampling design that captures detailed demographic and labor force information for all civilian, non-institutionalized household members. The 2015, 2017, 2019, 2021, and 2023 samples include a Computer and Internet Use supplement, funded by the National Telecommunications and Information Administration (NTIA). Commonly referred to as the NTIA Internet Use Survey, it offers comprehensive data regarding household internet subscription types and individual internet usage at home, in the workplace, and for activities such as communication, entertainment, telecommuting, and job searching (NTIA, 2023). The dataset was selected because it is the most comprehensive national survey of how Americans connect to the internet and what they do when they are online, with its large sample size and more than 50 questions about internet usage.

Study Sample

To examine trends in internet adoption over time, the study employs a pooled cross-sectional dataset by combining CPS for the years 2015, 2017, 2019, 2021, and 2023. Each CPS supplement provides a nationally representative cross-sectional snapshot of individuals living in the United States at a specific point in time. While each survey year features a different set of respondents, pooling these cross-sectional datasets facilitates temporal comparisons and allows for the identification of patterns across demographic and socioeconomic groups. Data for the years 2015-2023 were used because they provide

information on activities performed online, some of which are not captured in earlier CPS years. The final study sample comprised 464,039 participants aged 15 and older. This approach aligns with the statistical framework of pooled cross-sectional analysis, where data from independent cross-sections across time are aggregated to strengthen statistical power and improve generalizability (Dielman, 1983). Pooling cross-sectional data enables researchers to estimate the influence of time-varying and time-invariant predictors on outcomes of interest by leveraging both between-group and over-time variation (Raffalovich & Chung, 2004; Ngwa et al., 2016; Molebatsi et al., 2020). While this design does not track individuals longitudinally, it provides a robust basis for analyzing population-level trends and is especially useful in policy-relevant research where repeated cross-sections are more feasible than panel data collection (Pottel et al., 2021).

Outcome Variable for Regression Analysis

The outcome variable is Internet use in various locations. This variable was constructed using responses to multiple questions in the Computer and Internet Use Supplement of the CPS. Specifically, individuals were asked whether they accessed the internet in various locations over the past year, including at home, at work, at school, at a café or coffee shop, while traveling, at a public library or community location, at someone else's home, or at another location. Each of these items required a "Yes" (=1) or "No" (=2) response. Individuals were coded as internet users (i.e., internet user = 1) if they answered "Yes" to at least one of these questions, and as non-users (internet user = 0) otherwise.

Independent Variable of Interest for Regression Analysis

Disability status was used as a key independent variable. The binary variable disability was derived from the variable called PRDISFLG in the CPS, which indicates whether a person has any disability. Responses were coded as 1 for individuals with a disability and 0 for those without. To capture more granular information on disability types, a categorical variable 'DisStatus' was constructed using six CPS variables: PEDISEAR (serious difficulty hearing or deaf = hearing), PEDISEYE (serious difficulty seeing even when wearing glasses or blind = vision), PEDISREM (serious difficulty concentrating, remembering, or making decisions = cognitive), PEDISPHY (serious difficulty walking or climbing stairs = ambulatory), PEDISDRS (difficulty dressing or bathing = self-care), and PEDISOUT (difficulty doing errands alone such as visiting a doctor's office or shopping = independent-living). Each of these items had valid entries coded as 1 = Yes and 2 = No. Individuals were classified into a single disability type only if they reported one difficulty; for example, those who answered "Yes" to PEDISEAR and "No" to all other items were categorized as having a "Hearing Disability." Respondents who reported more than one type of difficulty were categorized and recoded as having multiple disabilities.

Other Covariates for Regression Analysis

Demographic factors, including age, sex, education, employment status, household size, and household income, were chosen as correlates; the direct and interaction effects of these factors were examined. Age was captured using the variable PRTAGE, which records a respondent's age in completed years as at their last birthday. Sex (PESEX) was coded as 1 = Male and 2 = Female. Educational attainment was measured using the variable

PEEDUCA, which identifies the highest level of school completed or degree received, ranging from less than first grade to doctorate degrees. Employment status (PREMNOT) categorized individuals as employed = 1 and unemployed = 0; this pertains to only individuals who are in the labor market as captured by the CPS. Household size was accounted for using HRNUMHOU, which captures the total number of people living in the respondent's household. Race/ethnicity (PTDTRACE) was derived from self-identified race categories. To control for income differences, family income was measured using HEFAMINC, which records total family income in 16 categorical brackets. For modeling purposes, HEFAMINC was log-transformed to normalize its distribution. Together, these covariates were included to isolate the effect of disability on internet use in any location while accounting for other relevant sociodemographic characteristics.

These control variables were selected based on extensive evidence from the digital inequality literature, which documents systematic inequalities in internet access and use across demographic and socioeconomic groups. Age is one of the strongest predictors of digital engagement; older adults consistently report lower adoption and less diverse internet use due to lower digital skills and lower technology confidence (Damoah, 2025; Johansson et al., 2021). Education similarly shapes digital skills and internet use, with higher educational attainment associated with greater device ownership, more advanced online activities, and higher levels of digital literacy (van Deursen, 2020; Scholz. et. al., 2017; Duplaga, 2017). Income is a central determinant of access and use, as households with higher family income are more capable of purchasing devices and maintaining home broadband subscriptions (Golden et al., 2023; Pettersson et al., 2023; Scholz. Et. al., 201).

Household size may influence internet use in competing ways: larger households can provide interpersonal support and assistance when individuals encounter barriers to digital engagement, yet they may also introduce constraints through shared devices and bandwidth, potentially limiting access opportunities (Damoah, 2025; Correa et al., 2017). Employment status is also relevant for digital inequality, being employed can increase opportunities to use internet and acquire digital competencies (van Deursen, 2020; Helsper, 2021; Helsper, 2012). The relevance of race in digital inequality research has been emphasized in the extant literature. With persistent racial gaps in broadband adoption and digital skill levels even after accounting for socioeconomic factors (Pettersson et al., 2023; Brown et al., 2020; Longoria et al., 2022; Wang, 2022). Including these covariates ensures that the estimated effect of disability on internet use is not confounded by other predictors of digital access and participation.

Data Analysis for Regression

To comprehensively examine digital inclusion among individuals with disabilities. It assesses overall internet use in different locations as a baseline indicator of digital access.

Internet Use in Different Locations

A series of survey-weighted binary logistic regressions were used to investigate the relationship between internet use in any location and disability status. Survey weights were applied to account for the CPS's complex sampling design and to ensure nationally representative estimates (Lumley, 2020). Specifically, analyses used the person-level supplement weights from the CPS to produce nationally representative estimates, with replicate weights applied to obtain correct standard errors. To do this, internet use (in any

location) was predicted by disability while controlling for the effects of covariates (age, education, sex, employment status, race, household size, and family income). The following logit models were used to test the study's objective:

$$\text{logit}(p) = \ln \frac{p}{(1-p)} = \beta_0 + \beta_1 \text{disability} + \varepsilon \quad (1)$$

$$\text{logit}(p) = \beta_0 + \beta_1 \text{disability} + \beta_2 \text{prtage} + \beta_3 \text{sex} + \beta_4 \text{education} + \varepsilon \quad (2)$$

$$\begin{aligned} \text{logit}(p) = & \beta_0 + \beta_1 \text{disability} + \beta_2 \text{prtage} + \beta_3 \text{sex} + \beta_4 \text{education} + \beta_5 \text{employment} + \beta_6 \text{hrnumhou} \\ & + \beta_7 \text{race} + \beta_8 \log(\text{hefaminc}) + \beta_9 \text{factor}(\text{year}) + \varepsilon \quad (3) \end{aligned}$$

$$\begin{aligned} \text{logit}(p) = & \beta_0 + \beta_1 (\text{disability} \times \text{race}) + \beta_2 (\text{disability} \times \text{employment}) + \beta_3 (\text{disability} \times \text{sex}) + \\ & \beta_4 (\text{disability} \times \text{education}) + \beta_5 (\text{disability} \times \text{factor}(\text{year})) + \beta_7 \text{hrnumhou} + \beta_8 \text{prtage} + \beta_9 \\ & \log(\text{hefaminc}) + \varepsilon \quad (4) \end{aligned}$$

$$\text{logit}(p) = \beta_0 + \beta_1 \text{DisStatus} + \beta_2 \text{prtage} + \beta_3 \text{sex} + \beta_4 \text{education} + \varepsilon \quad (5)$$

$$\text{logit}(p) = \beta_0 + \beta_1 \text{DisStatus} + \beta_2 \text{prtage} + \beta_3 \text{sex} + \beta_4 \text{education} + \beta_5 \text{employment} + \varepsilon \quad (6)$$

$$\begin{aligned} \text{logit}(p) = & \beta_0 + \beta_1 \text{DisStatus} + \beta_2 \text{prtage} + \beta_3 \text{sex} + \beta_4 \text{education} + \beta_5 \text{employment} + \beta_6 \text{hrnumhou} \\ & + \beta_7 \log(\text{hefaminc}) + \varepsilon \quad (7) \end{aligned}$$

where:

- p = probability of the positive outcome (i.e., that a person uses the internet)
- β_0 = intercept term (baseline log-odds when all predictors are zero)
- $\beta_1, \dots, \beta_p$ = coefficients for disability and other predictor variables (controls)
- $\text{logit}(p)$ = natural logarithm of the odds of internet use

- $\text{logit}(p) = \ln \frac{p}{(1-p)}$
- $\beta_n(\text{Disability} \times \text{controls}) = \text{interaction term (e.g., disability} \times \text{education)}$
- $\varepsilon = \text{error term}$

In Model 1, internet use was regressed on disability status only to assess the baseline association between disability and internet use. Also, Model 2 introduced age, sex, and education as control variables to adjust for basic sociodemographic factors (Scholz. Et. al., 2017; Duplaga, 2017; Au, 2024). Additionally, Model 3 expanded upon this by further controlling for employment status, household size, race, logged household income, and year fixed effects, providing a more comprehensive specification. Model 4 employs an intersectionality framework (Helsper, 2021; Tsatsou, 2022) to examine how disability intersects with other social factors to shape internet access patterns. Disability does not exist in isolation; rather, its effects on internet use may be amplified or mitigated depending on other social characteristics (Alper et al., 2016; Zheng & Walsham, 2021). Model 5 shifted focus to disability type, regressing internet use on specific disability categories while controlling for time-invariant variables, age, sex, and education. Again, model 6 added employment status to these controls, and model 7 further included household size and logged household income. All models were estimated using logistic regression. Due to the large sample size, a stringent significance threshold of $p < .0001$ was used to minimize false-positive bias (Lakens et al., 2018).

Summary of Participant Characteristics

The study was conducted with a total of 464,039 participants. Of this number, 241,919 (51.5%) were females and 222,120 (48.5%) were males. A total of 60,943, representing

12% of the total participants, are people with disabilities. Among those with disabilities, the most common type was multiple disabilities (5.6%), followed by ambulatory disabilities (2.5%), hearing disabilities (1.7%), cognitive disabilities (1.2%), vision disabilities (0.6%), independent living disabilities (0.4%), and self-care disabilities (0.0%). Regarding internet use, 372,668 (80.7%) participants reported using the internet, while 91,371 (19.3%) did not use the internet. Among individuals who report using the internet at various locations, usage rates vary across disability types compared to those with no disability. Internet use is highest among individuals without disabilities (82.9%). Among disability groups, individuals with cognitive disabilities (76.8%), vision disabilities (74.6%), and hearing disabilities (73.7%) report comparatively higher levels of internet use. Lower levels of internet use are observed among individuals with self-care disabilities (69.3%) and ambulatory disabilities (68.8%). Individuals with independent living disabilities report internet use at 61.2%, while those with multiple disabilities have the lowest reported internet use at 57.5% (See Appendix B for data on the subsample of disabled respondents).

Respondents have varying levels of educational attainment. A majority of individuals (59.1%) have some form of postsecondary education, including 26.7% with some college or an associate degree, 20.6% with a bachelor's degree, and 11.8% with a graduate degree. Those with a high school diploma or equivalent make up 28.2% of the data, while 12.8% have less than a high school diploma. This distribution indicates that the sample remains relatively well-educated, with most participants having attained education beyond high school. Additionally, 274,606 (95.9%) individuals reported being employed, while 11,115

(4.1%) were unemployed at the time of the survey. In terms of racial and ethnic composition, the largest group represented in the dataset is White respondents, who make up 318,373 (62.5%) of the total sample. Hispanics are the second-largest group at 61,572 (16.9%), followed by Black respondents at 45,955 (12%). Asian Americans comprise 25,080 (6%) of the sample, while American Indian or Alaska Native individuals make up 4,739 (0.7%). Others accounted for 8,320 (1.8%).

Table 1. Descriptive Statistics of Study Variables

Variable	Category	N	Percentage (%)
Internet Use in Any Location	No	91,371	19.3
	Yes	372,668	80.7
Disability	No	403,096	88
	Yes	60,943	12
Disability Type	Ambulatory	13,106	2.5
	Cognitive	5,561	1.2
	Hearing	9,343	1.7
	Independent Living	1,785	0.4
	Multiple	28,247	5.6
	Self-Care	225	0.0
	Vision	2,676	0.6
Sex	Female	241,919	51.5
	Male	222,120	48.5
Education	Less than High School Diploma	56,637	12.8
	High School Diploma or Equivalent	133,012	28.2
	Some College or Associate Degree	125,189	26.7
	Bachelor's Degree	93,992	20.6
	Graduate Degree	55,209	11.8
Employment Status	Unemployed	11,115	4.1
	Employed	274,606	95.9

Race/Ethnicity	White	318,373	62.5
	Black	45,955	12
	Hispanic	61,572	16.9
	Asian American	25,080	6
	American Indian/Alaska Native	4,739	0.7
	Other	8,320	1.8
Percentages are weighted to represent the U.S. population. Frequencies represent unweighted sample counts.			

Results of Regression Analyses

Association Between Disability and Internet Use in Any Location

All predictor variables in the models except employment were statistically significantly associated with internet use. In Model 1, having a disability was negatively associated with internet use. Specifically, individuals with a disability were less likely to report using the internet in the past three months compared to those without a disability [OR = 0.38]. In Model 2, after controlling for age, sex, and education, the negative association between disability and internet use persisted, though it was reduced [OR = 0.62], suggesting that these sociodemographic characteristics partly explain the bivariate relationship. When employment, household size, race/ethnicity, income, and year fixed effects were added in Model 3, disability was no longer statistically significant at conventional thresholds [OR = 1.04; 95% CI: 0.98-1.11].

Among the control variables, age had a negative relationship with internet use across all models. As people got older, their odds of using the internet decreased slightly [OR = 0.98]. Males had marginally lower odds of internet use compared to females [OR = 0.98 in Model 2; OR = 0.90 in Models 3 and 4]. Education was strongly positively associated with internet use. For example, individuals with a graduate degree were nearly three times as likely to use the internet compared to those with less than a high school education [OR = 2.97], while those with a bachelor's degree had odds of 2.67. Household characteristics also mattered. Living in a larger household was associated with slightly reduced odds of internet use [OR = 0.96]. Employment status showed no statistically significant association with

internet use [OR = 0.97; 95% CI: 0.92-1.03]. Household income, as expected, was positively associated with internet use, with a one-unit increase in the log of family income increasing the odds by 49% [OR = 1.49]. Regarding race/ethnicity, American Indian/Alaska Native [OR = 0.68], Asian American [OR = 0.78], Black [OR = 0.79], and Hispanic [OR = 0.72] individuals had significantly lower odds of internet use than the White respondents ($p < 0.001$).

In Model 4, interaction terms between disability and key covariates were introduced. The intersection of disability and race/ethnicity revealed that disabled Black individuals were somewhat less likely to use the internet compared to disabled Whites [OR = 0.89; 95% CI: 0.75-1.06], though this difference was not statistically significant. Similarly, disabled individuals identifying as Hispanic [OR = 1.05], Asian American [OR = 0.90], or other race [OR = 1.49] showed no statistically significant differences, while disabled American Indian/Alaska Native individuals showed a positive but non-significant trend [OR = 1.54; 95% CI: 0.90-2.67]. The interaction between disability and sex (Figure 1, B) showed that disabled males had significantly lower odds of internet use compared to disabled females [OR = 0.83]. Education remained a strong enabler even among people with disabilities (Figure 1, A). Disabled individuals with a graduate degree had significantly higher odds of using the internet than their less-educated disabled peers [OR = 1.58], followed by those with bachelor's degrees [OR = 1.39] and some college or associate degrees [OR = 1.31], while those with high school diplomas showed no significant difference [OR = 1.07; 95% CI: 0.90-1.28]. The interaction between disability and employment [OR = 1.18; 95% CI: 0.96-1.44] is not significant. Finally, the interaction between disability and survey year

showed clear improvements over time (Figure 1, C). Disabled individuals had higher odds of using the internet in 2021 [OR = 1.31] and 2023 [OR = 1.53] compared to 2015, pointing to narrowing gaps in digital access, though the effects for 2017 [OR = 1.12] and 2019 [OR = 1.10] were not statistically significant.

Figure 1. Interaction Between Disability and Sex, Education, and Time

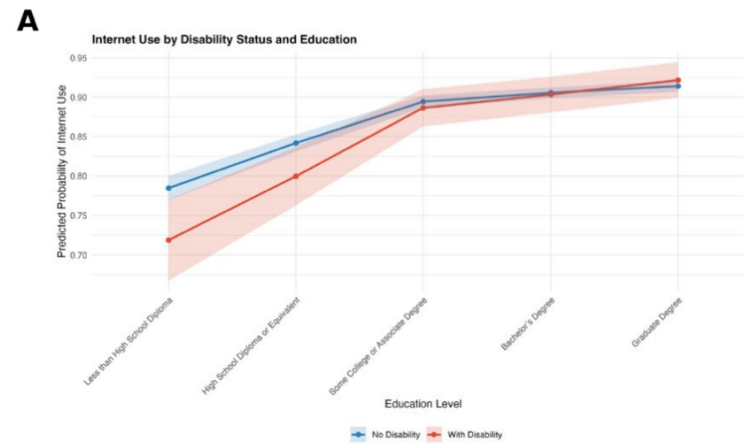
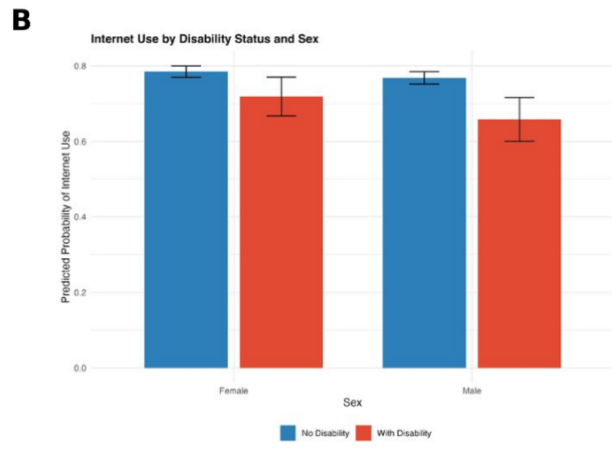
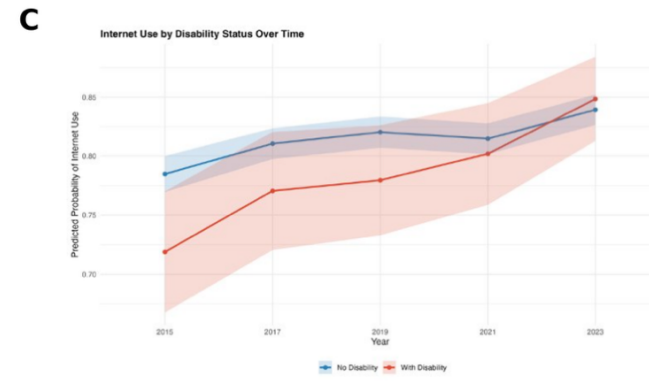


Table 2. Logistic Regression Results of Association Between Disability and Internet Use

Logistic Regression Results				
	<i>Dependent variable:</i>			
	Internet User			
	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
Disability	0.38	0.62	1.04	0.70
	(0.37, 0.39)	(0.61, 0.64)	(0.98, 1.11)	(0.54, 0.91)
Age		0.98	0.99	0.99
		(0.98, 0.98)	(0.99, 0.99)	(0.99, 0.99)
Male		0.98	0.90	0.91
		(0.97, 0.99)	(0.88, 0.92)	(0.89, 0.93)
High School Diploma or Equivalent		1.75	1.47	1.46
		(1.69, 1.80)	(1.39, 1.54)	(1.38, 1.54)
Some College or Associate Degree		3.35	2.36	2.32
		(3.24, 3.47)	(2.24, 2.49)	(2.20, 2.45)
Bachelor's Degree		4.31	2.67	2.63
		(4.14, 4.49)	(2.51, 2.83)	(2.48, 2.79)
Graduate Degree		5.36	2.97	2.92
		(5.11, 5.62)	(2.77, 3.19)	(2.72, 3.14)
Employed			0.97	0.96
			(0.92, 1.03)	(0.90, 1.02)
Household Size			0.96	0.96
			(0.95, 0.98)	(0.95, 0.98)
Black			0.79	0.79
			(0.75, 0.83)	(0.75, 0.84)
Hispanic			0.72	0.72

			(0.68, 0.76)	(0.68, 0.75)
Asian American			0.78	0.78
			(0.72, 0.85)	(0.72, 0.85)
American Indian/AK Ntv			0.68	0.66
			(0.58, 0.79)	(0.57, 0.78)
Other			1.02	0.99
			(0.91, 1.15)	(0.88, 1.12)
Family Income (logged)			1.49	1.49
			(1.45, 1.54)	(1.45, 1.53)
Disability:Black				0.89
				(0.75, 1.06)
Disability:Hispanic				1.05
				(0.87, 1.28)
Disability:Asian American				0.90
				(0.61, 1.33)
Disability:American Indian/Alaska Native				1.54
				(0.90, 2.67)
Disability:Other				1.49
				(0.96, 2.33)
Disability:Employed				1.18
				(0.96, 1.44)
Disability:Male				0.83
				(0.74, 0.93)
Disability:High School Diploma or Equivalent				1.07
				(0.90, 1.28)
Disability:Some College or Associate Degree				1.31

				(1.08, 1.59)
Disability: Bachelor's Degree				1.39
				(1.09, 1.77)
Disability: Graduate Degree				1.58
				(1.19, 2.10)
Disability: 2017				1.12
				(0.93, 1.35)
Disability: 2019				1.10
				(0.93, 1.31)
Disability: 2021				1.31
				(1.09, 1.57)
Disability: 2023				1.53
				(1.26, 1.85)
2017			1.18	1.17
			(1.11, 1.25)	(1.11, 1.24)
2019			1.26	1.25
			(1.19, 1.33)	(1.19, 1.32)
2021			1.22	1.21
			(1.15, 1.29)	(1.14, 1.28)
2023			1.46	1.43
			(1.38, 1.55)	(1.35, 1.52)
Constant	4.85	5.65	2.52	2.60
	(4.77, 4.93)	(5.41, 5.91)	(2.25, 2.83)	(2.31, 2.92)
Observations	464,039	464,039	285,721	285,721
<i>Note:</i> Coefficients are presented as odds ratios with 95% confidence intervals in brackets; Model 1: Nagelkerke $R^2 = 0.03$ Adjusted $R^2 = 0.03$ $R = 0.17$; Model 2: Nagelkerke $R^2 = 0.12$ Adjusted $R^2 = 0.12$ $R = 0.35$; Model 3: Nagelkerke $R^2 = 0.06$ Adjusted $R^2 = 0.06$ $R = 0.25$; Model 4: Nagelkerke $R^2 = 0.06$ Adjusted $R^2 = 0.06$ $R = 0.25$				

Association Between Disability Type and Internet Use

Across all three models, different types of disabilities were significantly associated with the likelihood of internet use, although the direction and strength of these relationships varied by disability type and model specification. All reported results are odds ratios (ORs). In Model 5, which includes only the disability types, all categories of disability were associated with significantly lower odds of internet use compared to individuals without disabilities. The largest negative associations were observed among individuals with multiple disabilities, whose odds of internet use were 72% lower [OR = 0.28], and those with independent living disabilities, who had 67% lower odds [OR = 0.33]. Individuals with ambulatory disabilities had 54% lower odds [OR = 0.46], as did those with self-care disabilities [OR = 0.46]. Vision disability was associated with 39% lower odds [OR = 0.61], hearing disability with 42% lower odds [OR = 0.58], and cognitive disability with 32% lower odds [OR = 0.68].

In Model 6, after adjusting for demographic factors such as age, sex, and education, the magnitude of negative associations was reduced across all disability types, though they remained below 1.00. The odds ratios for ambulatory disability rose to 0.76, hearing disability to 0.93, and vision disability to 0.82, indicating that demographic factors, particularly age and education, explain a considerable portion of the initial disadvantage observed in Model 5. Cognitive disability showed similar reduction [OR = 0.76]. Independent living disability, while improved, remained strongly negative [OR = 0.53], as did multiple disabilities [OR = 0.49] and self-care disability [OR = 0.60].

Model 7 further adjusts for employment, household size, race/ethnicity, income, and year fixed effects. Here, the pattern of results shifted markedly. Most disability types showed odds ratios close to or slightly above 1.00, and none were statistically significant at conventional thresholds. Ambulatory disability [OR = 1.10; 95% CI: 0.98-1.24], vision disability [OR = 1.08; 95% CI: 0.91-1.29], independent living disability [OR = 1.09; 95% CI: 0.75-1.59], and cognitive disability [OR = 1.17; 95% CI: 0.98-1.40] all showed no significant disadvantage in internet use once full controls were included. Hearing disability showed exact parity [OR = 1.00; 95% CI: 0.90-1.12]. Multiple disabilities, while improved from earlier models, remained modestly below parity [OR = 0.92; 95% CI: 0.82-1.03], though this difference was not statistically significant. Self-care disability showed elevated odds ratio [OR = 2.04; 95% CI: 0.75-5.59], though the extremely wide confidence interval indicates uncertainty in this estimate, and it is not statistically significant. This may be due to the small number of individuals in this category.

Table 3. Logistic Regression Results of Association Between Disability Type and Internet Use

Logistic Regression Results			
	<i>Dependent variable:</i>		
	Internet User		
	Model 5	Model 6	Model 7
	(1)	(2)	(3)
Ambulatory Disability	0.46	0.76	1.10
	(0.44, 0.48)	(0.73, 0.80)	(0.98, 1.24)
Cognitive Disability	0.68	0.76	1.17
	(0.63, 0.74)	(0.70, 0.82)	(0.98, 1.40)
Hearing Disability	0.58	0.93	1.00
	(0.55, 0.61)	(0.88, 0.98)	(0.90, 1.12)
Independent Living Disability	0.33	0.53	1.09
	(0.29, 0.36)	(0.47, 0.59)	(0.75, 1.59)
Multiple Disability	0.28	0.49	0.92
	(0.27, 0.29)	(0.47, 0.50)	(0.82, 1.03)
Self-Care Disability	0.46	0.60	2.04
	(0.33, 0.65)	(0.44, 0.82)	(0.75, 5.59)
Vision Disability	0.61	0.82	1.08
	(0.55, 0.68)	(0.73, 0.92)	(0.91, 1.29)
Age		0.98	0.99
		(0.98, 0.98)	(0.98, 0.98)
Male		0.97	0.90
		(0.96, 0.99)	(0.88, 0.92)
High School Diploma or Equivalent		1.73	1.46
		(1.68, 1.79)	(1.39, 1.54)
Some College or Associate Degree		3.31	2.36
		(3.20, 3.43)	(2.24, 2.49)
Bachelor's Degree		4.26	2.67
		(4.09, 4.43)	(2.51, 2.83)
Graduate Degree		5.28	2.97
		(5.04, 5.53)	(2.77, 3.19)
Employed			0.97
			(0.92, 1.03)

Household Size			0.96
			(0.95, 0.98)
Black			0.79
			(0.75, 0.83)
Hispanic			0.72
			(0.68, 0.75)
Asian American			0.78
			(0.72, 0.85)
American Indian/Alaska Native			0.68
			(0.58, 0.79)
Other			1.02
			(0.91, 1.14)
Family Income (logged)			1.49
			(1.45, 1.54)
2017			1.18
			(1.11, 1.25)
2019			1.26
			(1.19, 1.33)
2021			1.22
			(1.15, 1.29)
2023			1.46
			(1.38, 1.55)
Constant	4.85	5.69	2.52
	(4.77, 4.93)	(5.43, 5.96)	(2.24, 2.82)
Observations	464,039	464,039	285,721
<i>Note:</i>			
	Coefficients are presented as odds ratios with 95% confidence intervals in brackets.		
	Model 5: Nagelkerke R^2 = 0.04 Adjusted R^2 = 0.04 R = 0.19		
	Model 6: Nagelkerke R^2 = 0.13 Adjusted R^2 = 0.13 R = 0.35		
	Model 7: Nagelkerke R^2 = 0.06 Adjusted R^2 = 0.06 R = 0.25		

Device Usage Analysis

Device usage was analyzed using four binary indicators: desktop computer use, laptop use, tablet use, and mobile phone use -- to further investigate disparities in digital access. Each variable was coded as 1 if the respondent reported using the device to access the internet and 0 otherwise. These indicators show how people use different types of technology to connect to the internet. This gives us a better idea of digital inequality than just basic access. Internet usage shows if people are connected, but device usage shows how robust and flexible that connection is, since different devices offer varied levels of capability and engagement. Descriptive analyses were conducted using survey weighting to investigate the distribution of device usage patterns by disability type and status.

Trends in Device Usage by Disability Status

Figure 2 presents the percentage of users by disability status and year who report using different devices: desktop, laptop, tablet, and mobile phone, between 2015 and 2023. Overall, individuals without disabilities consistently report higher device usage rates compared to individuals with disabilities across all device types and years, though the magnitude of these gaps varies by device type and has shifted over time. Desktop use has declined steadily for both groups from 2015 to 2023, reflecting broader national trends away from desktop reliance. In 2015, 37.9% of individuals without disabilities used desktops compared to 27.7% of those with disabilities, a gap of 10.2 percentage points. By 2023, usage dropped to 23.0% and 19.7%, respectively, narrowing the gap to 3.3 percentage points. While both groups have reduced desktop usage, the decline has been steeper among individuals with disabilities, who started from a lower baseline.

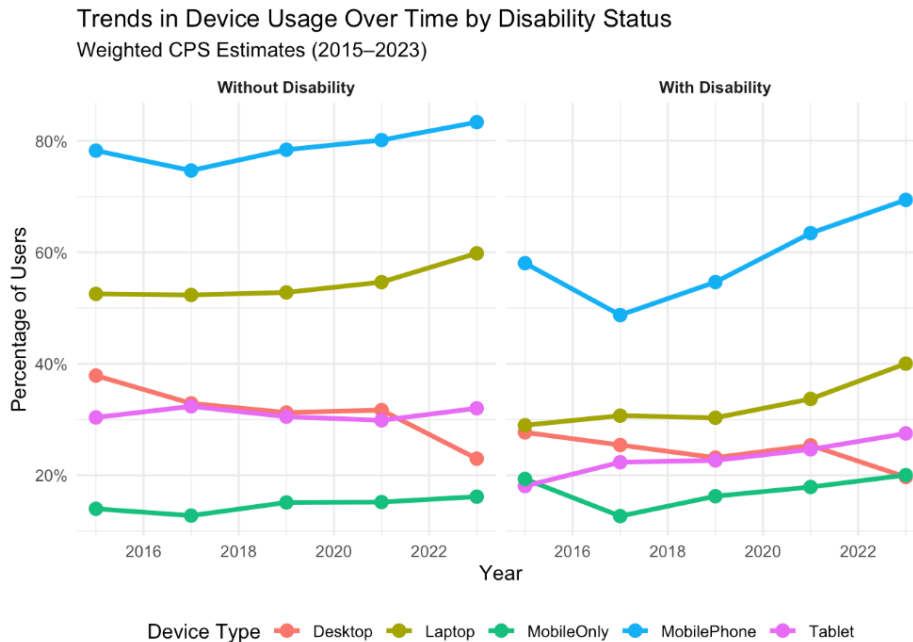
Laptop usage shows growth for individuals without disabilities, rising from 52.5% in 2015 to 59.8% in 2023. However, individuals with disabilities show more modest gains, increasing from 29.0% to 40.0% over the same period. The laptop gap, which stood at 23.6 percentage points in 2015, narrowed slightly to 19.8 percentage points by 2023, but remains considerable. This persistent divide indicates that portable computing access continues to be unequal, despite some improvement. Also, tablet usage has grown for both groups, but with persistent gaps. In 2015, 30.4% of people without disabilities used tablets compared to 18.1% of those with disabilities, a 12.3 percentage point gap. By 2023, usage had risen to 32.0% and 27.5%, respectively, reducing the gap to 4.5 percentage points. While this represents meaningful convergence, individuals with disabilities still lag behind in tablet adoption.

Additionally, mobile phone usage remains the most common across all years and groups, though notable disparities persist. Among people without disabilities, usage increased from 78.2% in 2015 to 83.3% in 2023. For individuals with disabilities, usage rose from 58.1% to 69.4% over the same period. While this represents growth, and the gap narrowed from 20.2 percentage points in 2015 to 13.9 percentage points in 2023, a considerable difference remains. Despite mobile phones being the most widely adopted technology, they have not fully achieved an equalizing role, with roughly 14% fewer individuals with disabilities using mobile phones compared to their non-disabled peers as of 2023. Thus, the data reveal persistent divides across all device types, although with varying trajectories. While gaps have narrowed for tablets and mobile phones, and to a lesser extent for desktops, laptop usage shows more persistent inequality. Arguably, individuals with disabilities consistently

lag behind in usage rates for all devices, suggesting that digital inclusion gaps extend across multiple forms of technology. These patterns underscore the need for comprehensive, device-specific strategies when designing digital equity policies, with particular attention to addressing barriers in laptop and mobile phone access.

Mobile-only use, defined as relying solely on a mobile phone without access to other devices presents a notably different pattern from all other device categories. Unlike desktop, laptop, tablet, and general mobile phone usage, disabled individuals report consistently higher rates of mobile-only use compared to those without disabilities across nearly all years examined. In 2015, 19.4% of individuals with disabilities were mobile-only users, compared to 14.0% of those without disabilities, a gap of 5.3 percentage points favoring greater mobile-only reliance among the disability group. By 2023, these figures stood at 20.0% and 16.2%, respectively, with the gap narrowing modestly to 3.9 percentage points. This reversed disparity suggests that disabled individuals are not only less likely to use most devices but are also more likely to depend exclusively on a mobile phone as their sole means of digital access. Such exclusive reliance on mobile devices may reflect structural barriers to acquiring or using laptops, desktops, and tablets, including cost, physical accessibility, and availability of assistive technologies. Given that mobile-only access is associated with more limited functionality for tasks such as job searching, completing forms, and accessing educational resources, the higher concentration of mobile-only use among individuals with disabilities raises additional equity concerns that go beyond device ownership rates alone (Mossberger et. al., 2017).

Figure 2. Trends in Device Usage by Disability Status



Device Usage by Disability Type

Figure 3 presents the percentage of users by disability type and year who reported using desktop computers, laptops, tablets, and mobile phones between 2015 and 2023. It offers a more granular view of digital device usage among people with different types of disabilities, compared with those without disabilities. Several trends emerge across device types, pointing to both divides and progress in digital inclusion. Desktop usage generally declined over time for all groups, including those without disabilities, mirroring broader trends in favor of portable devices. Among disability types, there is notable variation in baseline usage levels. In 2015, individuals with hearing disabilities reported the highest desktop usage at 39.2%, slightly exceeding those without disabilities (37.9%). By 2023,

desktop usage had declined across all groups, ranging from 15.4% among those with independent living disabilities to 24.9% among those with hearing disabilities. The steepest declines occurred among individuals with hearing disabilities (down 14.2 percentage points), independent living disabilities (down 11.4 percentage points), and self-care disabilities (down 12.7 percentage points).

Also, laptop usage rose consistently from 2015 to 2023 across all groups. By 2023, individuals with cognitive disabilities (55.9%) and self-care disabilities (56.3%) nearly reached parity with those without disabilities (59.8%), representing substantial gains from 2015 when their usage rates were 38.5% and 32.0%, respectively. Respondents with vision disability also showed strong growth, reaching 49.8% by 2023. However, significant gaps persist for individuals with multiple disabilities (32.7%) and independent living disabilities (35.2%), who consistently report the lowest laptop usage rates. These disparities suggest that portable computing remains less accessible for those with complex or severe functional limitations.

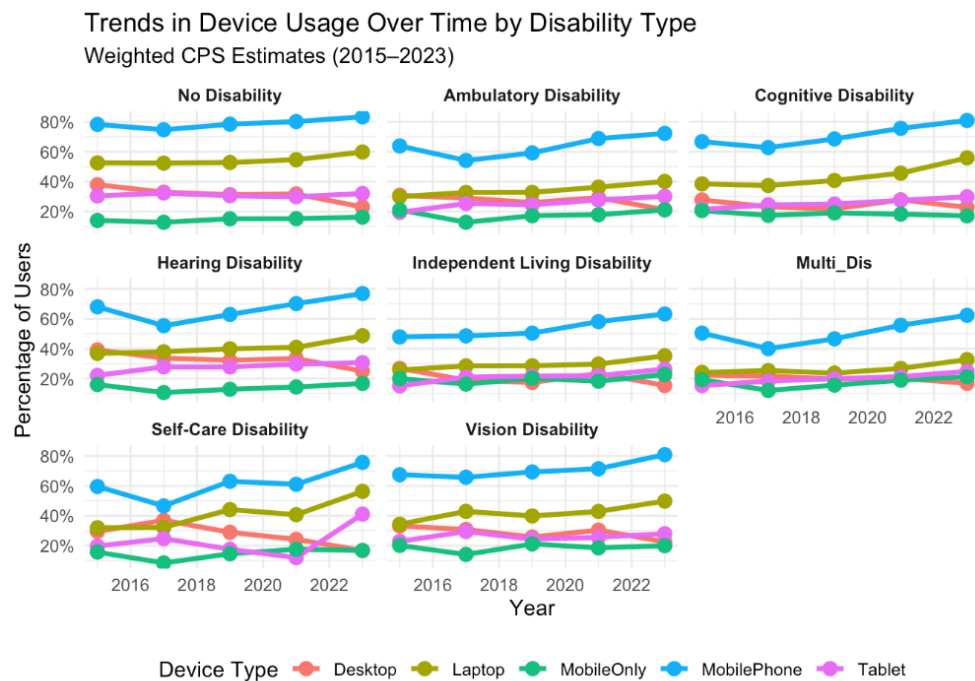
Additionally, tablet usage remains relatively stable across years, typically ranging between 15% and 41%, but with considerable variation across disability types and less clear temporal patterns. Self-care disability shows volatility: usage ranged from 19.7% in 2015 to a low of 12.0% in 2021, then jumped sharply to 41.1% in 2023, the highest rate among all groups. This volatility may reflect small sample sizes for this disability category. Generally, tablet usage appears more evenly distributed across disability types than laptops

or desktops, with most groups clustering between 25% and 32% by 2023, suggesting that tablets may offer moderate accessibility across different functional needs.

Moreover, mobile phones remain the most used device across all groups, with steady increases over time. By 2023, individuals with cognitive disabilities (80.9%) and vision disabilities (80.9%) had nearly achieved parity with those without disabilities (83.3%). Earlier years showed more pronounced inequalities, particularly among those with multiple disabilities and independent living disabilities, whose usage rates ranged between 47.9% and 50.4% in 2015. While these groups showed improvement by 2023, reaching 62.3% and 63.2%, respectively, they continue to lag behind other groups. The steady convergence for most disability types underlines mobile technology's critical role in bridging the digital divide, likely due to its portability and increasingly sophisticated accessibility features.

In essence, while gaps in digital access persist among certain disability types, especially for laptops and mobile phones among those with independent living or multiple disabilities, the trend over time points toward increasing device adoption and narrowing gaps for most groups. Cognitive, vision, and self-care disability groups have made particularly strong gains in laptop adoption, while mobile phones show broad-based growth. However, targeted interventions are still needed to address persistent gaps among individuals with independent living and multiple disabilities across all device types. These results show how significant it is to have diverse digital inclusion strategies for each type of disabilities, considering the unique problems and challenges that come with each one.

Figure 3. Trends in Device Usage by Disability Types



Online Activities Analysis

To investigate the extent to which individuals interact with the internet beyond access, a collection of online activity variables was analyzed. These variables were obtained from CPS inquiries that inquired about respondents' participation in particular activities during the previous year. Telework, online job search, online medical consultations, online class participation, online shopping, and social media use comprise the activities. Each activity was represented as a binary variable (1 = Yes, 0 = No). These measures reflect the degree to which individuals can use the internet to accomplish significant economic, health, educational, and social outcomes, thereby capturing functional digital inclusion. This component offers a deeper understanding of the integration of digital technologies into

daily life and the persistence of disparities across various online engagement domains, in addition to access.

Online Activities Performed by Disability Status

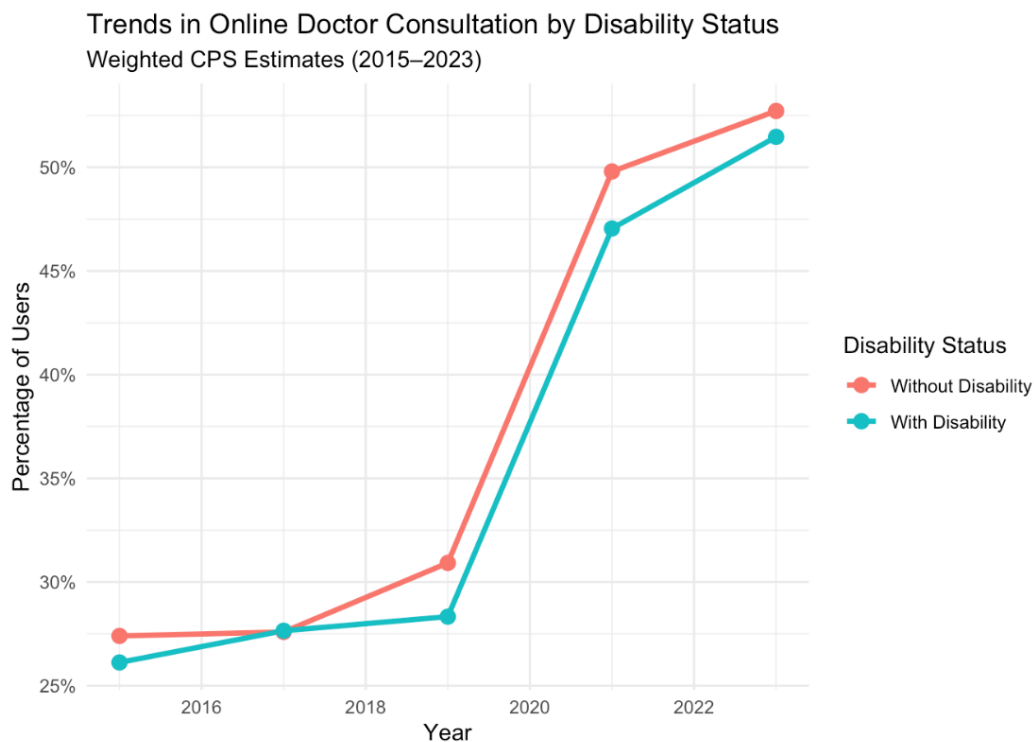
Having established patterns of internet access and device usage, the analysis now turns to examining online activities as a further test of digital capacity beyond access. While device ownership provides the infrastructure for digital participation, actual engagement in online activities, such as accessing healthcare services, offers a more direct measure of digital inclusion and the practical utility of internet connectivity.

The findings on online doctor consultations from 2015 to 2023 reveal a clear and steady increase in usage over time for both individuals with and without disabilities (Figure 4). Across most years, people without disabilities report slightly higher rates of online doctor consultations than those with disabilities, though the differences are relatively modest and the gap fluctuates over time. In 2015, online consultations were relatively low across the board, with approximately 27% of individuals in each group engaging in this activity, 27.4% for people without disabilities and 26.1% for those with disabilities. By 2017, both groups showed minimal growth, converging at approximately 27.6% for both groups. The slight increase in 2019 shows a modest gap emerging, with 30.9% of people without disabilities using online consultations compared to 28.3% of those with disabilities, indicating that online health services were becoming more mainstream but still not widely adopted.

A sharp rise occurs between 2019 and 2021, coinciding with the COVID-19 pandemic and the resulting shift toward telehealth. During this period, usage jumped dramatically for both groups, reaching 49.8% for those without disabilities and 47.1% for those with disabilities, an increase of nearly 20 percentage points for each group. This surge reflects broader transformations in healthcare delivery necessitated by the pandemic. By 2023, usage rates stabilized and continued to grow modestly, with 52.7% of individuals without disabilities reporting online doctor consultations compared to 51.5% of those with disabilities, a gap of just 1.2 percentage points. Thus, the findings highlight a positive trend toward widespread adoption of digital health services.

Online access to healthcare has improved significantly over time for both groups, with the pandemic serving as a major catalyst for telehealth adoption. While people with disabilities show slightly lower usage rates in most years, the differences are small and the overall trajectory is positive. Telehealth has become a mainstream healthcare option, as evidenced by the almost equal use by 2023 (figure 3), with over half of both categories using online consultations. Nevertheless, the persistent small gap indicates that there may be remaining barriers to telehealth access for individuals with disabilities. This underscores the necessity of ensuring that digital health platforms are fully accessible and that efforts to maintain and expand this infrastructure consider the specific needs of individuals with disabilities.

Figure 4. Trends in Online Doctor Consultation



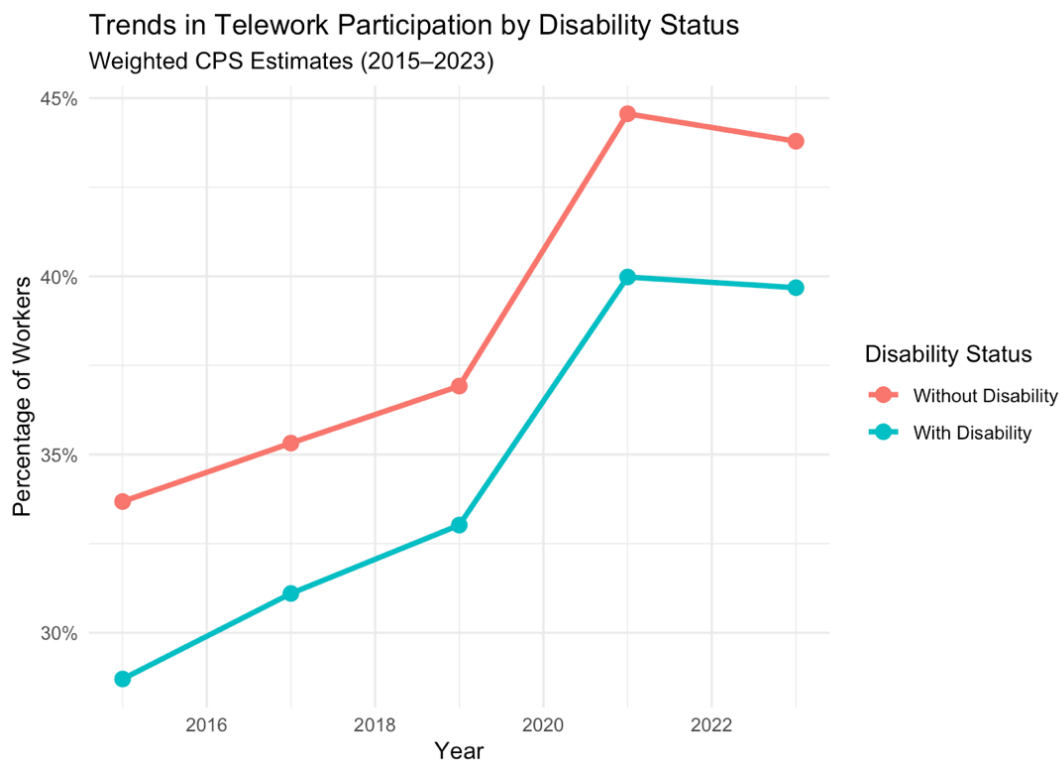
In addition to the above, the findings on telework by disability status from 2015 to 2023 show an overall upward trend in teleworking for both people with and without disabilities, with a consistent gap between the two groups (Figure 5). While both groups show growth in telework participation, individuals without disabilities have consistently reported higher rates of teleworking across all years. In 2015, teleworking was less common, with 28.7% of individuals with disabilities working remotely compared to 33.7% of those without disabilities, a gap of approximately 5 percentage points. This gap persisted through the following years, with both groups showing modest increases: by 2017, telework had risen to 31.1% among people with disabilities and 35.3% among those without. The trend continued upward in 2019, likely due to expanding workplace flexibility and digital

infrastructure, with 33.0% of individuals with disabilities and 36.9% of those without disabilities reporting telework.

However, a significant increase occurred between 2019 and 2021, coinciding with the COVID-19 pandemic, which prompted a major shift toward remote work. In 2021, 40.0% of individuals with disabilities and 44.6% of those without were teleworking, an increase of approximately 7 percentage points for those with disabilities and 7.6 percentage points for those without from 2019. Interestingly, the 2023 data shows that telework participation remained relatively stable post-pandemic, with only slight declines. About 39.7% of people with disabilities and 43.8% of those without continued to work remotely in 2023. This stability suggests that telework may have become a more permanent feature of the labor market, though differences in access or opportunity persist, with the gap remaining at approximately 4 percentage points.

Overall, while the growth in telework is promising for all workers, the consistently lower participation rates among people with disabilities, ranging from 4 to 5 percentage points across all years, reveal ongoing challenges in ensuring equitable access to remote work opportunities. Addressing these differences through policy support, workplace accommodations, and inclusive technology remains essential for maximizing the potential of telework as a tool for disability-inclusive employment.

Figure 5. Trends in Telework

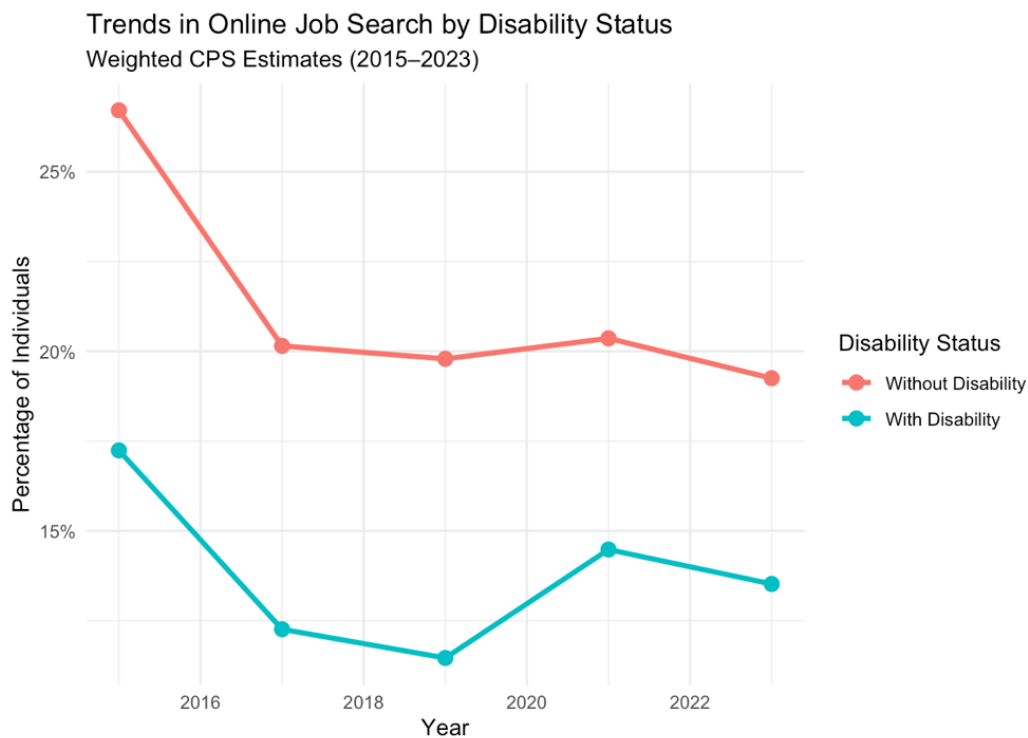


Further, the findings on online job search by disability status from 2015 to 2023 reveal a consistent trend. Individuals without disabilities report higher rates of searching for jobs online than their counterparts with disabilities (Figure 6). Both groups experienced declining trends from 2015 to 2019, followed by a modest recovery in 2021, before declining again by 2023. In 2015, online job search rates showed a notable gap, with 26.7% of people without disabilities reporting having searched for jobs online compared to 17.2% of people with disabilities, a difference of approximately 9.5 percentage points. This initial disparity suggests that digital job-seeking tools were already being accessed at different rates by the two groups. From 2015 to 2019, both groups experienced declines in online job search activity. By 2019, rates had dropped to 19.8% among people without disabilities

and 11.5% among those with disabilities, representing declines of nearly 7 percentage points and 6 percentage points, respectively.

A slight recovery occurred in 2021, coinciding with the pandemic-era labor market disruptions, when online job search increased to 20.4% for those without disabilities and 14.5% for those with disabilities. However, this recovery proved temporary. By 2023, rates had declined again to 19.3% and 13.5%, respectively. It reveals that the gap between the two groups remained significant, ranging from approximately 6 to 9.5 percentage points, with people without disabilities consistently more likely to search for jobs online. This persistent inequality may reflect multiple barriers facing people with disabilities in the labor market, including lower labor force participation rates, longer unemployment durations that reduce active job searching, or potential accessibility challenges with online job platforms. Notwithstanding the growing number of remote work opportunities, people with disabilities still search for jobs online less often than people without disabilities. This shows how essential it is to make sure that online job platforms and virtual recruitment practices are all fully accessible and welcoming. These findings also imply that people with impairments need specific employment support services to assist them find jobs in the digital job market.

Figure 6. Trends in Online Job Search

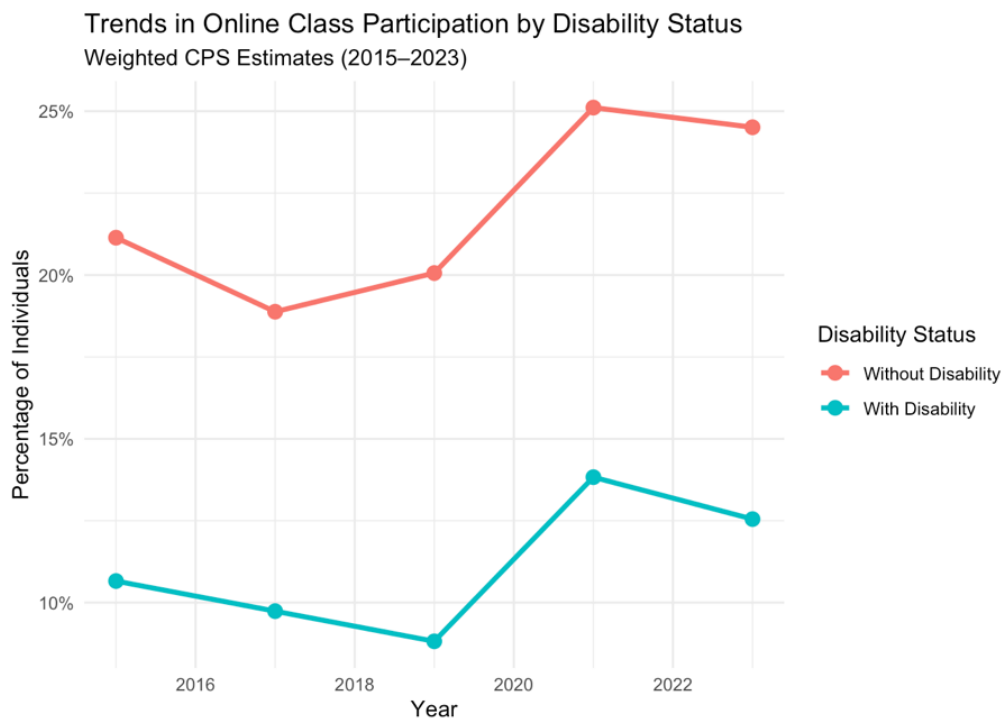


Additionally, the findings on online class participation by disability status from 2015 to 2023 reveal persistent differences in access to digital learning (Figure 7). It shows that individuals with disabilities participated in online classes at consistently lower rates than those without disabilities. In 2015, only 10.66% of individuals with disabilities reported taking online classes, compared to 21.14% of those without disabilities, a gap of approximately 10.5 percentage points. This early disparity likely reflects structural barriers, such as limited access to digital devices, lower broadband availability, inaccessible online learning platforms, or economic constraints that disproportionately affect people with disabilities. Rather than narrowing over time, the participation gap

remained persistent and even widened slightly in subsequent years. By 2019, participation among people with disabilities had declined to 8.82%, while people without disabilities had rates around 20.06%, creating the widest gap in the period under review at approximately 11.2 percentage points.

The COVID-19 pandemic in 2021 brought a surge in online class participation for both groups, likely driven by educational disruptions and widespread digital transitions. However, this shift did not equalize access. While individuals with disabilities saw their participation increase to 13.83%, those without disabilities reached 25.11%, maintaining a gap of roughly 11.3 percentage points. This pattern persisted through 2023, with 12.55% of people with disabilities participating compared to 24.51% of their peers without disabilities. These findings underscore the enduring digital divide in education for people with disabilities. Despite the pandemic's acceleration of online learning adoption and potential accessibility improvements, structural barriers remain firmly in place. The persistent gap suggests that increased availability of online education alone is insufficient. Rather, addressing fundamental issues of device access, broadband affordability, platform accessibility, and targeted support for learners with disabilities is essential to achieving digital equity in education.

Figure 7. Trends in Online Class Participation

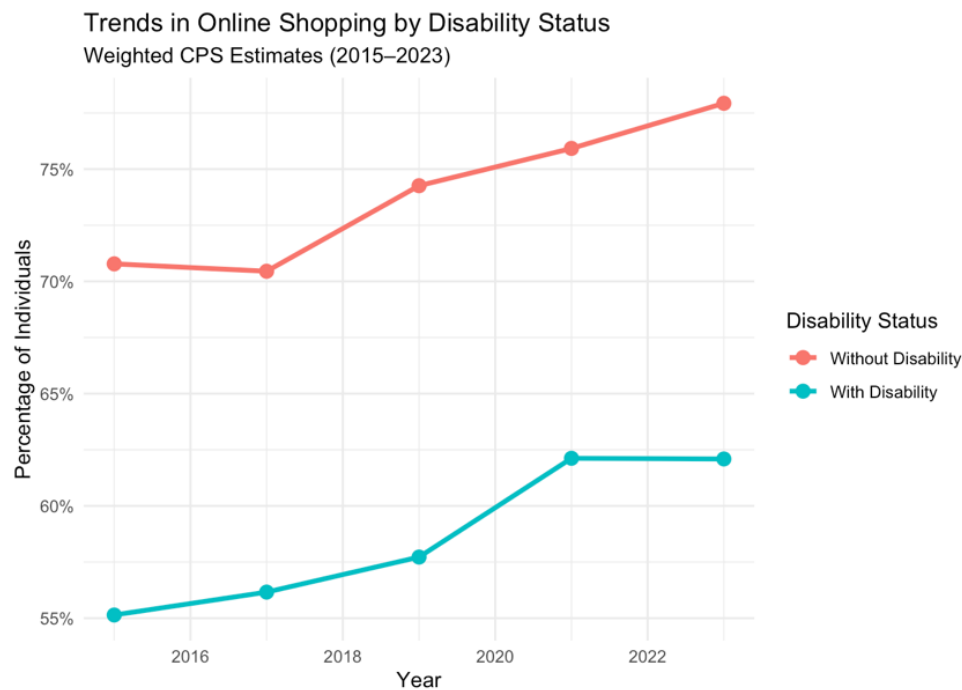


The findings on online shopping by disability status from 2015 to 2023 reveal persistent and substantial disparities in digital consumer participation (Figure 8). The findings show that, individuals with disabilities consistently reported online shopping at noticeably lower rates than their non-disabled counterparts, with a gap that remained wide despite modest increases in participation for both groups. In 2015, 70.78% of individuals without disabilities reported shopping online, compared to just 55.14% of those with disabilities, a gap of approximately 15.6 percentage points. These differences likely reflect differences in digital access, technological confidence, economic constraints, and the limited availability of accessible e-commerce platforms for people with disabilities. Rather than narrowing meaningfully over time, the participation gap remained large and relatively stable across the period. In 2017, the gap persisted at 14.3 percentage points (70.45% vs.

56.16%), and by 2019, it had actually widened slightly to 16.5 percentage points (74.26% vs. 57.72%), the largest gap in the period under review.

The COVID-19 pandemic years saw online shopping become increasingly essential for many households. While this drove participation upward for both groups, it did not eliminate the digital divide. In 2021, online shopping rates reached 75.92% for people without disabilities and 62.12% for those with disabilities, narrowing the gap somewhat to 13.8 percentage points. However, this progress proved temporary. By 2023, while participation continued to climb for both groups (77.93% without disabilities, 62.09% with disabilities), the gap had widened again to nearly 16 percentage points, returning to 2019 levels. These findings underscore the enduring barriers that people with disabilities face in digital commerce. Despite the pandemic's acceleration of e-commerce adoption and years of advocacy for web accessibility, structural inequities remain firmly in place. The persistent 15+ percentage point gap suggests that challenges related to platform accessibility, assistive technology compatibility, digital literacy support, and economic barriers may continue to limit online shopping participation among people with disabilities. Achieving digital equity in e-commerce will require sustained commitment to inclusive design standards, accessible payment systems, and targeted support that addresses the multifaceted barriers facing consumers with disabilities.

Figure 8. Trends in Online Shopping

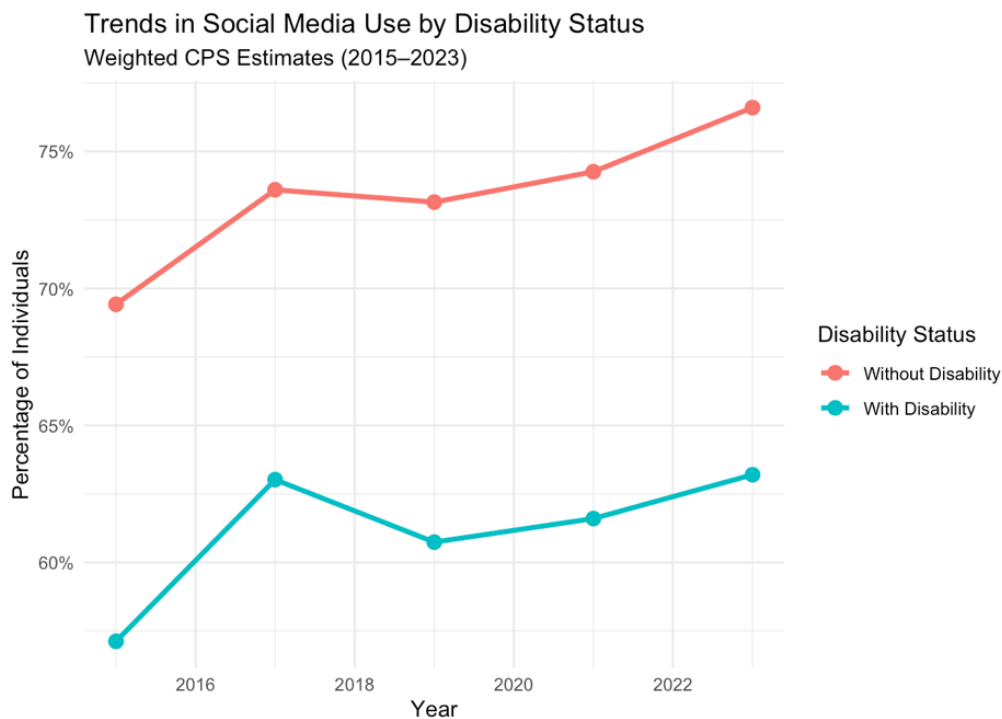


Lastly, the findings on social media use by disability status from 2015 to 2023 highlight disparities in digital social participation (Figure 9). Individuals with disabilities consistently reported social media use at lower rates than their non-disabled counterparts, with a gap that remained wide despite increases in participation for both groups. In 2015, 69.42% of individuals without disabilities reported using social media, compared to 57.12% of those with disabilities, a gap of approximately 12.3 percentage points. This disparity likely reflects structural barriers such as device accessibility, internet quality, digital literacy challenges, and platform design features that disproportionately affect people with disabilities. Participation gaps remained large and relatively stable, even widening marginally in later years. In 2017, social media use rose sharply for both groups (73.60% without disabilities, 63.02% with disabilities), reducing the gap modestly to 10.6

percentage points. However, this progress proved temporary. By 2019, the gap had returned to 12.4 percentage points (73.15% vs. 60.74%), nearly identical to 2015 levels.

The pandemic period, despite intensifying the need for digital connection, did not close the social media participation gap. In 2021, usage reached 74.26% among those without disabilities and 61.60% among those with disabilities, maintaining a 12.7 percentage point gap. By 2023, while both groups recorded their highest usage rates (76.60% without disabilities, 63.20% with disabilities), the gap had widened to 13.4 percentage points, larger than at any previous point in the period. These findings underscore the enduring digital divide in social participation for people with disabilities. Despite social media's increasing centrality for information access, community connection, and civic engagement, and despite years of accessibility advocacy, the participation gap has remained essentially unchanged. The persistent 12-13 percentage point gap suggests that barriers related to platform accessibility, assistive technology compatibility, content design, and digital literacy support continue to limit social media engagement among people with disabilities. Achieving digital equity in social media will require sustained commitment to universal design principles, accessible interfaces, inclusive content creation tools, and targeted digital skills training that addresses the multifaceted barriers facing users with disabilities.

Figure 9. Trends in Social Media Use



Discussion and Conclusion

This exploratory study examines internet use and digital inclusion among people with disabilities in the United States from 2015 to 2023, drawing on repeated cross-sectional data from the Current Population Survey (CPS). While previous research has documented persistent inequalities in digital technology access and use between disabled and non-disabled populations (Dobransky & Hargittai, 2016; Hargittai, 2022), this paper makes two key contributions to the literature. First, and most importantly, it provides systematic “longitudinal” evidence of sustained engagement in online activities among people with disabilities, revealing patterns of digital participation that challenge deficit-based narratives and highlight the transformative potential of accessible digital technologies.

Also, it offers a comprehensive intersectional analysis examining how disability interacts with race/ethnicity, gender, education, and employment to shape digital participation, extending prior work (Helsper, 2021; Goggin & Soldatic, 2022) through a large, nationally representative sample spanning multiple years.

One significant finding is the sustained use of the internet for certain online activities among people with disabilities, particularly for telehealth and telework. This persisted at elevated levels even as usage among people without disabilities stabilized or declined slightly after the pandemic. This represents a fundamental shift in how we understand digital inclusion for people with disabilities and challenges the traditional narrative that frames disability primarily through the lens of digital exclusion. The trends in online doctor consultations show this dynamic most clearly. In the early years of the study period, both groups showed relatively low engagement with telehealth. The pandemic increased participation for both groups, representing an unprecedented expansion of digital health services. By the end of the study period, however, usage rates not only remained elevated but continued to grow modestly, reaching near parity between people with and without disabilities. This sustained high-level engagement suggests that telehealth has become a permanent and valued feature of healthcare delivery for people with disabilities, addressing longstanding barriers to in-person medical care such as transportation challenges, among other things (Pettersson et al., 2023).

Similarly, telework participation among people with disabilities increased over the study period, with the pandemic era use largely maintained through the final year of observation.

While people without disabilities consistently reported slightly higher telework rates, the stability of remote work participation after the pandemic indicates that telework has become an established accommodation for many disabled workers. This is particularly significant given the historical barriers people with disabilities face when it comes to labor market participation. This supports scholarship emphasizing the significance of workplace flexibility, such as telework as a disability accommodation (Bricout et al., 2021). These sustained gains in telehealth and telework stand in contrast to other online activities. For instance, online job search participation declined for both groups over the study period. Individuals with disabilities also consistently showed lower rates of online job search. Also, online class participation revealed persistent disparities, where people with disabilities participated at considerably lower rates than their non-disabled peers across all years, even during the pandemic period. Further, online shopping showed inequality, with gaps remaining despite both groups' increased participation. Social media usage gaps also persisted, widening slightly over the study period.

What explains this divergent pattern? The activities that showed sustained gains, in telehealth and telework use, directly eliminate barriers to participation that disproportionately affect people with disabilities. Telehealth removes transportation barriers and reduces exposure to inaccessible physical environments (Pettersson et al., 2023). Additionally, remote work similarly addresses transportation challenges and provide schedule flexibility while allowing for personalized work environments (Bricout et al., 2021). In contrast, activities like online education, shopping, and social media may still contain embedded accessibility barriers in platform design, content structure, or

required digital literacy that limit full participation (Kaur & Saukko, 2022; Golden et al., 2023; Dobransky & Hargittai, 2021; Hargittai, 2022).

These findings have some theoretical implications. The growth in online participation shifts attention from capabilities deprivation to capabilities enhancement, establishing how digital technologies can expand the real freedoms people with disabilities have to achieve valued functionings when those technologies are designed with accessibility in mind (Mossberger et al., 2007; Sen, 2015; Zheng & Walsham, 2008). The sustained usage of telehealth and telework suggests that when digital services genuinely reduce barriers rather than create new ones, people with disabilities not only take advantage of them but maintain their use at rates comparable to or exceeding those without disabilities. From these findings, it may be argued that digital inequality is primarily not a problem of individual limitation or lack of skills but also involves questions of design justice and structural accessibility (Warschauer, 2003; Van Toorn & Cox, 2024). The afore notwithstanding, there are individual limitations and lack of skills in the general population, and likely this is true for people with disabilities, too, especially since some have not had the opportunity to learn informally at work or to have the same educational opportunities.

From a policy perspective, these findings strongly support the continuation and expansion of telehealth and remote work options as important accommodations under disability rights frameworks. These may be particularly important to people with disabilities, as some may face critical health challenges, and disabled individuals are employed at lower rates. The sustained levels of engagement indicate that these are not temporary adaptations but rather

essential tools for inclusion that address longstanding barriers. Policymakers should resist efforts to roll back telehealth coverage or force returns to exclusively in-person work, recognizing that these have been beneficial for people with disabilities and promote greater health and economic equity, thus enabling them to participate fully in society (Mossberger & Damoah, forthcoming; Mossberger et al. 2007; Van Toorn & Cox, 2024).

The findings on device usage underscore some nuances in how people with disabilities access digital technologies. Mobile phones appear as the most widely used device across all years for both groups. Usage among people with disabilities rises significantly over the study period. While gaps remain, this represents sizable convergence from the initial years. Also, desktop usage declined for both groups, reflecting broader national trends. Regarding the usage of tablets, it showed similar convergence, with gaps reducing considerably. However, laptop usage showed more persistent inequality, with gaps declining only marginally. These trends align with scholarship that suggests that mobile phones may serve as more accessible entry points to digital participation for many people with disabilities due to their portability and increasingly sophisticated accessibility features (Johansson et al., 2021; Correa et al., 2020).

Further, the finding that individuals with cognitive and vision disabilities achieved comparable usage with people without disabilities in mobile phone usage by the end of the study period supports this interpretation. Again, mobile phones may be helpful for disabled individuals; digital assistants like Siri may be useful for looking up information, even with limited vision, for example. However, the persistent laptop gap suggests that barriers

related to cost, portability preferences, and specific accessibility needs among others continue to limit adoption of certain device types.

Examining device usage by disability type reveals considerable heterogeneity often masked in aggregate analyses. For instance, individuals living with multiple disabilities and independent living disabilities consistently reported the lowest device usage rates across all categories and years. This highlights compounded barriers for those with complex or severe functional limitations. Conversely, individuals with cognitive disabilities, vision disabilities, and self-care disabilities showed growth in laptop use, approaching even equal use with people without disabilities by the final year. These within-group differences underscore the importance of disaggregating disability data, as Johansson et al. (2021), Chordiya et al., 2024, and Tsatsou (2021; 2022) emphasize, rather than treating people with disabilities as same. The high use of mobile phones suggests that policy initiatives for mobile use as a bridge to exclusion need serious consideration. Thus, programs that subsidize smartphones and data plans could serve as effective entry points for digital participation (Johansson et al., 2021; Correa et al., 2020). However, the persistent laptop gap indicates that comprehensive device access strategies are needed, as certain online activities, particularly employment-related activities and online education, often require larger screens and more powerful computing capabilities than smartphones typically provide.

Also, the findings from the intersectional analysis provides systematic evidence and reveal some key trends of how disability interacts with other variables of marginalization to shape

digital inclusion. First, education serves as an essential moderator of the relationship between disability and internet use, but primarily at higher educational levels. For instance, people with disabilities who have bachelor's degrees, some college education, and graduate degrees showed significantly higher odds of internet use. However, the interaction with high school completion was not statistically significant, suggesting that the educational advantage for people with disabilities becomes pronounced only at post-secondary levels. This indicates that higher education facilitates internet use among people with disabilities not only through economic means but could also promote use through digital literacy, social capital, and access to supportive networks (Damoah, 2025; Scholz et al., 2017; Correa et al., 2017). Further, the intersection of disability and gender revealed that disabled males had significantly lower odds of internet use compared to disabled females. These findings merit further investigation given that gender dynamics in digital access often favor males in the general population (Johansson et al., 2021).

Moreover, the analysis by disability type highlights how relevant it is to disaggregate disability data rather than treating people with disabilities the same. In the first model, all disability types showed lower odds of internet use compared to people without disabilities. These results align with calls from Johansson et al. (2021), Tsatsou (2021; 2022), and Chordiya et al. (2024) to move beyond homogenous conceptions of disability and recognize the diversity of experiences, needs, and barriers within disability communities. Policy interventions that treat disability as uniform group risk missing critical subgroup differences and deploying universal solutions that may be ineffective or even counterproductive for certain populations.

The findings speak to broader theoretical debates about the nature of digital inequality and the road to digital equity. The sustained adoption of telehealth and telework among people with disabilities underscore the fact that digital technologies can enhance capabilities and expand freedoms (Sen, 2015; Zheng & Walsham, 2008; Zheng & Stahl, 2011; Mossberger et al., 2012). Rather than viewing digital inequality solely through a deficit lens, where people with disabilities are framed as lacking skills or motivation, these findings support a capability approach that emphasizes how digital technologies either enable or constrain meaningful participation (Mossberger et al., 2007; Robeyns, 2005).

The contrast between activities that showed sustained gains (telehealth, telework) and those that remained unequal (education, shopping, social media) suggests that, perhaps, access alone is insufficient for digital equity. As Mossberger et al. (2012), Mossberger et al. (2007), and Warschauer (2003) argue; what matters is not merely the physical availability of technology but people's ability to make use of those technologies to engage in meaningful social practices. The persistent gaps in online education, shopping, and social media seem to point to possible barriers in usability, interface design, content accessibility, and digital literacy that prevent full participation even when basic internet access exists (Kaur & Saukko, 2022; Golden et al., 2023; Mason et al., 2021).

From a social equity perspective, these findings emphasize that digital access has become a fundamental prerequisite for human flourishing and democratic participation in the 21st century (Reglitz, 2020; Damoah, 2025; Mossberger & Damoah, forthcoming). When most people with disabilities are using the internet, and over half are engaging in telehealth,

digital technologies can be said to have clearly moved from just being a convenience to essential infrastructure for education, healthcare, employment, and civic engagement. This reality demands policy frameworks grounded in digital equity as a social justice imperative and a human right approach (United Nations, 2024; Van Toorn & Cox, 2024; Wright & Merritt, 2020; Wronka, 2017).

The intersectional findings underscore that digital equity policies must address multiple, overlapping dimensions of marginalization simultaneously. Consequently, programs focused solely on disability without paying attention to race, education, gender, and economic status may miss critical barriers facing those at the intersections of multiple marginalized identities (Helsper, 2021). As Golden et al. (2023) demonstrated in the education context, the pandemic period remote learning deepened inequalities for disabled youth from racially minoritized and low-income households, revealing how inadequate consideration to intersectionality can compound rather than lighten inequality.

Based on the findings of the study, some policy directions are proposed. First, telehealth and telework should be enshrined as permanent accessibility accommodations under disability rights frameworks such as the Americans with Disabilities Act. The sustained high levels of engagement demonstrate these are not temporary pandemic adaptations but essential tools for inclusion. Policymakers should resist efforts to mandate returns to exclusively in-person work arrangements and instead ensure that remote options remain available as needed accommodations.

Also, given the rise in mobile phone usage and the persistent laptop gap, digital inclusion programs should adopt dual strategies. Thus, subsidizing smartphones and data plans as immediate entry points while also providing routes to laptop and desktop access for activities requiring more vigorous computing. Furthermore, the strong educational influence in internet use among people with disabilities points to the critical need for accessible digital literacy training integrated into disability support services and adult education programs. Such programs should be culturally responsive and tailored to different disability types, recognizing the diverse needs and learning styles within disability communities (Kennedy et al., 2013; Sevilla et al., 2007).

In addition to the above, addressing intersectional barriers requires coordinated policy approaches that recognize how disability interacts with race, education, gender, and economic status. Programs should include targeted outreach to disabled individuals from racially minoritized communities, those with lower educational attainment, and those in rural areas where broadband access remains limited (Lai & Widmar, 2021; Mossberger & Damoah, 2024). Support for affordability, such as subsidized internet service and devices, must be combined with accessible content, interfaces, and support services.

Finally, the heterogeneity across disability types underscores the need for differentiated rather than generalized interventions. Individuals with multiple disabilities and independent living disabilities face distinct and often more severe barriers that require specialized supports, while those with cognitive or vision disabilities may benefit from specific assistive technologies and training programs. Policy frameworks should

incorporate this diversity and support targeted interventions co-designed with disability communities (Johansson et al., 2021; Chordiya et al., 2024).

The above notwithstanding, a primary limitation of the study lies in its reliance on repeated cross-sectional data from the CPS. This constrains the ability to make causal inferences about the relationship between disability and internet use. Although it includes multiple survey years and employs logistic regression models with interaction terms to examine internet use over time, it does not track the same individuals. Consequently, the observed associations may reflect compositional changes in the sample or broader societal trends rather than individual level behavioral changes. This design limitation makes it difficult to determine whether increased internet use among people with disabilities led to improved employment outcomes, social inclusion, or health access, or whether such outcomes facilitated internet use. Future research would benefit from longitudinal panel designs that follow individuals across time, enabling researchers to better understand causal paths and temporal dynamics underlying digital inclusion.

Conclusion

This study leverages nearly a decade of nationally representative data to document a fundamental shift in digital participation among people with disabilities in the United States. A central finding, sustained high level engagement in telehealth and telework that goes beyond the pandemic, demonstrates that when digital technologies genuinely reduce barriers to participation, people with disabilities not only adopt these technologies but maintain usage at levels approaching or matching their non-disabled peers. These challenge

deficit-based narratives that frame digital inequality primarily as individual limitation and instead highlights how accessible design can expand capabilities and freedoms (Sen, 2015; Zheng & Walsham, 2008; Mossberger et al., 2012). Also, the intersectional analysis, provides systematic evidence of how disability interacts with education and gender to shape digital participation. Using a large-pooled sample across multiple years, the analysis reveals that post-secondary education and gender represent key moderators of the relationship between disability and internet use. These underscore the need for policies that address multiple overlapping dimensions of marginalization simultaneously rather than treating disability in isolation (Helsper, 2021; Goggin & Soldatic, 2022).

Additionally, the persistent gaps in online education, shopping, and social media, contrasted with almost equal use in telehealth, show that technological progress alone does not ensure equity. The distinction between activities showing sustained gains and those remaining unequal may point to fundamental differences in how digital technologies are designed and structured, as well as the choices that individuals make. Activities that directly eliminate barriers to participation, such as telehealth, removing transportation challenges, and telework, providing schedule flexibility, are those that achieve high usage and retention over time. From a theoretical perspective, these findings support shifting from a deficit model focused on what people with disabilities lack to a capabilities approach emphasizing how these technologies either enable or constrain meaningful participation (Sen, 2015; Robeyns, 2005; Warschauer, 2003).

The device usage, particularly mobile phone use and persistent laptop gaps, suggest that comprehensive digital inclusion strategies must address multiple forms of access simultaneously. Mobile phones offer significant entry points due to portability and increasingly sophisticated accessibility features, but full participation in education and employment often requires more sophisticated computing devices. Policies should support both immediate mobile access and access to affordable laptops and training or support. Again, the significance of disaggregated analysis and differentiated policy responses is underscored by the heterogeneity observed across disability categories. Individuals with multiple disabilities and independent living disabilities encounter unique and frequently more severe obstacles than those with single sensory or mobility impairments. In order to be effective, it is argued that interventions must be co-designed with disability communities and adjusted to the diverse needs and experiences of these populations (Johansson et al., 2021; Tsatsou, 2022).

Finally, the study's contribution lies in detailing a paradigm shift in how we should understand digital inclusion for people with disabilities. During the onset of the pandemic and its aftermath, public policies subsidized internet subscriptions and affordable devices, and these were in place through the end of the period studied here. There was growth in internet adoption among people with disabilities at this time, as well as in the general population. Yet gaps remain. The sustained adoption of accessible digital services demonstrates that the challenge may not primarily be due to affordability alone. When digital technologies eliminate rather than create barriers, people with disabilities may engage at high and sustained levels. This finding reframes digital equity as fundamentally

a question of social justice and human rights, demanding comprehensive policies that combine accessible infrastructure, inclusive design, targeted support, and regulatory enforcement (United Nations, 2024; Van Toorn & Cox, 2024; Mossberger & Damoah, forthcoming). Only through such multifaceted approaches can digital technologies fulfill their potential as tools for capabilities enhancement and democratic participation rather than exacerbating existing forms of marginalization and exclusion.

CHAPTER 3

ONLINE POLITICAL PARTICIPATION AND DISABILITY: EXAMINING BARRIERS, FACILITATORS, AND INCLUSION THROUGH THE CIVIC VOLUNTARISM MODEL

Abstract

Despite extensive research on online political participation, people with disabilities remain largely absent from this discourse. Using the Civic Voluntarism Model, this study examines how resources, psychological engagement, and social networks shape online political participation among individuals with disabilities. The study uses data from the 2023 Current Population Survey Volunteering and Civic Life Supplement (N = 42,621). Also, the Heckman probit selection model is employed to account for internet access bias. The results show that even though individuals with disabilities have higher odds of online political participation (OR = 1.35), this becomes non-significant once psychological engagement variables are introduced. The interaction between disability and political efficacy shows that disabled individuals with higher political efficacy show 37% greater odds of online engagement (OR = 1.37, $p < 0.05$), which suggests that psychological empowerment is crucial for individuals with disabilities' participation. Among the predictors of online political participation, political efficacy appears as the major predictor (OR = 1.56 - 1.58). Further, the analysis for the disaggregated data reveals heterogeneity across disability types. Individuals having independent living disabilities and multiple disabilities show the strongest participation patterns. These findings challenge assumptions about digital platforms automatically democratizing participation, demonstrating instead

that online inclusion requires cultivating political confidence together with technical accessibility. The study advances theoretical understanding of disability and digital democracy while offering practical implications for inclusive civic engagement initiatives.

Keywords: *Online political participation, Disability, Civic Voluntarism, Inequality*

Introduction

Since the mid-twentieth century, the definitions of civic participation have evolved from solely encompassing electoral activities, such as voting and campaigning, to include unconventional political actions, such as protesting, and non-political endeavors, such as volunteering for social causes (Theocharis & van Deth, 2018; Boulianne, 2020). This developing comprehension underscores new moods of political engagement that are independent of electoral cycles (Ruess et al., 2023). The Internet has broadened the realm of political participation by enabling unique types of mediated political activity (Theocharis & de Moor, 2021; Kim & Hoewe, 2020). Critically, these digital platforms hold transformative potential for individuals with disabilities by reducing traditional barriers to participation (Bastien et al., 2020). The internet enables people with limited mobility to engage in political activities from home, eliminating transportation challenges and physical accessibility barriers that have historically constrained their civic involvement (Oni et al., 2017).

Similarly, accessible technologies can help individuals with limited vision or hearing overcome barriers to in-person participation through screen readers, captioning, and other adaptive tools. This democratizing potential makes understanding online political participation among people with disabilities not merely an academic exercise, but a matter of fundamental democratic inclusion. The internet serves as a significant medium for individuals to partake in political activity (Oser et al. 2022; Boulianne, 2020). The internet and its myriad applications have showed the capacity to engage millions in meaningful

activities that yield political consequences in the actual world (Escher et al., 2017; Yasseri et al., 2016; Friess et al., 2021; Saldaña et al., 2015). Social media provide innovative avenues for political engagement, many of which necessitate less time, effort, and cost investment compared to traditional forms of formal participation (Saldaña et al., 2015; Vraga, 2019).

Hooghe & Kern (2017) and Vissers and Stolle (2014) show that there is a decline in formal political participation in certain Western democracies, and that has generated interest in online participation as a means to empower politically underrepresented groups, such as women, ethnic minorities, youth, the less educated, and low-income individuals (Sasaki, 2017; Wang, 2022; Stolle & Hooghe, 2005 as cited in Vissers & Stolle (2014)). Research on online political participation has predominantly examined various forms of engagement, encompassing structured e-participation activities such as online petitions, participatory budgeting, and consultation processes (Boulianne, 2020; Theocharis, 2015; Theocharis & de Moor, 2021). Similarly, research on online political participation considers informal behaviors like sharing, liking, and commenting, typically analyzed within the framework of online public spheres and civic engagement (Friess et al., 2021; Cho et al., 2021). These activities have demonstrated the ability to enhance, rather than supplant, conventional offline political engagement (Oser et al., 2022; Boulianne & Theocharis, 2020; Gil de Zúñiga et al., 2017).

Despite extensive research on online participation, little attention has been paid to people with disabilities' online political participation. This neglect is particularly concerning given

that evidence from different contexts suggests that poor health and disability have been linked to lower political participation (Mattila & Papageorgiou, 2017; Mattila et al., 2013; Priestley et al., 2016; Reher, 2020; Waltz & Schippers, 2021). Thus, understanding whether and how the internet's enabling potential translates into actual political participation for people with disabilities has significant implications for democratic representation and policy development. If digital technologies successfully reduce traditional barriers, they could fundamentally reshape political inclusion for millions of citizens.

Conversely, if people with disabilities remain underrepresented in online political spaces despite the internet's promise, this shows critical failures in digital accessibility and suggests the need for policy interventions. This neglect is also remarkable given the proven participation gaps for other groups, such as gender disparities (Sasaki, 2017; Williams & Teal, 2017), as well as the intersectionality of socioeconomic characteristics such as age, education, and income (Helsper, 2021). Research shows that resources for political participation are unequally distributed across socioeconomic groups (Williams & Teal, 2017), and that inequality exacerbates participation challenges for people with disabilities.

To bridge this gap, it is imperative to examine and understand the extent to which people with disabilities participate in online politics relative to their non-disabled counterparts. This study uses data from the Volunteering and Civic Life Supplement of the US Current Population Census to ensure that this important group is not overlooked in the broader discussion of political inclusion. The extant literature lacks sufficient research on the factors that facilitate or hinder online participation among people with disabilities. Thus,

this paper seeks to fill that gap by examining these factors, with particular focus on the moderating role of variables drawn from the Civic Voluntarism Model. Consequently, this paper seeks to explore the question: (1) How does online political participation of individuals with disabilities compare to that of those without disabilities? (2) How do resources (e.g., education), psychological engagement (e.g., political interest and efficacy), and recruitment through social networks contribute to the online political participation of individuals with disabilities? (3) What are the differences in online political participation among various disability groups?

Theoretical and Literature Review

Civic Voluntarism Model: Core Components and Application

Verba, Scholzman, and Brady (1995) developed the civic voluntarism model (CVM) to gain a more comprehensive understanding of political participation in the United States. As Verba et al. (1995) define it, political participation is "directly...affecting the making or implementation of public policy or indirectly influencing the selection of people who make those policies" (p. 38). The CVM advances that political participation is determined by three factors. These factors are resources (time, money, skills), psychological engagement (interest, efficacy), and recruitment through social networks. This tripartite framework has proven influential in explaining variations in political participation across diverse populations and contexts.

The resources component of the CVM is one of the most widely accepted predictors of political participation. Kopacheva (2021) asserts that personal resources, particularly those related to personal or family socioeconomic status (SES), may increase the likelihood of one's participation in political activities. Specifically, the likelihood of citizens being politically active may be increased by the availability of SES resources, which may enhance their knowledge and abilities in managing and comprehending political information and content. According to Kim & Khang (2014), and Verba et al. (1995), individuals with higher SES have access to a greater number of resources, including higher educational levels, more economic resources in the form of income or property, and a higher occupational status. Consequently, they can engage in political life more frequently and with less effort.

The second component within the CVM is psychological engagement. Kirbiš et al. (2017) define psychological political engagement as the cognitive and motivational components of political culture, specifically an individual's political orientation. Citizens' participation is more likely to occur when individuals are motivated to engage in politics; are interested in political life; and do not feel impotent in their ability to influence political institutions and actors (Verba et al., 1995; Guo et al., 2021; Schlozman et al., 2018). In the psychological engagement component, it was previously discovered that political interest, political trust, and political efficacy significantly influence citizen participation (Kushin et al., 2022; Ruess et al., 2023; Kim and Khang, 2014; Baber, 2020; Park, 2019). A sense of political efficacy engenders the belief that one's participation has a meaningful impact.

Political efficacy denotes an individual's evaluation of his or her capacity to engage meaningfully and competently in the political process (Baber, 2020; Schlozman et al., 2018; Kim & Khang, 2014; Kirbiš et al., 2017; Oni et al., 2017). Consequently, an individual's conviction in their ability to influence the political system (internal efficacy), their perception of the system's responsiveness to such interventions (external efficacy), together, form the individual's overall political efficacy (Ostrander et al., 2020; Kopacheva, 2020). Previous research has demonstrated that an individual's political efficacy, competence, or confidence plays a crucial role in shaping political participation behavior (Baber, 2020; Beaumont, 2011; Oni et al., 2017).

Again, existing research has underscored the significance of political knowledge and political interest in shaping political participation. Political knowledge refers to an individual's accurate understanding of governmental processes and policy matters (Intyaswati & Fairuzza, 2023), while political interest captures how much a person cares about politics and public affairs. This motivational component revolves around whether someone pays attention to campaigns, follows political news, or finds political issues personally significant (Guo et al., 2021; Kopacheva 2021; Intyaswati & Fairuzza, 2023). It is about the intrinsic drive or curiosity toward political matters. Researchers assert that individuals who possess political awareness exhibit higher levels of political engagement and derive satisfaction from monitoring political developments and holding authorities accountable (Kusumarani & Zo, 2019; Claassen & Highton, 2009; Kopacheva, 2021; Putnam, 2000; Yamamoto et al., 2018).

Accordingly, it is advanced that insufficiency in political knowledge may inhibit a significant segment of the population from engaging in active political participation. It is further asserted that the availability of political information and an individual's interest in political matters will significantly affect their intention to partake in online political engagement (Claassen, 2011; Oni et al., 2017). Thus, psychological engagement is essential for political participation because it establishes a fundamental connection with communities and their individual members through political interests, partisanship, political ideology, and other factors (Ostrander et al., 2021).

In addition to the above, recruiting networks constitute the third critical factor shaping political participation according to the CVM (Alcher, 2025; Fanea-Ivanovici & Baber, 2023; Schlozman et al., 2018; Verba et al., 1995). These networks represent social connections and environments that mobilize citizens and encourage political opinion expression and action, encompassing both formal institutional structures and informal social interactions within individuals' social environments, including family, peers, and community associations (Verba et al., 1995). Formal recruiting networks include secondary institutions of adult life and established groups that convene regularly, such as citizen initiatives, sports clubs, neighborhood associations, voluntary organizations, and religious institutions (Goetting & Becker, 2025; Holecz et al., 2022; Kusumarani & Zo, 2019; Mueller, 2020).

Institutional involvement through employment, membership in voluntary associations, participation in religious activities, and engagement in church activities has consistently

been shown to promote political participation (Brady, Verba, and Schlozman 1995; Verba et al., 1995). Informal networks operate through casual but recurring conversations with neighbors, family members, or acquaintances about local and political issues, disseminating information about neighborhood developments and participation opportunities (Goetting & Becker, 2025; Mueller, 2020). Whether structured or spontaneous, these social connections serve as conduits for political mobilization by exposing citizens to recruitment efforts, political discussions, and direct encouragement to participate (Ostrander et al., 2021; Kirbiš et al., 2017; Oni et al., 2017).

The CVM has been used in studying online participation in different contexts and among different people (Baber, 2020; Kim & Khang, 2014; Oni et al., 2017). For instance, Baber (2020) uses CVM to check the intentions of people towards political crowdfunding. The model's adaptability to digital contexts has made it particularly valuable for understanding how traditional participation dynamics translate to online environments, where physical barriers are reduced and new forms of engagement emerge. The CVM is particularly suited for examining the political participation of people with disabilities for three interrelated reasons. First, its explicit focus on resource inequalities aligns directly with the documented socioeconomic disadvantages this population faces. Individuals with disabilities experience systematically lower rates of educational attainment, income, and employment compared to non-disabled individuals (Mattila & Papageorgiou, 2017; Williams & Teal, 2017), creating precisely the kind of resource constraints that CVM was designed to analyze.

Additionally, the psychological engagement component captures efficacy barriers that are especially pronounced among marginalized groups. Research demonstrates that individuals with disabilities report diminished levels of both internal and external political efficacy, often viewing the political system as less responsive to their needs (Mattila & Papageorgiou, 2017; Reher, 2020). This makes the CVM's attention to political attitudes and beliefs directly relevant to understanding participation patterns in this population. Third, the recruitment and social networks dimension addresses the social isolation that many people with disabilities experience (Williams & Teal, 2017), which may be partially mitigated through online connections that transcend physical barriers to face-to-face interaction.

Moreover, applying the CVM to online political participation of people with disabilities enables systematic examination of a critical question: do digital environments transform traditional participation dynamics? The theoretical value of this application lies in testing whether the internet functions as a compensatory mechanism that reduces resource barriers, whether psychological factors become more salient predictors when physical obstacles are removed, and whether online networks can substitute for traditional recruitment channels that may be less accessible to people with disabilities.

However, in the context of vulnerable people like people with disabilities, the CVM is yet to be applied in identifying and understanding factors that drive the online political participation of people with disabilities. Inequality in political participation frequently echoes greater socioeconomic inequalities, since people with more resources (time, money,

and skills) are more likely to take part. Recruitment through social networks helps to overcome resource obstacles, making participation available to people who would not otherwise participate. As a result, this essay adapts the CVM's basic components (resources, psychological engagement, and recruitment networks) to aid in studying the factors that drive online political participation of people with disabilities.

Disability and Political Participation

Many times, political participation has been seen as the result of resources and social networks. Good education, civic skills, and high-income help to promote participation (Oni et al., 2017). Good social interactions then raise the possibility of political recruiting. Regarding persons with disabilities, several of these features could be absent or at least less than for members of society at large. Moreover, disability might restrict people's mental or physical resources, so extra time, money, and effort are usually needed to offset the restrictions (Helsper, 2021; Mattila & Papageorgiou, 2017). Again, Williams & Teal (2017) contend that individuals with disabilities, while engaged in the political sphere, frequently remain marginalized and/or are denied comprehensive participation. Barriers to political participation may arise from or be affected by physical obstacles, as well as socioeconomic factors, such as poverty, lower educational attainment, and elevated unemployment rates. In this view, it is more likely that persons with disabilities suffer from resource scarcity, which is needed to participate politically, based on the CVM.

Prior research indicates that health-related issues diminish voting turnout and other political and civic engagement types (Bricout et al., 2021; Mattila et al., 2013; Waismel-

Manor et al., 2023; Waltz & Schippers, 2021). Research focusing specifically on the involvement of individuals with impairments is predominantly carried out in the United States. Individuals with disabilities, on the average, indicate diminished levels of both internal and external political efficacy (Mattila & Papageorgiou, 2017). They are less inclined to view the political system as responsive to their needs; and frequently, due to diminished educational attainment and civic competencies, they believe themselves to be less equipped for political participation. Additionally, women with disabilities tend to have lower levels of political efficacy than men and women without disabilities due to lower work, income levels, and higher degrees of isolation (Williams & Teal, 2017).

In Europe, Reher (2020) shows that perceptions of discrimination enhance the internal efficacy and political engagement of citizens with disabilities; however, they concurrently diminish their external efficacy, political trust, and voter turnout. Waltz & Schippers (2021) identified six categories of barriers and facilitators affecting the political lives of individuals with disabilities: networks, recruitment and mentoring, resources (financial, temporal, and energetic), the hierarchy of impairments i.e., the way society ranks or values different types of disabilities differently, with some impairments being viewed as more positively or acceptable than others, accessibility of political spaces and activities, and legal frameworks and policies. Regarding legal frameworks, the authors examined mechanisms across five European nations including disability employment quotas (ranging from 3% in Belgium to 6% in France), though these rarely applied to political candidates.

Critically, legislation often excluded elected officials, for example, the UK's Equality Act 2010 protects disabled employees but not Members of Parliament (Waltz and Schippers, 2021). Additionally, disability benefits systems created barriers, as means-tested support could be withdrawn when individuals earned political salaries, effectively penalizing political participation. Only the UK provided direct financial support for disabled candidates through Access to Elected Office funds to cover campaign-related accessibility costs (Waltz and Schippers, 2021). Additionally, Priestley et al. (2016) contend that exercising political rights depends on equitable access to political knowledge and activities. Politically marginalized groups may be more effectively engaged by openly addressing their problems and collaborating with civil society organizations that advocate for their interests.

The extant literature has shown that individuals with disabilities in the United States are less likely to engage in political activities, such as attending political meetings or providing financial contributions to candidates (Mattila & Papageorgiou, 2017). Nonetheless, there are several significant exceptions. Individuals with disabilities are equally likely as their non-disabled counterparts to engage with public officials (Mattila & Papageorgiou, 2017). Moreover, notable gender disparities exist. Women with disabilities, while generally engaging less in participation, exhibit a higher propensity to partake in protests or marches compared to their non-disabled counterparts (Williams & Teal, 2017). Moreover, they are more predisposed to respond to perceived prejudice.

Also, structural hurdles to political participation have historically served as a significant justification for the exclusion of individuals with disabilities, just as institutional barriers have for racial and ethnic groups (Wang, 2022; Schmaling & Williams, 2017). Again, Schmaling & Williams (2017) notes that members of minority racial or ethnic groups and those with disabilities are faced with distinct challenges regarding political participation; nonetheless, for the "minority within the minority, these barriers can be exacerbated and compounded significantly" (p. 175). The intersectional nature of these barriers underscores the importance of examining disability within broader contexts of marginalization. Moreover, in addition to the absence of avenues for self-advocacy, political inefficacy is a significant issue impacting the political participation of individuals from racial and ethnic groups with disabilities.

Given these systematic barriers to traditional political participation, online platforms theoretically offer transformative potential for people with disabilities. The Internet, functioning as a platform with diminished physical barriers and accessibility features, presents unparalleled participation opportunities among individuals historically marginalized within the political space (Kim & Hoewe, 2020; Theocharis & de Moor, 2021; Theocharis & van Deth, 2018; Stein et al., 2025). Physical barriers that prevent in-person participation, such public meetings in buildings without proper accommodations and rallies requiring extended standing, are reduced or removed in online environments (Priestley et al., 2016; Schur et al., 2015; Waltz & Schippers, 2021; Oni et al., 2017). Moreover, the nature of many online political activities allows individuals to participate on their own schedules, reducing the temporal constraints that disproportionately affect people

with disabilities who may require additional time for daily activities or who face unpredictable health challenges.

Social media has been argued to be a powerful leveler for online political participation, particularly for people with disabilities who may face significant barriers to traditional forms of civic engagement (Trevisan, 2020; Kim & Lee, 2021; Yamamoto et al., 2015; Yang & DeHart, 2016; Wang, 2021). The extant literature consistently shows that, there is a positive relationship between social media use and political participation, with meta-analytic findings showing that over 80% of studied relationships are positive (Boulianne, 2015). It offers unprecedented accessibility by removing physical barriers like inaccessible polling places, among others that have historically excluded many from the political process (Trevisan, 2020; Sweet et al., 2020; Bitman, 2023; Gelfgren et al., 2022). Studies have found that online social capital, political self-efficacy, and participation in online groups, among others, are significant predictors of political participation (Yang & DeHart, 2016; de Zúñiga et al., 2012). The afore suggests that social media creates networks and builds confidence that translate into real political action.

Moreover, the ability to express political opinions, share information, fact-check claims, and mobilize support, all from the comfort of one's home and convenience, means that people with mobility limitations, or other disabilities can participate as fully engaged citizens in ways that were previously impossible. By lowering the physical, temporal, and social barriers to political engagements, social media platforms have the potential to create a more inclusive democracy where people with disabilities can exercise their civic voice

and influence political outcomes on equal footing with their non-disabled peers (Gelfgren et al., 2022; Sweet et al., 2020).

Furthermore, the significance of studying online political participation of people with disabilities extends beyond individual empowerment to fundamental questions of political representation and digital equity. People with disabilities constitute approximately 26% of the U.S. adult population (CDC, 2024; Okoro et al., 2018), yet remain significantly underrepresented in political discourse and decision-making processes (Schur et al., 2017; Schur et al., 2015). If the internet is asserted to democratize political participation by lowering barriers to entry, then empirical evidence is urgently needed to assess whether it is fulfilling this promise for people with disabilities. This is relevant given ongoing policy debates about digital accessibility, broadband access, and the role of technology in civic life. Understanding the factors that facilitate or hinder online political participation among people with disabilities has direct implications for disability policy, digital inclusion initiatives, and the design of accessible digital civic infrastructure (Mossberger et al., 2003; Bastien et al., 2020).

Notwithstanding the comprehensive examination of online political participation focusing mostly on structured e-participation activities such as online petitions, participatory budgeting, and consultation processes (Boulianne, 2020; Theocharis, 2015; Theocharis & de Moor, 2021), as well as informal behaviors, such as sharing, liking, and commenting (Friess et al., 2021; Cho et al., 2021), the involvement of individuals with disabilities in this discourse is conspicuously lacking. Although the CVM (Verba et al., 1995; Fanea-

Ivanovici & Baber, 2023; Schlozman et al., 2018; Alscher, 2026) has played a pivotal role in the analysis of political participation broadly, its application to the experiences of individuals with disabilities within digital environments has been seemingly lacking (Bastien et al., 2020). This oversight is particularly noteworthy considering the CVM's focus on resources, recruitment, and psychological engagement, elements distinctly influencing the lived experiences of individuals with disabilities. However, individuals with disabilities encounter unique obstacles, such as limitations in resources, social isolation, and systemic inequities, which are insufficiently addressed in the extant literature.

Integrating disability considerations into CVM-based studies of online political participation would reveal the interplay of these dynamics, thereby uncovering avenues for enhanced political inclusion. Applying CVM to online participation of people with disabilities allows us to test whether: (a) digital environments reduce traditional resource barriers; (b) psychological factors become more salient predictors when physical barriers are removed; and (c) recruiting networks facilitates online participation of people with disabilities. This framework thus enables systematic examination of whether and how the internet transforms the traditional CVM dynamics for this population. Such research has the potential to show not only the distinctive challenges encountered by this demographic but also the ways in which digital tools and networks may alleviate obstacles to political participation.

Owing to these theoretical considerations and literature review, the following are hypothesized:

Hypothesis 1: People with disabilities would be more likely to engage in online political participation compared to their non-disabled counterparts when controlling for socioeconomic factors and psychological engagement.

Hypothesis 2: Employment, education, and income would moderate the relationship between disability and online political participation. Drawing from CVM's emphasis on resources, this hypothesis examines whether socioeconomic advantages amplify or diminish the effect of disability status on online participation.

Hypothesis 3: Among individuals with disabilities, psychological engagement (e.g., political interest and efficacy) is a stronger predictor of online political participation than socioeconomic resources. This hypothesis proposes that when physical barriers are removed or reduced in online environments, motivational factors become more influential in driving participation.

Hypothesis 4: Recruitment through social networks significantly increases the likelihood of online political participation for people with disabilities, helping to offset resource-related barriers.

Research Design

Data

This study uses data from the 2023 Current Population Survey (CPS), specifically drawing from two supplements. The Volunteering and Civic Life Supplement provides insights into civic engagement, volunteerism, and political participation, while the Computer and Internet Use Supplement offer household-level information on internet access and digital connectivity. The survey is administered to about 50,000 eligible housing units, comprising over 126,665 people aged 15 and over, ensuring national coverage. This dataset was chosen for its broad reach and robust methods. The CPS's stratified sample design and weighting techniques ensure that the dataset is nationally representative, making it appropriate for analyzing large socioeconomic trends. The inclusion of precise demographic and socioeconomic data increases the dataset's usefulness for regression studies, particularly when investigating the social drivers of civic and political participation.

Sample Characteristics

The study sample comprised 42,621 respondents. Table 4 presents the descriptive statistics for the study's variables, with percentages weighted to represent the U.S. population. Most respondents ($n = 35,689$, 85.1%) reported having no disability, while 6,932 (14.9%) reported having at least one disability. Among specific disability types, multiple disabilities were the most prevalent ($n = 3,041$, 6.6% of total sample), followed by ambulatory disabilities ($n = 1,499$, 3.1%) and hearing disabilities ($n = 1,185$, 2.4%). The sample was fairly balanced by sex, with males comprising 48.1% ($n = 20,057$) of the total respondents and females 51.9% ($n = 22,564$) of the sample. The age distribution showed that adults

aged 25-44 represented the largest group (n = 12,960, 34.1%), followed by those aged 45-64 (n = 13,012, 31.3%) and older adults aged 65 and above (n = 13,716, 27.7%). Young adults aged 18-24 comprised the smallest group (n = 2,348, 6.9%).

Educational attainment was relatively high, with 92.2% of total respondents having completed high school or higher education. Specifically, 26.9% (n = 11,733) had a high school diploma or equivalent, 26.7% (n = 11,493) had some college or an associate degree, 23.7% (n = 9,803) held a bachelor's degree, and 14.9% (n = 6,418) had a graduate degree. Only 7.8% (n = 3,174) had less than a high school education. Among those reporting employment status, the majority were employed (n = 24,488, 96.5%), with only 3.5% (n = 810) unemployed. The racial composition was predominantly White (n = 30,840, 66.8%), followed by Hispanic (n = 4,826, 14.1%), Black (n = 3,850, 11.4%), Asian American (n = 1,930, 5.0%), Other (n = 796, 2.0%), and American Indian/Alaska Native (n = 379, 0.7%) respondents.

Table 4. Descriptive Statistics of Study Variables (N = 42,621)

Variable	Category	N	Percentage (%)
Disability Status			
	No Disability	35,689	85.1
	Has Disability	6,932	14.9
Disability Types			
	Multiple Disabilities	3,041	6.6
	Ambulatory Disability	1,499	3.1
	Hearing Disability	1,185	2.4
	Cognitive Disability	656	1.5
	Vision Disability	318	0.7
	Independent Living Disability	209	0.5
	Self-Care Disability	24	0.1
Sex			
	Female	22,564	51.9
	Male	20,057	48.1
Age Group			
	18-24	2,348	6.9
	25-44	12,960	34.1
	45-64	13,012	31.3
	65+	13,716	27.7
Education Level			
	Less than High School	3,174	7.8
	High School Diploma/Equivalent	11,733	26.9
	Some College/Associate Degree	11,493	26.7
	Bachelor's Degree	9,803	23.7
	Graduate Degree	6,418	14.9
Employment Status			
	Employed	24,488	96.5
	Unemployed	810	3.5
Race/Ethnicity			
	White	30,840	66.8
	Hispanic	4,826	14.1
	Black	3,850	11.4
	Asian American	1,930	5.0
	Other	796	2.0
	American Indian/Alaska Native	379	0.7

Note: Percentages are weighted to represent the U.S. population. Frequencies (n) represent unweighted sample counts. Disability type percentages are calculated from the total

sample. Employment status calculated based on n = 25,298 respondents with non-missing employment data.

Dependent Variable

The dependent variable for the study is online political participation. Online political participation is a binary variable that was created from the question “In the past 12 months, how often did [you/[NAME]] post [your/ his/ her] views about political, societal, or local issues on the internet or social media?” with answers: “ (1) Basically every day; (2) A few times a week; (3) A few times a month; (4) Once a month; (5) Less than once a month; and (6) Not at all. All those who chose from 1-5 are designated Yes, and 6 is designated No.

Independent Variable of Interest

For the main model, disability status is used as an independent variable of interest in the study. Respondents were asked, “Does this person have any of these disability conditions (hearing, vision, cognitive, ambulatory, self-care, and independent living)?” This question demanded a yes or no answer; thus, anyone who answered yes to the question is deemed as a person with disability. Again, disability type will be used as an independent variable for another model. The disability types in the data are, hearing (is...deaf or does...have serious difficulty hearing?), vision (is...blind or does...have serious difficulty seeing even when wearing glasses?), cognitive (because of a physical, mental, or emotional condition, does...have serious difficulty concentrating, remembering, or making decisions?), ambulatory (does...have serious difficulty walking or climbing stairs?), self-care (does...have difficulty dressing or bathing?), and independent living (because of physical, mental or emotional condition does...have difficulty doing errands alone such as visiting

a doctor's office or shopping?). A multiple disability variable is created from these questions on whether a person has more than one of the disabilities listed.

Covariates

Considering existing literature, demographic and contextual factors such as age, sex, resources (education, employment status, and household income) marital status, race, psychological engagement (political efficacy and political interest), and social network will be used as correlates, examining their direct and interaction effects.

Political efficacy denotes an individual's evaluation of his or her capacity to engage meaningfully and competently in the political process (Baber, 2020; Kim & Khang, 2014; Kirbiš et al., 2017; Oni et al., 2017). Consequently, an individual's conviction in their ability to influence the political system (internal efficacy), their perception of the system's responsiveness to such interventions (external efficacy), together forms the individual's overall political efficacy (Ostrander et al., 2020; Kopacheva, 2020). Following Verba and Nie (1972), political efficacy is used as a single concept and does not disaggregate it into internal and external efficacy. Thus, political efficacy is measured by a composite score of the following questions "In the past 12 months,] did [you/[NAME] vote in the last local elections, such as for mayor or school board?; In the past 12 months,] did [you/[NAME] attend a public meeting, such as a zoning or school board meeting, to discuss a local issues?; In the past 12 months,] did [you/[NAME] contact or visit a public official – at any level of government – to express [your/his/her] opinion?; [In the past 12 months,] did [you/[NAME] give money or possessions with a combined value of more than \$25 to a

political organization, party, or campaign?, In the past 12 months, Did [you/[NAME]] buy, or boycott products or services based on the political values or business practices of that company? While the aforementioned questions do not directly measure political efficacy, they serve as a reasonable proxy because they capture participation in the traditional sense, which has been linked to perceptions of one's ability to understand and influence the political process, also signifying an individual's belief regarding their capacity to impact the political system through collective or consumer-oriented actions which is consistent with the conceptualization of external efficacy as faith in the system's responsiveness (Balch, 1974; Craig et al., 1990; Easton & Dennis, 1967; Kopacheva, 2021; Niemi et al., 1991).

Political interest is measured by a composite score of the following questions “In the past 12 months, how often did [you/[NAME]] discuss political, societal, or local issues with [your/his/her] neighbors?; In the past 12 months, how often did [you/[NAME]] read, watch or listen to news or information about political, societal, or local issues?; In the past 12 months, how often did [you/[NAME]] discuss political, societal, or local issues with friends or family?”

Social network is measured by a composite score of the following questions “In the past 12 months, did [you/[NAME]] belong to any groups, organizations, or associations? In the past 12 months, did [you/[NAME]] spend any time volunteering for any organization or association?”

Data Analysis

The Heckman Probit Selection Model is used to address potential selection bias in online political participation. Because online political participation is dependent on internet connectivity, those who do not have access are automatically excluded from the outcome analysis. This omission may generate bias if factors impacting internet access, such as income or education, also influence online political participation. The Heckman model accounts for this bias by estimating both a selection equation (internet access) and a main outcome equation, online political participation (Lyu & Noh, 2017). To evaluate the association between disability status and online political participation while controlling for selection bias, this study employs a two-step Heckman correction model with Maximum Likelihood Estimation (MLE) (Ampaw et al., 2020; Morrissey et al., 2016; Goldfarb & Prince, 2008).

Following established methodological precedents, the selection equation is specified as a probit model and the outcome equation as a logit model. This mixed-link specification is supported in the literature. Miranda and Rabe-Hesketh (2006) use full maximum likelihood estimation of sample selection models with probit selection and alternative links, including logit in the outcome equation; Van de Ven and Van Praag (1981) provide the theoretical foundation for bivariate selection models and note that the framework can be adapted to different link functions; Börsch-Supan and Hajivassiliou (1993) outline simulation-based estimation methods that accommodate mixed-link selection systems; and Miranda (2004) offers an applied example of a probit selection with logit outcome estimated via full maximum likelihood. These studies collectively justify the use of a probit-logit

specification, allowing the first stage to retain the normality assumption standard in selection modelling while enabling the second stage to produce interpretable odds ratios for the binary outcome (Beydoun et al., 2025; Ampaw, 2020).

Step 1: Selection Equation (Internet Access)

In the first stage, I model the likelihood of having household internet access, which is a prerequisite for online political participation. Internet and broadband access are location-dependent, with people in rural areas generally underserved, having access to only low-quality broadband and internet, or no access at all (Mossberger & Tolbert, 2021; Dobransky & Hargittai, 2006; Duplaga, 2017; Orviska & Hudson, 2009; Goldfarb & Prince, 2008; Mills & Whitacre, 2003). Household size has been linked to internet access (Damoah, 2025; Correa et al., 2017; Scholz et al., 2017) as costs may be shared, whereas individuals living alone may be less likely to afford access. However, household size has not been shown to directly affect online political participation, making it suitable as the exclusion variable.

Other key predictors included in the model are age, as older adults consistently report lower adoption and less diverse internet use due to lower digital skills and technology confidence (Damoah, 2025; Johansson et al., 2021); education, with higher educational attainment associated with greater device ownership and digital literacy (van Deursen, 2020; Scholz et al., 2017; Duplaga, 2017); income, as higher family income enables purchasing devices and maintaining broadband subscriptions (Golden et al., 2023; Pettersson et al., 2023; Scholz et al., 2017); employment status, as being employed increases opportunities to use

internet and acquire digital competencies (van Deursen, 2020; Helsper, 2021; Helsper, 2012); and race, with persistent racial gaps in broadband adoption and digital skill levels even after accounting for socioeconomic factors (Pettersson et al., 2023; Brown et al., 2020; Longoria et al., 2022; Wang, 2022). By modeling these factors in the first stage, I obtain Heckman's correction factor (Inverse Mills Ratio) to account for selection bias in the second stage analysis of online political participation. This equation is estimated using a Probit model:

$$I^* = \beta_0 + \beta_1 \text{Disability} + \beta_2 \text{Age} + \beta_3 \text{Sex} + \beta_4 \text{Education} + \beta_5 \text{Employment Status} + \beta_6 \text{Race} + \beta_7 \text{Marital Status} + \beta_8 \text{Household Income} + \beta_9 Z + \varepsilon_i$$

where:

- $I = 1$ if the individual has internet access.
- Z is an exclusion restriction (instrumental variable), a variable affecting internet access but not directly influencing political participation (Household size).
- ε is the error term.

Step 2: Outcome Equation (Online Political Participation)

In the second stage, I formulate a model to explain the decision to participate politically online in terms of contributing factors, including the Inverse Mills Ratio as a covariate. The second stage is estimated using a logit regression to facilitate interpretation in terms of odds ratios, while still incorporating the selection correction from the first stage:

$$O^* = \beta_0 + \beta_1 \text{Disability} + \beta_2 \text{Age} + \beta_3 \text{Sex} + \beta_4 \text{Education} + \beta_5 \text{Employment Status} + \beta_6 \text{Race} + \beta_7 \text{Marital Status} + \beta_8 \text{Household Income} + \beta_9 \text{Political Interest} + \beta_{10} \text{Social Networks} + \beta_{11} \text{Political Efficiency} + \lambda + \varepsilon_i$$

where:

- $O = 1$ if the individual engages in online political participation.
- λ is the Inverse Mills Ratio (IMR), controlling for selection bias.
- ε is the error term.

Interaction Terms

To further analyze whether employment, education, income, political efficacy, and social networks moderate the relationship between disability and online political participation, an extended Heckman selection model is estimated, incorporating interaction effects in the logit outcome equation:

$$O^* = \beta_0 + \beta_1 \text{Disability} + \beta_2 (\text{Disability} \times \text{Social Network}) + \beta_3 (\text{Disability} \times \text{Political Efficacy}) + \beta_4 (\text{Disability} \times \text{Education}) + \beta_5 (\text{Disability} \times \text{Employment Status}) + \beta_6 (\text{Disability} \times \text{Household Income}) + \text{Covariates} + \lambda + \varepsilon_i.$$

The outcome equation's logit link allows the interaction effects to be interpreted in terms of the odds of participating politically online, conditional on having internet access, while still correcting for potential selection bias from the first-stage probit model.

Results

The probit selection model in Table 5, which analyzes factors associated with internet usage, indicates that educational attainment is the primary determinant of internet use. In comparison to the reference category of less than high school completion, all education categories exhibit statistically significant positive associations with internet usage ($p < 0.001$). High school graduates show the smallest positive association (coefficient = 0.396), followed by those with some college or associate degrees (coefficient = 0.598), bachelor's degree holders (coefficient = 0.635), and graduate degree holders exhibiting the strongest association (coefficient = 0.711). This progressive increase underscores that each additional level of educational attainment enhances the probability of internet adoption.

Another significant predictor is age, with a small but statistically significant negative coefficient (-0.008 , $p < 0.001$), indicating that older individuals are marginally less likely to be internet users. Additionally, household size functions as the exclusion restriction in this selection model, exhibiting a positive association with internet usage (coefficient = 0.295, $p < 0.001$). Also, regarding race, Asian Americans exhibit a statistically significant negative association with internet usage (coefficient = -0.177 , $p < 0.05$) compared to White respondents. However, Black, Hispanic, and Other Race categories show no statistically significant associations with internet usage.

Furthermore, the findings show that several demographic and socioeconomic variables were not statistically significantly related to internet usage. Gender does not demonstrate a significant association, with males exhibiting a non-significant negative coefficient (-

0.017). Similarly, there is no evident association between employment status and internet usage (coefficient = -0.013). Perhaps most surprisingly, family income does not predict internet usage (coefficient = 0.119). This suggests that income barriers may be less pronounced than commonly assumed once educational attainment is controlled for. Finally, marital status (divorced, married, separated, and widowed) does not exhibit any associations with internet usage when contrasted with never-married individuals.

Table 5. Probit Regression for Selection Model of the Association Between Internet Use and Disability

Selection Model: Internet User (Probit)	
	<i>Dependent variable:</i>
	Internet User
	Probit Coefficients
Age	-0.008*** (0.002)
Male	-0.017 (0.046)
High School Graduate	0.396*** (0.093)
Some College/Associate Degree	0.598*** (0.096)
Bachelor's Degree	0.635*** (0.101)
Graduate Degree	0.711*** (0.107)
Employed	-0.013 (0.132)
Asian American	-0.177* (0.079)
Black	-0.083 (0.067)
Hispanic	0.014 (0.105)
Other Race	-0.332 (0.265)

Divorced	0.186
	(0.154)
Married	-0.032
	(0.086)
Separated	-0.017
	(0.065)
Widowed	-0.132
	(0.160)
Log Family Income	0.119
	(0.145)
Household Size	0.295***
	(0.053)
Constant	0.568**
	(0.203)
Observations	8217
Log Likelihood	-2564.32
McFadden R ²	0.047
Observations	8,217
Log Likelihood	-2,432.268
Akaike Inf. Crit.	4,902.536
<i>Note:</i>	$p < 0.05$; $p < 0.01$; $p < 0.001$
	*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$
Reference categories: Female, < HS Diploma, Unemployed, White, Never Married; Household Size is the exclusion restriction	

Association Between Disability and Online Political Participation

The result in Table 6 shows a complex relationship between disability status and online political participation that varies across model specifications. In the baseline model (Model 1), individuals with disabilities demonstrate marginally higher odds of online political participation compared to non-disabled individuals (OR = 1.31, 95% CI: 1.00-1.72). When demographic and socioeconomic controls are introduced in Model 2, this positive relationship strengthens slightly, with disabled individuals showing 35% higher odds of

online political participation (OR = 1.35, 95% CI: 1.03-1.77). However, the relationship becomes non-significant in Model 3, with the inclusion of the other covariates like political efficacy, among others (OR = 1.20, 95% CI: 0.90-1.59). This suggests that political orientations may mediate the disability-participation relationship.

Also, the inclusion of interaction terms in Model 4 shows that the main effect of disability becomes statistically non-significant (OR = 0.79, 95% CI: 0.07-9.19), although the very wide confidence interval suggests estimation uncertainty. Regarding interaction terms, the interaction between disability and political efficacy (Figure 10) establishes that disabled individuals with higher levels of political efficacy show 37% greater odds of online political engagement (OR = 1.37, 95% CI: 1.03-1.83). The interaction between disability and social networks shows a modest negative coefficient (OR = 0.87), though this effect is not statistically significant. Other interaction terms, including those with education levels, employment status, and family income are statistically not significant.

Educational attainment shows an interesting result across model specifications. In Model 2, higher education is associated with increased odds of online political participation. Individuals with bachelor's degrees show 101% higher odds (OR = 2.01, 95% CI: 1.10-3.68), while those with graduate degrees demonstrate 99% higher odds (OR = 1.99, 95% CI: 1.05-3.74) compared to those without high school completion. However, when political efficacy among others is introduced in Models 3 and 4, this relationship reverses. Those with some college or associate degrees show 71% lower odds of participation (OR = 0.29, 95% CI: 0.09-0.96), while graduate degree holders show 77% lower odds (OR = 0.23-0.24,

95% CI: 0.06-0.86-0.88). The afore suggests that once political interest, social networks, and political efficacy are controlled, formal education becomes negatively associated with online political participation, possibly indicating that they mediate education's positive effect.

Political efficacy demonstrates the strongest association, with each unit increase corresponding to 56-58% higher odds of online political participation across Models 3 and 4 (OR = 1.56-1.58, 95% CI: 1.46-1.69). Also, political interest similarly shows a positive relationship, with each unit increase associated with 10% higher odds of participation (OR = 1.10, 95% CI: 1.08-1.13). Social networks also contribute positively, although the effect is modest and marginally significant, with larger networks corresponding to 7-8% higher odds of online political engagement (OR = 1.07-1.08, 95% CI: 0.98-1.19).

In addition to the above, the results for demographics reveal interesting variations in online political participation. Married individuals consistently show lower odds of online political participation compared to never-married individuals (OR = 0.73, 95% CI: 0.60-0.89), while other marital status categories show no significant differences. This finding is unexpected as the extant literature has shown that being married positively associates with political participation, at least for offline participation (Daenekindt, et al., 2020; Stoker & Jennings, 1995; Gruneau, 2018).

Again, among racial groups, Black people show 59-60% higher odds of online political participation (OR = 1.59-1.60, 95% CI: 1.08-2.35), while Hispanic individuals demonstrate 50-51% higher odds (OR = 1.50-1.51, 95% CI: 1.16-1.95). American Indian/Alaska Native

respondents show the highest point estimate (OR = 2.15-2.16), although this effect does not reach statistical significance. The finding regarding Black people's online participation is in congruence with Wang (2021)'s finding that when it comes to online political participation, Black people exhibit high levels of participation compared to White people. Perhaps the most strikingly, higher family income is associated with lower odds of online political participation (OR = 0.43, 95% CI: 0.24-0.76). This suggests that economic resources may not translate directly into digital political engagement once other factors, particularly efficacy and social networks are controlled.

The inverse Mills ratio (IMR) shows varying patterns across models. In Model 1, it is highly significant (OR = 0.22, 95% CI: 0.08-0.57), indicating selection bias. In Model 2, the IMR becomes non-significant (OR = 1.41), but in Models 3 and 4, it drops (OR = 0.002, 95% CI: 0.00-0.38), suggesting use of the Heckman selection model was appropriate.

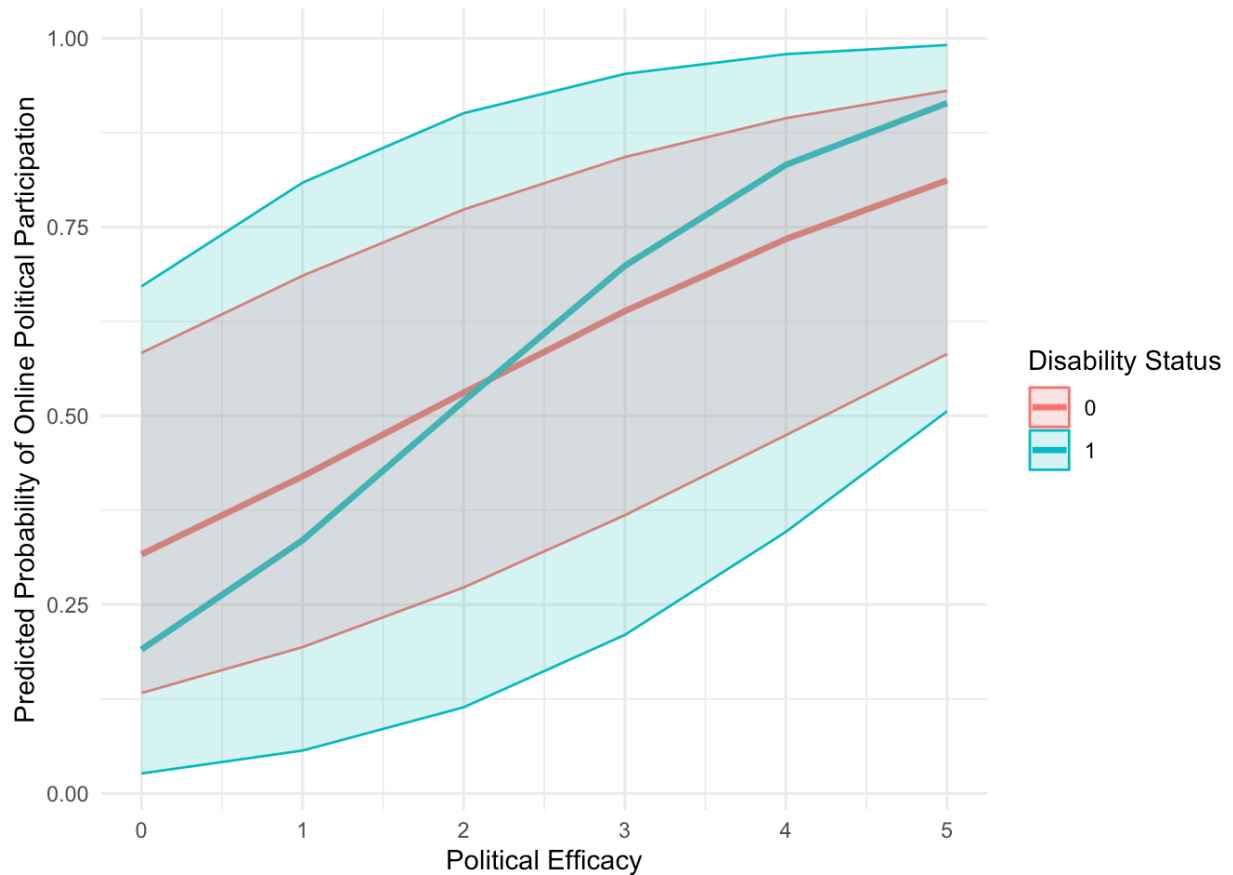
Table 6. Logistic Regression of Association Between Disability and Online Political Participation

Logistic Regression Results				
	<i>Dependent variable:</i>			
	Online political participation			
	Model 1	Model 2	Model 3	Model 4
Disability	1.31	1.35	1.20	0.79
	(1.00, 1.72)	1.03, 1.77)	(0.90, 1.59)	(0.07, 9.19)
Age		0.99	1.00	1.00
		(0.99, 1.00)	(0.99, 1.01)	(0.99, 1.01)
Male		0.88	0.94	0.93
		0.77, 1.01)	(0.81, 1.08)	(0.81, 1.08)
High School Diploma or Equivalent		1.53	0.49	0.47

		(0.92, 2.56)	(0.20, 1.22)	(0.19, 1.17)
Some College or Associate Degree		1.61	0.29	0.29
		(0.91, 2.88)	(0.09, 0.96)	(0.09, 0.96)
Bachelor's Degree		2.01	0.30	0.29
		(1.10, 3.68)	(0.09, 1.03)	(0.09, 1.00)
Graduate Degree		1.99	0.23	0.24
		(1.05, 3.74)	(0.06, 0.86)	(0.06, 0.88)
Employed			0.96	0.92
			(0.65, 1.42)	(0.60, 1.39)
Black			1.59	1.60
			(1.08, 2.33)	(1.09, 2.35)
Hispanic			1.50	1.51
			(1.16, 1.95)	(1.16, 1.95)
Asian American			1.06	1.06
			(0.78, 1.44)	(0.78, 1.45)
Amer Indian/Alaska Native			2.15	2.16
			(0.87, 5.30)	(0.88, 5.31)
Other			1.31	1.30
			(0.81, 2.12)	(0.81, 2.10)
Divorced			0.99	0.99
			(0.76, 1.27)	(0.76, 1.28)
Married			0.73	0.73
			(0.60, 0.89)	(0.60, 0.89)
Separated			0.84	0.86
			(0.46, 1.54)	(0.47, 1.57)
Widowed			0.92	0.90
			(0.56, 1.51)	(0.55, 1.49)
Family income (logged)			0.43	0.43
			(0.24, 0.75)	(0.24, 0.76)
Political interest			1.10	1.10
			(1.08, 1.13)	(1.08, 1.13)
Social network			1.07	1.08
			(0.98, 1.18)	(0.98, 1.19)
Political efficacy			1.58	1.56
			(1.48, 1.69)	(1.46, 1.67)
IMR	0.22	1.41	0.002	0.002
	(0.08, 0.57)	(0.28, 7.17)	(0.00, 0.38)	(0.00, 0.38)

Disability: Social network				0.87
				(0.59, 1.28)
Disability: Political efficacy				1.37
				(1.03, 1.83)
Disability: Political interest				0.96
				(0.87, 1.05)
Disability: High School Diploma or Equivalent				1.98
				(0.39, 10.17)
Disability: Some College or Associate Degree				0.95
				(0.19, 4.73)
Disability: Bachelor's Degree				1.89
				(0.36, 9.99)
Disability: Graduate Degree				0.37
				(0.07, 2.07)
Disability: Employed				1.31
				(0.44, 3.92)
Disability: Family income (logged)				0.95
				(0.55, 1.64)
Constant	0.31	0.19	5.98	6.32
	(1.14, 1.62)	(0.60, 2.41)	(21.97, 7,083.45)	(31.09, 9,952.39)
Observations	7,439	7,439	7,439	7,439
Akaike Inf. Crit.	7,194.90	7,185.46	6,719.14	6,717.02
<i>Note:</i> Coefficients are presented as odds ratios with 95% confidence intervals in brackets.				
Model 1: Nagelkerke $R^2 = 0$ Adjusted $R^2 = 0$ $R = 0.06$				
Model 2: Nagelkerke $R^2 = 0.01$ Adjusted $R^2 = 0.01$ $R = 0.09$				
Model 3: Nagelkerke $R^2 = 0.11$ Adjusted $R^2 = 0.1$ $R = 0.33$				
Model 4: Nagelkerke $R^2 = 0.11$ Adjusted $R^2 = 0.11$ $R = 0.33$				

Figure 10. Interaction of Disability and Political Efficacy



Association Between Disability Types and Online Political Participation

The disaggregated analysis of disability types in Table 7 reveals nuanced patterns in online political participation, although with generally wider confidence intervals and less statistical precision than initially observed. The findings demonstrate considerable variation across different functional limitations, with most disability types showing non-significant associations once demographic and political attitude controls are included. Individuals with independent living disabilities show higher odds of online political engagement in the baseline model (OR = 2.97, 95% CI: 1.00-8.84) and with demographic

controls (OR = 3.15, 95% CI: 1.06-9.38). This positive association persists but becomes non-significant in Model 7 when political attitudes are included (OR = 2.94, 95% CI: 0.92-9.42). The wide confidence intervals reflect the relatively small number of individuals with independent living disabilities in the sample, warranting cautious interpretation. Nevertheless, the consistent direction and magnitude of effects suggest that individuals with independent living disabilities may find online platforms particularly valuable for political expression.

Additionally, people with cognitive disability shows elevated odds ratios across all specifications (OR = 1.72 in Model 5, 1.69 in Model 6, and 1.38 in Model 7), although none reach conventional levels of statistical significance. The confidence intervals (ranging from 0.81-2.92) consistently include 1.0, indicating uncertainty about the direction of the relationship. While the point estimates suggest that individuals with cognitive disabilities may have higher rates of online political participation, the data do not provide sufficient evidence to distinguish this from chance variation.

Also, people with multiple disabilities show a of positive associations that remain relatively stable across model specifications. In Models 5 and 6, individuals with multiple disabilities show 72-74% higher odds of online political engagement (OR = 1.72-1.74, 95% CI: 1.06-2.83), which are statistically significant. However, this relationship becomes marginally non-significant in Model 7 when political attitudes are controlled (OR = 1.59, 95% CI: 0.96-2.66). This pattern suggests that individuals with multiple disabilities may have

stronger political motivations that partially explain their online engagement, although the relationship remains positive even after accounting for these attitudes.

Further, other disability types show inconsistent with online political participation. Ambulatory disability consistently shows lower odds ratios across all models (OR = 0.64-0.67), but not statistically significant. Also, vision disability similarly shows reduced odds ratios (OR = 0.66-0.75) but not statistically significant. Although hearing disability exhibits odds ratios close to 1.0 across all specifications (OR = 0.99-1.12), it is also not significant statistically.

Moreover, educational attainment shows an unexpected reversal in Model 7, while bachelor's and graduate degrees are associated with increased participation in Model 6 (OR = 2.02-2.04), these relationships become negative when political attitudes are controlled in Model 7 (OR = 0.24-0.32). This unexpected finding seems to suggest a strong suppression effect, where education's influence operates primarily through political efficacy and interests. Once these are controlled, the direct effect of education becomes negative, possibly reflecting unmeasured characteristics of highly educated individuals who perhaps choose not to participate online despite having political interest.

These findings collectively suggest more heterogeneity and uncertainty in the relationship between disability types and online political participation. While independent living and multiple disabilities show suggestive evidence of increased online participation, most disability types exhibit non-significant associations. The strong role of political attitudes in explaining participation patterns underscores the importance of considering political

motivation alongside functional limitations when examining digital political inclusion for people with disabilities.

Table 7. Logistic Regression of Association Between Disability Types and Online Political Participation

Logistic Regression Results			
	<i>Dependent variable:</i>		
	Online political participation		
	Model 5	Model 6	Model 7
Ambulatory Disability	0.64	0.67	0.64
	(0.28, 1.42)	(0.30, 1.51)	(0.31, 1.34)
Cognitive Disability	1.72	1.69	1.38
	(1.02, 2.92)	(1.01, 2.83)	(0.81, 2.35)
Hearing Disability	1.03	1.12	0.99
	(0.60, 1.77)	(0.65, 1.93)	(0.55, 1.78)
Independent Living Disability	2.97	3.15	2.94
	(1.00, 8.84)	(1.06, 9.38)	(0.92, 9.42)
Multiple Disability	1.72	1.74	1.59
	(1.06, 2.80)	(1.07, 2.83)	(0.96, 2.66)
Vision Disability	0.75	0.75	0.66
	(0.31, 1.82)	(0.30, 1.85)	(0.25, 1.73)
Age		0.99	1.00
		(0.99, 1.00)	(0.99, 1.02)
Male		0.89	0.94
		(0.78, 1.02)	(0.82, 1.08)
High School Diploma or Equivalent		1.55	0.50
		(0.92, 2.60)	(0.20, 1.26)
Some College or Associate Degree		1.63	0.30
		(0.91, 2.92)	(0.09, 1.00)
Bachelor's Degree		2.04	0.32
		(1.11, 3.75)	(0.09, 1.09)
Graduate Degree		2.02	0.24
		(1.07, 3.83)	(0.06, 0.91)
Employed			0.98
			(0.66, 1.45)
Black			1.58
			(1.08, 2.31)

Hispanic			1.50
			(1.16, 1.95)
Asian American			1.07
			(0.78, 1.45)
American Indian/Alaska Native			2.13
			(0.87, 5.25)
Other			1.35
			(0.83, 2.17)
Divorced			0.98
			(0.76, 1.27)
Married			0.72
			(0.59, 0.88)
Separated			0.84
			(0.46, 1.53)
Widowed			0.90
			(0.55, 1.48)
Family income (logged)			0.43
			(0.24, 0.76)
Political interest			1.10
			(1.08, 1.13)
Social network			1.07
			(0.98, 1.18)
Political efficacy			1.58
			(1.48, 1.69)
IMR	0.22	1.44	0.002
	(0.08, 0.58)	(0.28, 7.34)	(0.00, 0.44)
Constant	0.31	0.18	5.27
	(1.14, 1.61)	(0.59, 2.41)	(10.86, 3,447.12)
Observations	7,439	7,439	7,439
Akaike Inf. Crit.	7,194.11	7,185.62	6,721.34
<p><i>Note:</i> Coefficients are presented as odds ratios with 95% confidence intervals in brackets.</p> <p>Model 5: Nagelkerke $R^2 = 0.01$ Adjusted $R^2 = 0.01$ $R = 0.08$</p> <p>Model 6: Nagelkerke $R^2 = 0.01$ Adjusted $R^2 = 0.01$ $R = 0.11$</p> <p>Model 7: Nagelkerke $R^2 = 0.11$ Adjusted $R^2 = 0.11$ $R = 0.33$</p>			

Discussion and Conclusion

Discussion

This study examined online political participation among individuals with disabilities through the lens of the Civic Voluntarism Model (CVM), which emphasizes the role of resources, recruitment, and psychological engagement as the building blocks of participation (Verba et al., 1995). By applying this framework to nationally representative data from the 2023 Current Population Survey, the findings show nuanced and complex patterns that offer new insights into how the use of digital platforms both reflect and reshape political inclusion for historically marginalized groups like people with disabilities.

The observation based on the findings shows a more complex picture than initially anticipated regarding the relationship between disability status and online political participation. When controlling for demographic and socioeconomic factors in Model 2, disabled individuals showed 35% higher odds of online political participation, providing initial support for Hypothesis 1 (people with disabilities would be more likely to engage in online political participation compared to their non-disabled counterparts when controlling for socioeconomic factors and psychological engagement). This suggested that online platforms like social media might function as compensatory platforms, reducing physical and logistical barriers that disadvantage people with disabilities regarding traditional or offline participation. However, this relationship became non-significant once psychological engagement variables, among others, were introduced in Model 3 and

reduced further with interaction terms added in Model 4. The afore seems to show that the apparent participation advantage conferred by digital platforms is facilitated by political attitudes and motivations.

The above interpretation finds support in the interaction analysis. Interaction between disability and political efficacy shows that disabled individuals with higher levels of political efficacy have 37% greater odds of online political participation. This provides strong support for Hypothesis 3 (among individuals with disabilities, psychological engagement (e.g., political interest and efficacy) is a stronger predictor of online political participation than socioeconomic resources) and extends beyond previous research by demonstrating not merely that efficacy matters, but that it matters more for people with disabilities. The enabling potential of digital platforms is thus conditional; it manifests most powerfully when individuals possess strong beliefs in their ability to influence political outcomes. This supports the CVM's emphasis on psychological engagement as a critical determinant of participation (Verba et al., 1995; Kirbiš et al., 2017; Oni et al., 2017), while demonstrating that in digital contexts, efficacy may function as a particularly potent compensatory resource for those facing resource disadvantages.

Further, political efficacy emerged as the dominant predictor of online political participation across all model specifications, with each unit increase corresponding to 56-58% higher odds of participation. This finding resonates strongly with existing research, highlighting efficacy as central to political behavior (Baber, 2020; Oni et al., 2017; Oser et al., 2022), particularly in digital environments where physical barriers to entry are reduced

(Kirbiš et al., 2017). Political interest also exerted a positive effect, underscoring the motivational component of the CVM. Together, these attitudinal variables demonstrate that psychological engagement becomes paramount once individuals gain digital access, consistent with the model's prediction that motivation drives participation when resources are available.

The above notwithstanding, the findings regarding socioeconomic resources present perhaps the most theoretically intriguing results. Educational attainment showed a dramatic reversal across model specifications. In Model 2, higher education was associated with increased odds of online political participation, with bachelor's degree holders showing 101% higher odds and graduate degree holders showing 99% higher odds compared to those without high school completion. This initially aligned with the CVM's resource component, which advances that education provides knowledge, skills, and cognitive resources that facilitate participation (Verba et al., 1995; Kim & Khang, 2014; Kopacheva, 2021).

However, the introduction of psychological variables in Model 3 produced a reversal. Individuals with some college education showed 71% lower odds, while graduate degree holders showed 77% lower odds of online political participation. These unexpected findings suggest that education operates primarily as an indirect predictor, cultivating political efficacy, interest, and civic skills rather than directly enabling participation (Verba et al., 1995). Once these psychological factors are controlled, the direct effect of education

becomes negative. Owing to the afore, some theoretical interpretations warrant consideration.

First, this may reflect suppression effects, where highly educated individuals with low psychological engagement are particularly unlikely to participate online, perhaps due to time constraints from professional obligations or alternative channels for political expression. Second, it suggests that less-educated individuals who possess high political efficacy and interest may be especially motivated to use accessible online platforms, for which education becomes less essential. These findings challenge assumptions about the straightforwardness of resource-based participation models and underscores the compensatory potential of digital environments for individuals with high motivation but limited formal education.

Based on the findings, hypothesis 2, which proposed that employment, education, and income would moderate the relationship between disability and online political participation, received no empirical support. The interaction terms for disability with education levels, employment status, and family income were not statistically significant. The afore appears to suggest that socioeconomic advantages do not amplify or diminish the effect of disability status on online participation in the ways expected by traditional resource-based frameworks. Rather than socioeconomic status conditioning participation, psychological engagement appears to operate as the primary mechanism through which participation occurs.

In addition to the above and contrary to the CVM and prior research that opine that showing recruitment or mobilization associates positively with online political participation (Kim & Khang, 2014; Guo et al., 2021), neither the main effect of social networks nor its interaction with disability reached statistical significance, thus failing to support Hypothesis 4 (recruitment through social networks significantly increases the likelihood of online political participation for people with disabilities, helping to offset resource-related barriers). These findings are incongruent with the extant and may reflect some possibilities. First, networks accessible to people with disabilities may be more socially supportive but less politically oriented (Williams & Teal, 2017). Again, disabled individuals who overcome accessibility barriers to participate online may rely more on intrinsic motivation than on social network or mobilization, consistent with Kim and Khang's (2014) finding that psychological engagement outweighs recruitment for online participation. Consequently, these findings suggest the CVM's recruitment component may require refinement for disability-inclusive digital contexts.

Furthermore, the disaggregated analysis of disability types revealed some level of heterogeneity and some uncertainty, reinforcing how important it is to move beyond a uniform conception of disability (Mattila & Papageorgiou, 2017; Schmaling & Williams, 2017). Individuals with independent living disabilities demonstrated the most consistent pattern. They showed higher odds of online political participation across model specifications, though the relationship became non-significant when political attitudes were controlled. This suggests that online platforms may provide particularly valuable opportunities for individuals whose independent living challenges make traditional

participation venues especially inaccessible. However, the wide confidence intervals reflect the relatively small number of individuals with independent living disabilities in the sample, necessitating cautious interpretation. Also, people with cognitive disabilities showed consistently elevated odds ratios across all specifications, but none was statistically significant. While the point estimates suggest possible increased participation, the data do not provide sufficient evidence to distinguish this from chance variation.

Additionally, individuals with multiple disabilities showed positive associations that remained relatively stable, with 72-74% higher odds in Models 5 and 6, although this became non-significant in Model 7 when psychological engagement and other covariates were controlled. This suggests that individuals with multiple impairments may possess particularly strong political motivations, perhaps because their lived experiences of compounded disadvantage heighten the perceived urgency of political participation. The reduction of the effect when attitudes are controlled indicates that psychological engagement mediates this relationship.

The above notwithstanding, other disability types showed inconsistent associations. Individuals with ambulatory and vision disabilities consistently showed reduced odds ratios but were not statistically significant. Again, people with hearing disability exhibited higher odds ratios across all specifications but was not statistically significant. These results suggest that the accessibility advantages of online platforms may not translate uniformly across different types of functional limitations. Physical accessibility features that benefit individuals with mobility limitations in traditional venues may not have parallel

advantages in digital spaces, where different barriers (such as website accessibility, assistive technology compatibility, and interface design) become salient. Collectively, these disaggregated findings intimate more heterogeneity and uncertainty in the relationship between disability types and online political participation. The variation across disability categories underscores that impairments intersect with digital affordances and barriers in highly specific ways, and that accessibility in online contexts remains uneven despite the theoretical promise of digital inclusion.

The inverse Mills ratio remained significant across most specifications, confirming the appropriateness of the Heckman selection model and indicating that internet access continues to stratify opportunities for participation (Mossberger et al., 2003; Goldfarb & Prince, 2008). Even when digital platforms reduce other barriers, fundamental divides in access ensure that participation remains conditional on connectivity. Besides, the negative association between higher family income and online political participation once efficacy and networks are controlled seems to suggest that economic resources may not translate directly into online political participation and may even be negatively associated once psychological factors are accounted for. This finding could reflect that higher-income individuals have access to alternative, less visible forms of political influence that do not require public online expression.

The above findings carry significant theoretical and practical implications. Theoretically, they demonstrate that the CVM may require modification when applied to digital contexts, particularly for people with disabilities. While the model's three-component structure

remains useful, the relative weights of resources, psychological engagement, and recruitment shift dramatically. In online environments, psychological engagement, particularly political efficacy, becomes the predominant predictor, overshadowing socio-economic resources. Resources appear to operate primarily as preconditions (in the form of internet access) and as indirect ways to efficacy rather than as direct enablers of participation.

Additionally, the recruitment component operates more in traditional participation contexts, suggesting that online participation may be more individually motivated than network dependent. Again, the findings show that digital platforms like social media offer compensatory potential, but this potential is realized primarily through psychological empowerment rather than simply through reduced physical barriers. The interaction between disability and political efficacy reveals that digital inclusion is not merely a technical challenge of making platforms accessible, but a broader challenge of cultivating political confidence and competence among individuals who have historically been excluded from political discourse.

With regard to policy, the findings suggest that interventions to promote political inclusion should prioritize psychological empowerment alongside technical accessibility and resource provision. Efforts to strengthen political efficacy through civic education, mentorship programs, or confidence-building initiatives may yield larger participatory gains than resource-based strategies alone (Bastien et al., 2020). Moreover, policies must account for the diversity of disability experiences. Strategies that benefit individuals with

independent living limitations may not translate effectively for those with other types of impairments. A one-size-fits-all approach to digital inclusion is unlikely to succeed. Instead, tailored initiatives that combine technical accessibility improvements with targeted efforts to cultivate efficacy and interest are more likely to advance meaningful participation.

Also, the findings highlight the significance of internet access as a foundational requirement to participation. While psychological factors dominate once individuals are online, access itself remains stratified by education, suggesting that digital divide interventions must continue addressing both connectivity and the educational disparities that predict technology adoption (Helsper, 2021). Furthermore, the heterogeneity across disability types underscores the need for universal design principles in digital platform development, recognizing that accessibility requirements vary across different functional limitations (Priestley et al., 2016).

Conclusion

This study contributes to both theory and practice by applying the Civic Voluntarism Model to analyze online political participation among individuals with disabilities. The results show that the relationship between disability and digital participation is complex and highly conditional. While disabled individuals showed higher participation odds when demographic factors were controlled, this advantage disappeared once psychological engagement was considered and manifested most strongly through an interaction with political efficacy. This underscores that the democratizing potential of digital platforms is

not automatic but contingent on psychological empowerment. The findings show that psychological engagement, particularly political efficacy, appears as the main predictor of online participation. Also, social networks do not increase participation differentially for disabled individuals, indicating that recruitment mechanisms may function differently in digital contexts.

The disaggregated analysis of disability types uncovers heterogeneity and uncertainty, with independent living disabilities showing the strongest and most consistent associations, multiple disabilities showing positive but reduced effects, and other disability types exhibiting inconsistent associations. These variations reveal that accessibility in digital spaces remains uneven across different functional limitations and that online platforms do not uniformly reduce barriers across all disability categories. These insights extend existing debates by showing that the predictors of participation operate fundamentally differently in digital environments than in offline contexts. Psychological motivation can partially compensate for resource deficits, but this compensation occurs primarily for individuals with high efficacy. Access divides remain consequential as foundational barriers, and disability-specific challenges persist even in supposedly accessible online spaces. This underscores the need for policy frameworks that address not only technical accessibility and internet connectivity but also psychological empowerment and tailored accessibility strategies that recognize the diversity of disability experiences.

The above notwithstanding, some limitations need to be acknowledged. The cross-sectional design precludes causal inference, and the single-item measures of political

efficacy and interest, while widely used, capture complex constructs only partially. Also, the relatively small sample sizes for some disability types, resulted in wide confidence intervals and limited statistical power to detect effects. Future research should employ longitudinal designs to track participation routes over time, develop more refined measures of digital accessibility that link technical affordances with participation outcomes, and integrate qualitative perspectives that capture the lived experiences of political engagement among people with disabilities (Waltz & Schippers, 2021; Priestley et al., 2016).

Despite these limitations, the study shows that individuals with disabilities are not marginal observers but active contributors to democratic life when psychological barriers are addressed alongside physical and technical ones. The finding that disabled individuals with high political efficacy show 37% greater odds of participation than people without disabilities reveal the transformative potential of cultivating political confidence. Recognizing both the barriers that suppress participation and the facilitators that enable it, particularly psychological empowerment, is essential for designing democratic systems that are inclusive, equitable, and representative.

Further, the internet offers meaningful opportunities for political inclusion, but these opportunities are realized most fully when individuals possess not only access and technical skills but also the belief in their capacity to influence political outcomes. For people with disabilities, who have historically faced systematic exclusion from political participation, strengthening political efficacy may be as important as ensuring technical accessibility. Policy initiatives should thus pursue integrated strategies that combine

universal design principles, connectivity programs, and civic engagement interventions specifically tailored to build political confidence among disabled individuals. Only through such comprehensive approaches can the promise of digital democracy be extended equitably to all citizens, regardless of their functional limitations.

CHAPTER 4

BRIDGING EMPLOYMENT GAPS: THE ROLE OF TELEWORK IN EMPLOYMENT RETENTION FOR INDIVIDUALS WITH DISABILITIES

Abstract

Despite policy initiatives aimed at enhancing job inclusion, individuals with disabilities encounter considerable employment gaps, with merely 32% employed compared to 80% of people without disabilities. The COVID-19 pandemic accelerated an extraordinary increase in telework that briefly diminished this disparity, but the post-pandemic return-to-office trend threatens these advancements. Using the Current Population Survey data from November 2023 (N = 12,305), the study examines whether telework serves as an effective employment retention mechanism for workers with disabilities. Analysis based on survey-weighted logistic regression indicate that individuals with disabilities had 48-62% reduced odds of employment retention compared to non-disabled individuals, even after accounting for demographics, education, household income, internet access, and industry factors. Although telework shows positive associations with retention, this effect seems largely mediated by worker characteristics and industry context, becoming non-significant in fully adjusted models. The afore notwithstanding, the interaction between disability and telework showed no statistical significance, thus providing no strong evidence that telework differentially benefits or do not benefit people with disabilities. Disaggregated analyses indicate that workers with multiple disabilities experience significantly greater retention disadvantages, with 67% lower odds. The findings suggest that the mere availability of telework, without addressing educational, economic, and occupational

barriers, is insufficient to bridge disability employment disparities, necessitating comprehensive interventions that address both workplace accommodations and structural inequities.

Keywords: *Telework, Disability, Job Demands-Resource Theory, Social Equity, Employment*

Introduction

Despite decades of policy initiatives aimed at expanding workplace inclusion, individuals with disabilities continue to face significant employment gaps in the United States. As of 2020, only 32% of people with disabilities were employed, compared to 80% of their non-disabled counterparts (Bloom et al., 2024). This gap, larger than inequalities associated with race, gender, or educational attainment, underscores the persistent structural barriers that limit both access to and continuity in employment for this population (Acemoglu & Angrist, 2001; Bloom et al., 2024). Although considerable attention has focused on initial hiring and workforce entry, the challenge of maintaining stable employment remains an equally critical yet underexplored dimension of disability inclusion.

The COVID-19 pandemic fundamentally transformed the landscape of work, catalyzing an unprecedented expansion in telework and remote work arrangements. Before the pandemic, approximately 7% of full workdays in the United States were completed remotely; by 2023, this figure had surged to 28% (Barrero et al., 2023). This dramatic shift removed many long-standing barriers related to commuting, physical workplace accessibility, and rigid scheduling that had historically constrained labor market participation for people with disabilities (Ameri et al., 2023; Ozimek, 2022; Ne’eman & Maestas, 2023). During this period, employment among individuals with disabilities increased by 22% between 2019 and 2024 (Bloom et al., 2024), reflecting how telework expanded inclusion by offering greater autonomy and control over work environments.

Telework has been shown to directly impact work-life balance and improved well-being of employees. Research on telework shows that it has the potential to increase job satisfaction, improve retention and recruitment rates, and save time commuting through flexible scheduling, thereby creating mutually beneficial outcomes for both employers and employees (Kwon & Kim-Goh, 2023; Chien, 2019). For individuals with disabilities specifically, telework reduces physical barriers such as pain, fatigue, and mobility limitations, making it a powerful accommodation that enables sustained workforce participation (Moon et al., 2014). The flexibility inherent in remote work allows employees to tailor their work environments to accommodate functional capacities, manage health conditions more effectively, and balance employment with medical care or other personal needs (Moon et al., 2014). Consequently, telework, during the pandemic served as a mechanism not merely for crisis adaptation but as a viable way toward advancing equity and inclusive participation in the labor market.

However, the post-pandemic period has witnessed a significant reversal as many organizations rolled back remote work options and re-emphasized physical presence in the workplace. Major corporations, including Amazon, have mandated full return-to-office schedules, with executives asserting that in-person work strengthens learning, collaboration, and corporate culture (Patel, 2024). The federal government has similarly called for civil servants to resume in-office duties, signaling that the broad telework flexibility introduced during the pandemic has been curtailed. This reversal has profound implications for workers with disabilities, as the very mechanism that temporarily

narrowed the employment gap is rapidly contracting, potentially eroding hard-won gains in inclusion and retention.

For individuals whose labor market participation depended on telework to overcome structural, health-related and accessibility barriers, the return-to-office movement risks re-entrenching inequalities that the pandemic moment had begun to dismantle. Yet, despite the documented increase in disability employment during the telework expansion and growing concerns about retention as organizations mandate office returns, research on employment retention among people with disabilities remains limited. Whereas existing studies have examined workplace accommodations (Wong et al., 2021), job satisfaction among teleworkers (Kwon & Kim-Goh, 2023), and general employment outcomes (Park & Park, 2021), few have specifically investigated whether telework serves as an effective retention mechanism for workers with disabilities. This paucity in the literature is particularly concerning given the difficult position of many workers with disabilities in the labor market.

Disabled individuals remain overrepresented in service and blue-collar sectors where telework opportunities are limited (Kruse et al., 2022; Makridis & Schloetzer, 2022), face persistent digital divides in access to high-speed internet and assistive technologies (Fong & Swick, 2022; Scanlan, 2022), and encounter organizational barriers even when telework arrangements are said to be available (Josephat, 2024; Simpson, 2011). Without empirical evidence on how telework influences employment retention for this population,

policymakers and organizations lack the foundation necessary to design inclusive workplace policies that preserve the gains achieved during the pandemic.

Owing to the above, it is critical to empirically examine whether telework genuinely improves employment retention for individuals with disabilities. Accordingly, the study seeks to address a fundamental question at a pivotal moment in the evolution of work: What is the effect of telework on employment retention among individuals with disabilities? By investigating this question using nationally representative data, it responds directly to an essential stage where the promise of digital inclusion is colliding with a renewed push toward physical presence. Understanding these dynamics is essential to ensuring that progress in disability employment is not rolled back as workplace norms continue to shift, and to informing policies that can sustain and extend the inclusive potential of telework.

Literature Review

Employment retention for individuals with disabilities has become an increasingly critical area of inquiry, particularly amid evolving workplace dynamics shaped by technological innovation and the expansion of telework. This part of the paper integrates empirical and theoretical insights through the lenses of Job Demands-Resources (JD-R) Theory and Social Equity Framework to understand the mechanisms that may lead to retention of employment among individuals with disabilities. The section is organized into two subsections: the Empirical Literature Review, which synthesizes research findings across

related domains, and the Theoretical Literature Review, which explores conceptual frameworks explaining these relationships.

Empirical Literature Review

Employment retention represents a persistent challenge for individuals with disabilities, with research showing that maintaining employment is often more complex than securing initial employment (Park & Park, 2021; Kudla et al., 2024; Ponzio et al., 2024). Multiple factors influence job retention outcomes, including individual characteristics, workplace accommodations, disability management practices, and organizational support systems (Fong & Swick, 2022; Bloom et al., 2024). Studies have revealed that personal and contextual factors interact in shaping retention outcomes.

At the individual level, the extant literature highlights how disability type and its severity, and adaptive capabilities affect long-term employment stability. Park and Park (2021) found that among individuals with intellectual disabilities, higher cognitive functioning, better adaptive behavior skills, and previous work experience predicted stronger job retention outcomes. Similarly, Ponzio et al. (2024) identified that individuals with progressive conditions, such as multiple sclerosis face unique barriers related to symptom fluctuation and disease progression, underscoring the need for adaptive work environments. Kudla et al. (2024) identified education, vocational training, coping strategies, and self-efficacy as critical predictors of long-term job retention among those with physical disabilities. Choi et al. (2025) on their part, found that workers demonstrating consistent job performance and strong interpersonal skills were more likely to be retained

by employers. Collectively, these studies show that personal capabilities must align with supportive organizational contexts to sustain employment for people with disabilities.

In addition to the above, workplace accommodations consistently emerge as a major determinant of retention. Wong et al. (2021) conducted a systematic review showing that accommodations such as modified schedules, assistive technology, and task restructuring significantly enhance job retention and return-to-work outcomes. Kim et al. (2020) found similar effects in South Korea, where accessible physical environments and specialized equipment improved employees' intentions to remain employed. Tran et al. (2022), using a machine-learning approach, identified that individualized and context-specific accommodations were more effective than standardized interventions, highlighting how personalized support strategies are relevant. Organizational-level studies confirm that disability management programs emphasizing early intervention, job coaching, and ongoing communication promote higher retention rates (Habeck et al., 2010; Lefever et al., 2018; Thomas & Morgan, 2021). These findings underscore the value of holistic approaches that integrate both individual and organizational support mechanisms.

Moreover, workplace accommodation has become a key retention mechanism, linking directly to the growing significance of telework. Choi (2020) found that flexible work arrangements, including telework, improved retention among federal employees. The afore is congruent with broader research on telework's benefits for people with disabilities, which emphasizes its potential to remove transportation and physical accessibility barriers but improves job satisfaction (Bloom et al., 2024; Schur et al., 2020). Empirical evidence

suggests that telework, when appropriately implemented, facilitates inclusion and equity in employment. Schur et al. (2020) observed that employees with disabilities were more likely to telework than their typical peers, as telework better accommodated their functional needs. Ameri et al. (2023) and Ozimek (2022) found that telework helped stabilize employment for disabled workers during the pandemic by enabling continued participation despite health risks or workplace barriers. Furthermore, Bloom et al. (2024) averred that hybrid work models improved retention without compromising productivity, indicating telework's potential to sustain workforce diversity and inclusion.

Beyond workplace flexibility, digital inclusion is increasingly recognized as a cornerstone of employment opportunity and retention. White et al. (2011) highlighted that access to digital technology and broadband connectivity enables individuals with disabilities to participate more fully in modern labor markets, strengthening pathways to economic self-sufficiency. They found that technology not only facilitates telework and remote training but also enhances social capital and professional networking, factors strongly associated with retention. However, White et al. (2011) also identified persistent barriers such as limited assistive technology access, affordability challenges, and inadequate digital literacy training, all of which can hinder employment continuity. These findings complement studies by Fong and Swick (2022) and Scanlan (2022), which show that unequal access to high-speed internet disproportionately affects people with disabilities and racial minorities, underscoring structural inequities in digital participation.

Notwithstanding these advantages, access to telework opportunities remains unequal. Research by Kruse et al. (2022) and Makridis and Schloetzer (2022) shows that workers with disabilities remain overrepresented in service and blue-collar sectors, where telework and telecommuting options are limited. Structural inequalities, including occupational exclusion and limited access to high-speed internet or digital devices, continue to restrict participation (Fong & Swick, 2022; Scanlan, 2022; Robinson et al., 2015). These digital divides intersect with racial and socioeconomic inequalities, further marginalizing disabled workers from minority backgrounds (Fong & Swick, 2022). Therefore, telework accommodations and digital access serve as critical retention mechanisms; however, their effectiveness depends heavily on inclusive organizational policies and equitable technological infrastructure.

The above empirical evidence establishes that employment retention for individuals with disabilities is shaped by complex interactions among personal attributes, organizational practices, and environmental conditions. Although previous research emphasizes accommodations and flexibility as key enablers, few studies examine telework as a distinct retention mechanism. Consequently, this study builds upon the extant literature by exploring how telework influences employment retention among people with disabilities.

Theoretical Literature Review

The Job Demands-Resources (JD-R) theory is a flexible and integrative job-design framework that explains how workplace characteristics shape employee well-being and motivation, which in turn influence key organizational outcomes (Bakker et al., 2023;

Demerouti & Bakker, 2023; Rahme et al., 2025; Mérida-López et al., 2022). According to this model, all job attributes can be classified into job demands or job resources (Demerouti & Bakker, 2022). Job demands refer to the physical, psychological, social, and organizational aspects of work that require sustained physical, cognitive, or emotional effort, producing physiological or psychological costs that may drain energy and contribute to burnout over time (Beekman et al., 2025; Tummers & Bakker, 2021). Job resources, by contrast, are the job aspects that support the achievement of work-related goals, help regulate or buffer the negative effects of demands, and stimulate personal learning, growth, and development (Chen, 2024; Demerouti & Bakker, 2023). These resources include social and organizational support mechanisms such as coworker and supervisor support, buddy schemes, autonomy, goal clarity, performance feedback, and technology-related support, all of which have motivating potential and practical relevance for improving work engagement (Auton & Sturman, 2024; Emidy, 2025; Tomczak & Kulikowski, 2024; Tummers & Bakker, 2021).

A defining characteristic of JD-R is that it has dual psychological pathways. In the health-impairment process, unmanaged or excessive job demands, including extreme workload, professional isolation, and interpersonal conflicts among others, can lead to chronic strain and eventual burnout. These sometimes activate self-undermining behaviors that can create a cycle of escalating demands and diminishing well-being (Demerouti & Bakker, 2023; Rahme et al., 2025; Lehmann et al., 2021). In contrast, the motivational process asserts that elevated job resources promote a self-reinforcing gain, where motivation is sustained and expressed as work engagement, a state defined by vigor, dedication, and absorption,

ultimately supporting performance outcomes (Kwon & Kim, 2020; Peiró et al., 2024). Additionally, JD-R also recognizes that demands and resources do not operate independently but interact across domains. A domain's demands may boost the effects of resources from another domain, although one domain's resources may buffer the negative effects of demands originating elsewhere, particularly in contexts where employees navigate multiple finite energy reserves (Chen, 2024; Demerouti & Bakker, 2023).

Moreover, various studies underscore JD-R's relevance in examining employee-employment relationship. Research shows that during mandated remote work conditions, resources such as home office comfort and technical support, significantly supported telework engagement-related outcomes like satisfaction and performance; however, professional isolation acted as a drain, undermining telework engagement levels (Auton & Sturman, 2024; Chen, 2024). Under crisis conditions, JD-R's ability to incorporate contextual stressors and support structures remains convincing, allowing scholars to examine how structural workplace adaptations enhance or impede well-being and engagement for both neurotypical and neurodivergent employees (Demerouti & Bakker, 2023; Kwon & Kim, 2020; Peiró et al., 2024; Tomczak & Kulikowski, 2024; Beekman et al., 2025).

Telework is increasingly conceptualized as both a workplace innovation and a disability accommodation that enhances flexibility, autonomy, and job sustainability (Ki & Lee, 2025; Chien, 2019; Peiró et al., 2024). Through the lens of JD-R theory, telework functions as a multifaceted job resource that simultaneously reduces certain demands (commuting,

physical workplace navigation, exposure to health risks) but increasing personal resources (autonomy, control over work environment, schedule flexibility). According to Moon et al. (2014), telework improves work-life balance and alleviates conditions, such as physical strain, commuting difficulties, and fatigue that often represent significant job demands, limiting employment retention for people with disabilities. Similarly telework promotes autonomy and self-determination by allowing employees to tailor work environments to their functional capacities, enhancing personal resources that support sustained employment.

Building on social exchange theory, prior research shows that telework functions as a reciprocal relationship between organizations and employees, a perspective compatible with the JD-R model's emphasis on resource exchange (Beekman et al., 2025). Kwon and Kim-Goh (2023) found that flexible work arrangements enhance satisfaction and performance when employees perceive them as signals of organizational trust and support, representing organizational resources that buffer against job demands. Extending this to disability inclusion, Kwon et al. (2021) observed that telework becomes a meaningful accommodation for disabled employees when supported by inclusive leadership and positive coworker interactions, demonstrating how social resources amplify the benefits of structural resources like telework. However, weak managerial engagement or isolation can erode these benefits by creating new social and emotional demands. Together, these studies highlight that telework's success depends not only on technological access but also on the quality of social and organizational reciprocity, reflecting the JD-R principle that resources are most effective when they address both structural and relational demands.

Kruse et al. (2022) found that telework arrangements during the COVID-19 pandemic were critical for maintaining economic stability among employees with disabilities, particularly by mitigating exposure risks and preserving job continuity, effectively reducing health-related demands and maintaining employment resources. Telework has also been linked to reduced absenteeism and improved productivity when accompanied by proper accommodations and ergonomic measures (Hong et al., 2024), demonstrating how properly resourced telework arrangements can enhance both worker well-being and organizational outcomes. However, these benefits are not uniformly distributed across all occupations, raising equity concerns central to the Social Equity Framework. The degree to which telework advantages individuals with disabilities depends on job type and industry context. Bloom et al. (2024) and Makridis and Schloetzer (2022) showed that telework yields stronger retention effects in white-collar and cognitive roles than in manual or service occupations, where physical presence is essential. This occupational variation underscores the significance of understanding structural constraints when developing inclusive telework policies and highlights how labor market segmentation creates unequal access to job resources.

From a Social Equity Framework perspective, the interaction of race, internet access, and disability reflects broader systemic inequalities in resource distribution and opportunity structures. Studies by Fong and Swick (2022) and Scanlan (2022) reveal that limited broadband access disproportionately affects minority and low-income communities, thereby reducing opportunities for remote work and skill development. Robinson et al. (2015) argued that digital inequalities contribute to labor market exclusion by constraining

access to telework-compatible jobs and career advancement opportunities, reflecting how structural inequities compound across multiple dimensions of disadvantage. These insights underscore that telework's potential as an inclusion mechanism depends on equitable technological access, particularly high-speed internet and digital literacy, resources that are unequally distributed across social groups. White et al. (2011) further supports this position, advancing that digital accessibility initiatives and technology-focused policies can expand participation for disabled individuals across industries by integrating universal design principles into workforce development programs, addressing both resource availability and systemic barriers to access.

The theoretical significance of telework for people with disabilities thus lies in its dual function as both a job resource within the JD-R framework and a mechanism for addressing social inequities. It mitigates mobility, health, and accessibility demands as it potentially expands opportunities for participation in mainstream labor markets. However, the Social Equity Framework highlights that without structural supports such as digital infrastructure, and adaptive management practices, telework may inadvertently exacerbate existing inequalities by being accessible only to those already advantaged by education, occupation, and economic resources (Josephat, 2024; Simpson, 2011). Therefore, integrating disability management frameworks with telework and digital inclusion strategies is essential for promoting sustainable employment that addresses both resource provision and equity concerns.

These theoretical perspectives converge on the idea that telework, when supported by adequate organizational, technological, and policy interventions, can enhance employment retention for individuals with disabilities by functioning as a critical job resource. However, its success depends on addressing contextual disparities related to job type, technology access, and inclusive workplace culture, factors that reflect broader social inequities in opportunity and resource distribution. The JD-R theory provides a framework for understanding how telework operates as a resource that protects against employment-threatening demands, also, the Social Equity Framework shows how unequal access to this resource perpetuates systematic disadvantages for marginalized groups. These frameworks collectively serve as a foundation for this essay, which examines how telework influences employment retention outcomes for people with disabilities. The study thus hypothesizes that:

H1: Individuals with disabilities who engage in telework are more likely to retain employment compared their non-disabled counterparts.

Research Design

Data

The study employs the Current Population Survey (CPS) as its data source. The CPS is a monthly survey of households. The CPS offers demographic data for household members, encompassing age, race & ethnicity, educational attainment, and job status. The November 2023 sample include a Computer and Internet Use supplement, funded by the National Telecommunications and Information Administration (NTIA). Commonly referred to as

the NTIA Internet Use Survey, it offers comprehensive data regarding household internet subscription types and individual internet usage at home, in the workplace, and for activities such as communication, entertainment, telecommuting, and job searching (National Telecommunications and Information Administration, 2024). The dataset was selected because it is the most comprehensive national survey of how Americans connect to the internet and what they do when they are online, with its large sample size and more than 50 questions about internet usage.

Sample Characteristics

The study sample included 12,305 respondents from the CPS Computer and Internet Use supplement dataset. Table 8 shows descriptive statistics for all key study variables. Most respondents, 11,640 (95%), reported no disability, with 665 (5%) reporting at least one disability. Among respondents with disabilities, hearing disabilities were the most prevalent ($n = 167$; 1.2%), followed by multiple disabilities ($n = 151$; 1.1%), cognitive disabilities ($n = 128$; 1.0%), and ambulatory disabilities ($n = 118$; 0.9%). Vision disabilities ($n = 79$; 0.7%), independent living disabilities ($n = 19$; 0.1%), and self-care disabilities ($n = 3$; 0.0%) were the least common.

In addition to the above, the sample composition was 53.3% male ($n = 6,429$) and 46.7% female ($n = 5,876$). Regarding employment retention, the vast majority ($n = 11,173$; 90.9%) remained employed, but 1,132 (9.1%) did not. Also, for educational attainment, most respondents had completed at least high school. Specifically, 26.5% ($n = 3,207$) held a bachelor's degree, 24.6% ($n = 2,982$) had a high school diploma or equivalent, 24.2% ($n = 3,080$) had some college or an associate degree, and 17.3% ($n = 2,174$) held a graduate

degree. About 7.4% (n = 862) had less than a high school education. Further, individuals aged 25-44 made up the largest group (n = 4,981; 42.0%), followed by those aged 45-64 (n = 4,969; 39.4%), those aged 65 and older (n = 1,221; 7.9%), and young adults aged 18-24 (n = 1,134; 10.7%). Lastly, in terms of race, most respondents identified as White (n = 8,369; 62.2%), followed by Hispanic (n = 1,853; 18.0%), Black (n = 943; 10.3%), Asian American (n = 813; 6.9%), Other (n = 245; 2.1%), and American Indian/Alaska Native (n = 82; 0.4%).

Table 8. Descriptive Statistics of Study Variables

Variable	Category	N	Percentage (%)
Disability	No	11,640	95%
	Yes	665	5%
Sex	Female	5,876	46.7%
	Male	6,429	53.3%
Age Group	18-24	1,134	10.7%
	25-44	4,981	42%
	45-64	4,969	39.4%
	65+	1,221	7.9%
Education	Less than High School Diploma	862	7.4%
	High School Diploma or Equivalent	2,982	24.6%
	Some College or Associate Degree	3,080	24.2%
	Bachelor's Degree	3,207	26.5%
	Graduate Degree	2,174	17.3%
Employment Retention	Not Retained	1,132	9.1%
	Retained	11,173	90.9%
	White	8,369	62.2%
	Black	943	10.3%
	Hispanic	1,853	18%
	Asian American	813	6.9%
	American Indian/AK Ntv	82	0.4%
	Other	245	2.1%
Disability Type	Ambulatory Disability	118	0.9%
	Cognitive Disability	128	1%
	Hearing Disability	167	1.2%
	Independent Living Disability	19	0.1%
	Multiple Disability	151	1.1%
	Self-Care Disability	3	0%
	Vision Disability	79	0.7%
Percentages are weighted to represent the U.S. population. Frequencies represent unweighted sample counts.			

Dependent Variable

The dependent variable is employment retention. The analytic sample is restricted to respondents employed in November 2023 and observed in November 2024. Employment retention equals 1 if the respondent is employed in November 2024 and 0 otherwise.

Independent Variable of Interest

For the main model, disability status is used as an independent variable of interest in the study. Respondents were asked, “Does this person have any of these disability conditions (hearing, vision, cognitive, ambulatory, self-care, and independent living)?” This question demanded a yes or no answer. Thus, anyone who answered yes to the question is deemed as a person with a disability. Again, disability type will be used as an independent variable for another model. The disability types in the data are, hearing (is...deaf or does...have serious difficulty hearing?), vision (is...blind or does...have serious difficulty seeing even when wearing glasses?), cognitive (because of a physical, mental, or emotional condition, does...have serious difficulty concentrating, remembering, or making decisions?), ambulatory (does...have serious difficulty walking or climbing stairs?), self-care (does...have difficulty dressing or bathing?), and independent living (because of physical, mental or emotional condition does...have difficulty doing errands alone such as visiting a doctor’s office or shopping?). A multiple disability variable is created from these questions on whether a person has more than one of the disabilities listed.

Telework is another variable of interest. The CPS asks people the activities they perform on the internet and one of the questions is “Do you/Does NAME use the Internet to telecommute or work while away from (your/his/her) usual workplace, such as working

from home?” This is a binary variable equal to one if an individual an individual reported using the internet to telecommute.

Other Covariates

Demographic factors, including age, sex, education, race, marital status, household income, home internet access, and industry type were chosen as correlates.

Data Analysis

A series of survey-weighted binary logistic regressions were used to investigate the relationship between employment, disability status, and telework. Survey weights were applied to account for the CPS's complex sampling design and to ensure nationally representative estimates (Lumley, 2020). To do this, employment retention was predicted by disability and telework while controlling for the effects of covariates (age, education, sex, race, household internet access, marital status, and family income). The following logit models were used to test the study’s objective:

$$P(\text{Employed}_{i,2024} = 1 / \text{Employed}_{i,2023} = 1) = \beta_0 + \beta_1 \text{Telework}_i + \beta_2 \text{Disability}_i + \beta_3 X_i + \varepsilon_i$$

Where:

$P(\text{Employed}_{i,2024} = 1 / \text{Employed}_{i,2023} = 1) = 1$ if the person was employed in both 2023 and 2024 or 0 otherwise.

Telework_i = binary variable indicating whether individual i uses the internet for telework.

Disability_i = binary variable indicating whether individual i has a disability.

X_i = vector of control variables (e.g., age, sex, race, educational attainment, industry, household internet connection type).

ε_i = error term.

Expanded Model with Interaction Effects

$$P(\text{Employed}_{i,2024} = 1 / \text{Employed}_{i,2023} = 1) = \beta_0 + \beta_1(\text{Telework}_i \times \text{Disability}_i) + \beta_2 X_i + \varepsilon_i$$

Where interaction terms:

$(\text{Telework}_i \times \text{Disability}_i)$ is an interaction between telework and disability status to test if telework impacts employment retention differently for individuals with disabilities.

X_i = vector of control variables (e.g., age, sex, race, educational attainment, occupation, industry).

ε_i = error term.

Results

Association Between Disability and Employment Retention

Table 9 presents the results of weighted survey logistic regression models examining the determinants of employment retention, with coefficients reported as odds ratios across three specifications. The progression from Model 1 through Model 3 allows for a systematic assessment of how disability status, telework arrangements, and other covariates shape the likelihood of employment retention as demographic, socioeconomic, technological, and industry-level factors are progressively introduced.

Across all specifications, disability status is consistently and negatively associated with employment retention. In Model 1, which includes only disability and teleworking, workers with disabilities face 62 percent lower odds of retaining employment compared to their non-disabled counterparts (OR = 0.38, 95% CI: 0.27-0.53). This negative association

is consistent after successive adjustments. In Model 2, which adds interaction between disability and telework, the odds ratio rises to 0.44 (95% CI: 0.29-0.67). Also, in Model 3, the fully adjusted model controlling for demographics, socioeconomic characteristics, internet access, and industry, the odds ratio increases to 0.52 (95% CI: 0.33-0.82). These findings reflect a persistent disadvantage for workers with disabilities in maintaining employment. This seems to suggest that observed retention gaps cannot be fully explained by differences in demographics, educational attainment, household resources, or industry of employment.

Telework on the other hand, shows a positive association with employment retention in Models 1 and 2, with workers who telework experiencing approximately 49 to 57 percent higher odds of retention (OR = 1.49, 95% CI: 1.20-1.85 in Model 1; OR = 1.57, 95% CI: 1.24-1.99 in Model 2). However, this association becomes statistically non-significant in the fully adjusted Model 3 (OR = 1.20, 95% CI: 0.93-1.55), suggesting that the apparent benefits of telework are largely accounted for by worker characteristics, household resources, and industry composition. The afore notwithstanding, the interaction between disability and telework in Models 2 and 3 is not statistically significant (OR = 0.65-0.68), indicating that whereas the coefficient suggest teleworking may be somewhat less beneficial for disabled workers, this difference does not reach conventional levels of statistical significance in this sample.

In addition to the above, age is associated with reduced odds of retention (OR = 0.97, 95% CI: 0.96-0.98), reflecting natural life-cycle dynamics of labor force participation. Also,

male workers are significantly more likely than women to retain employment (OR = 1.31, 95% CI: 1.02-1.67), underscoring persistent gender disparities in employment stability. Further, education appears as one of the most powerful predictors. Compared to workers without a high school diploma, individuals with a high school degree (OR = 1.66, 95% CI: 1.08-2.55), some college or an associate degree (OR = 1.91, 95% CI: 1.28-2.85), a bachelor's degree (OR = 2.03, 95% CI: 1.33-3.11), or a graduate degree (OR = 2.51, 95% CI: 1.54-4.10) are all significantly more likely to retain employment. This strong and positive association between educational attainment and employment retention highlights the protective role of human capital in employment retention, consistent with broader evidence on labor market returns to education or schooling.

On the other hand, race show no statistically significant associations with employment retention. Although the coefficients suggest Black workers may have somewhat lower odds of retention (OR = 0.87) and American Indian/Alaska Native workers may have higher odds (OR = 2.43), the confidence intervals for all racial categories include 1.0, precluding definitive conclusions about differential retention by race. However, family income reveals a significant positive association with retention. Higher family income increases the likelihood of retention (OR = 1.52, 95% CI: 1.16-2.00), reflecting the stabilizing role of economic security. Marital status shows no statistically significant effects, even though the coefficients suggest divorced individuals may have modestly higher odds of retention (OR = 1.30, 95% CI: 0.88-1.92). Surprisingly, home internet access shows a positive coefficient (OR = 1.56); however, it is not statistically significant (95% CI: 0.73-3.36), suggesting that

connectivity alone may not be a significant determinant of retention once other factors are controlled.

Again, industry-level associations are largely non-significant, with an exception. Compared to workers in Agriculture, Forestry, Fishing, and Hunting, only those in Real Estate and Rental and Leasing show significantly higher odds of retention (OR = 4.08, 95% CI: 1.11-15.09). Even though the coefficients suggest workers in Finance and Insurance (OR = 1.90), Durable Goods Manufacturing (OR = 1.65), and Transportation and Warehousing (OR = 1.64) may experience better retention, and those in Retail Trade (OR = 0.84) may face greater instability, these differences do not reach statistical significance. The Mining industry shows an exceptionally high coefficient (OR = 14.25) but with an extremely wide confidence interval (95% CI: 0.74-275.89), reflecting high uncertainty due to small sample size.

In summary, these findings indicate that disability has a negative association with employment retention, even when accounting for various individual, household, and structural variables. Education and family income appears to be the facilitators that associate most positively with retention. Although telework is associated with employment retention, it appears to be largely mediated by worker and household characteristics. The afore result thus provide no concrete evidence that telework differentially benefit or do not benefit disabled workers compared to their non-disabled counterparts.

Table 9. Logistic Regression of Association Between Disability and Employment Retention

Logistic Regression Results			
	<i>Dependent variable:</i>		
	Employment retention		
	Model 1	Model 2	Model 3
Disability	0.38	0.44	0.52
	(0.27, 0.53)	(0.29, 0.67)	(0.33, 0.82)
Telework	1.49	1.57	1.20
	(1.20, 1.85)	(1.24, 1.99)	(0.93, 1.55)
Age			0.97
			(0.96, 0.98)
Male			1.31
			(1.02, 1.67)
High School Diploma or Equivalent			1.66
			(1.08, 2.55)
Some College or Associate Degree			1.91
			(1.28, 2.85)
Bachelor's Degree			2.03
			(1.33, 3.11)
Graduate Degree			2.51
			(1.54, 4.10)
Black			0.87
			(0.59, 1.28)
Hispanic			1.20
			(0.80, 1.78)
Asian American			1.08
			(0.60, 1.97)
American Indian/Alaska Native			2.43
			(0.81, 7.33)
Other			0.65
			(0.35, 1.19)
Home Internet			1.56
			(0.73, 3.36)
Divorced			1.30
			(0.88, 1.92)
Married			1.10
			(0.83, 1.47)
Separated			1.26

			(0.52, 3.07)
Widowed			1.27
			(0.69, 2.30)
Family Income (logged)			1.52
			(1.16, 2.00)
Accommodation and Food Services			1.02
			(0.38, 2.72)
Arts, Entertainment, and Recreation			1.04
			(0.35, 3.10)
Construction			1.22
			(0.49, 3.09)
Educational Services			1.03
			(0.43, 2.48)
Finance and Insurance			1.90
			(0.81, 4.43)
Health Care and Social Assistance			1.24
			(0.51, 2.98)
Information			1.40
			(0.45, 4.43)
Management and Administrative Services			1.39
			(0.56, 3.49)
Manufacturing - Durable Goods			1.65
			(0.65, 4.19)
Manufacturing - Nondurable Goods			1.20
			(0.45, 3.16)
Mining			14.25
			(0.74, 275.89)
Other Services			1.20
			(0.48, 3.04)
Professional, Scientific, and Technical Services			1.55
			(0.65, 3.72)
Public Administration			1.31
			(0.49, 3.47)
Real Estate and Rental and Leasing			4.08
			(1.11, 15.09)

Retail Trade			0.84
			(0.35, 2.05)
Transportation and Warehousing			1.64
			(0.61, 4.41)
Utilities			1.06
			(0.32, 3.57)
Wholesale Trade			1.64
			(0.55, 4.90)
Disability: Telework		0.65	0.68
		(0.31, 1.35)	(0.32, 1.43)
Constant	10.25	10.05	3.78
	(8.78, 11.95)	(8.61, 11.71)	(0.89, 15.98)
Observations	5,772	5,772	5,772
<i>Note:</i> Coefficients are presented as odds ratios with 95% confidence intervals in brackets. Model 1: Nagelkerke $R^2 = 0.02$ Adjusted $R^2 = 0.02$ $R = 0.15$ Model 2: Nagelkerke $R^2 = 0.02$ Adjusted $R^2 = 0.02$ $R = 0.15$ Model 3: Nagelkerke $R^2 = 0.08$ Adjusted $R^2 = 0.08$ $R = 0.29$			

Association Between Disability Types and Employment Retention

Table 10 presents the results of weighted survey logistic regression models that disaggregate disability status into specific categories, providing a more granular examination of how different types of disabilities shape employment retention. Results are expressed as odds ratios relative to individuals without disabilities across two specifications. Model 4 includes only disability types and telework; however, Model 5 introduces the full set of demographics, socioeconomic, technological, and industry controls. Due to small sample size, individuals with self-care disabilities were excluded from this analysis.

In Model 4, several disability types show statistically significant negative associations with employment retention. Workers with ambulatory disabilities face 71 percent lower odds of retaining employment compared to those without disabilities (OR = 0.29, 95% CI: 0.12-0.74). Also, individuals with hearing disability show significantly reduced retention (OR = 0.44, 95% CI: 0.23-0.84), representing a 56 percent reduction in the odds of retained employment. Again, those with multiple disabilities show the most disadvantage, with affected workers experiencing 75 percent lower odds of retention (OR = 0.25, 95% CI: 0.15-0.42). In contrast, cognitive disability shows a negative association, but it is not statistically significant (OR = 0.50, 95% CI: 0.23-1.10). Further, individuals in the independent living category show a negative association (OR = 0.23) but with wide confidence intervals (95% CI: 0.04-1.42) that preclude definitive conclusions, perhaps due to small sample size. Vision disability shows no significant association with retention (OR = 1.10, 95% CI: 0.35-3.47).

When the full set of controls is introduced in Model 5, the associations for most disability types reduce further and lose statistical significance, with one exception. Multiple disabilities continue to show significantly lower employment retention (OR = 0.33, 95% CI: 0.18-0.60), representing a 67 percent reduction in the odds of employment retention even after accounting for demographics, internet access, telework, and industry type. This continued disadvantage suggests that workers with multiple disabilities face structural barriers to retention that cannot be explained by differences in human capital, household resources, or sector of employment.

Other disability types show negative estimates in Model 5 but are statistically not significant. Ambulatory disability continues to show a disadvantage (OR = 0.41, 95% CI: 0.14-1.16), although not statistically significant. Similarly, cognitive disability (OR = 0.49, 95% CI: 0.21-1.15) and hearing disability (OR = 0.53, 95% CI: 0.28-1.01) show reduced odds of retention with coefficients suggesting approximately 50 percent lower odds, but with confidence intervals that just barely include or approach 1.0. Independent living disability maintains a very low estimate (OR = 0.20) but with extremely wide confidence intervals (95% CI: 0.03-1.44), reflecting high uncertainty due to limited sample size. Vision disability shows no evidence of negative association in either specification.

The reduction of effects from Model 4 to Model 5 for ambulatory, cognitive, and hearing disabilities seem to suggest that much of the retention disadvantage associated with these conditions may be mediated through lower educational attainment, reduced household income, limited internet access, or concentration in less stable industries. However, the persistence of significant effects for multiple disabilities indicates that workers facing multiple functional limitations encounter barriers that extend beyond these measured factors.

Overall, this disaggregated analysis reveals heterogeneity in how different disability types affect employment retention. People with multiple disabilities emerge as the most disability that struggle when it comes to retaining employment. Ambulatory, cognitive, and hearing disabilities show negative associations that appear largely mediated by socio-economic and structural factors. Vision and independent living disabilities show either no association or

effects too imprecise to interpret with confidence. These results underscore how germane it is to distinguish between disability types when analyzing employment outcomes, as aggregated measures risk obscuring the particularly critical challenges faced by workers with multiple functional limitations.

Table 10. Logistic Regression of Association Between Disability Types and Employment Retention

Logistic Regression Results		
	<i>Dependent variable:</i>	
	Employment retention	
	Model 4	Model 5
Ambulatory Disability	0.29	0.41
	(0.12, 0.74)	(0.14, 1.16)
Cognitive Disability	0.50	0.49
	(0.23, 1.10)	(0.21, 1.15)
Hearing Disability	0.44	0.53
	(0.23, 0.84)	(0.28, 1.01)
Independent Living Disability	0.23	0.20
	(0.04, 1.42)	0.03, 1.44)
Multiple Disability	0.25	0.33
	(0.15, 0.42)	(0.18, 0.60)
Vision Disability	1.10	1.16
	(0.35, 3.47)	(0.37, 3.67)
Telework	1.49	1.15
	(1.20, 1.84)	(0.91, 1.45)
Age		0.97
		(0.96, 0.98)
Male		1.30
		(1.02, 1.67)
High School Diploma or Equivalent		1.68
		(1.08, 2.59)
Some College or Associate Degree		1.92
		(1.27, 2.90)
Bachelor's Degree		2.05
		(1.32, 3.19)
Graduate Degree		2.56

		(1.54, 4.25)
Black		0.87
		(0.59, 1.28)
Hispanic		1.19
		(0.80, 1.77)
Asian American		1.08
		(0.60, 1.97)
American Indian/Alaska Native		2.36
		(0.77, 7.25)
Other		0.67
		(0.36, 1.23)
Home Internet		1.59
		(0.74, 3.43)
Divorced		1.32
		(0.89, 1.94)
Married		1.10
		(0.82, 1.47)
Separated		1.26
		(0.52, 3.06)
Widowed		1.29
		(0.71, 2.34)
Family income (logged)		1.48
		(1.12, 1.94)
Accommodation and Food Services		1.00
		(0.37, 2.67)
Arts, Entertainment, and Recreation		1.02
		(0.34, 3.07)
Construction		1.20
		(0.48, 3.03)
Educational Services		0.99
		(0.41, 2.40)
Finance and Insurance		1.87
		(0.81, 4.35)
Health Care and Social Assistance		1.20
		(0.50, 2.90)
Information		1.35
		(0.43, 4.22)
Management and Administrative Services		1.35
		(0.54, 3.39)

Manufacturing - Durable Goods		1.60
		(0.63, 4.08)
Manufacturing - Nondurable Goods		1.18
		(0.45, 3.13)
Mining		13.74
		(0.71, 264.81)
Other Services		1.19
		(0.47, 3.03)
Professional, Scientific, and Technical Services		1.52
		(0.63, 3.64)
Public Administration		1.27
		(0.48, 3.38)
Real Estate and Rental and Leasing		4.07
		(1.11, 14.87)
Retail Trade		0.82
		(0.33, 1.99)
Transportation and Warehousing		1.57
		(0.58, 4.24)
Utilities		1.05
		(0.32, 3.44)
Wholesale Trade		1.53
		0.51, 4.60)
Constant	10.26	4.12
	(8.79, 11.96)	(0.98, 17.38)
Observations	5,772	5,772
<p><i>Note:</i> Coefficients are presented as odds ratios with 95% confidence intervals in brackets.</p> <p>Model 4: Nagelkerke $R^2 = 0.03$ Adjusted $R^2 = 0.03$ $R = 0.16$</p> <p>Model 5: Nagelkerke $R^2 = 0.09$ Adjusted $R^2 = 0.08$ $R = 0.29$</p>		

Discussion and Conclusion

Discussion

This study examined the relationship between telework and employment retention among people with disabilities, addressing a critical gap in understanding how remote work arrangements influence job retention for this population. Using weighted survey logistic regression to examine employment retention, the results underscore some interesting findings about the assumptions of telework as an inclusive workplace accommodation.

Perhaps the most striking finding is the consistent employment retention disadvantage faced by workers with disabilities. Across all model specifications, individuals with disabilities exhibited 48-62% lower odds of retaining employment compared to their non-disabled counterparts, even after controlling for demographics, internet access, industry, and telework participation. This persistent gap is congruent with established evidence of labor market disadvantages for people with disabilities (Kudla et al., 2024; Park & Park, 2021; Ponzio et al., 2024) but adds a surprising dimension, the retention disadvantage persists despite the widespread adoption of telework and other workplace accommodations that emerged during and after the COVID-19 pandemic.

The above finding extends the work of Schur et al. (2020), who found that workers with disabilities were more likely to telework than their non-disabled counterparts, as telework better accommodated their functional needs. Nonetheless, the findings underscore that

access to telework does not translate into equivalent retention outcomes. Whereas telework positively associates with employment retention, it does not really translate into retention for people with disabilities. Further, the interaction between disability status and telework show no statistical significance, implying that there is no concrete evidence that telework differentially benefits or fails to benefit disabled workers relative to their non-disabled peers. Even though the coefficient suggest teleworking may be somewhat less beneficial for workers with disabilities regarding their retention of employment, it is inconclusive because of the non-significance of the confidence interval. This, perhaps, suggests that under current implementation conditions, telework neither serves as the equalizing accommodation that optimistic perspectives anticipated (Ameri et al., 2023; Kruse et al., 2022; Ozimek, 2022) nor produces any differential disadvantages. The question remains whether telework's potential as an inclusive resource is simply unrealized or whether implementation quality varies across workplaces such that aggregate effects are negligible.

Through the lens of JD-R theory, telework functions as a multifaceted job resource that simultaneously reduces certain demands, such as commuting, physical workplace navigation, and exposure to health risks, but also increases personal resources including autonomy, control over work environment, and schedule flexibility (Demerouti & Bakker, 2023; Ki & Lee, 2025; Mérida-López et al., 2022). The finding that telework's association with retention is mediated by worker characteristics and industry context suggests that the resource-generating potential of telework depends heavily on the broader employment ecosystem in which it is embedded. According to JD-R theory's dual-pathway model, unmanaged demands can trigger health-impairment processes leading to burnout and

eventual job loss, while adequate resources fuel motivational processes that sustain work engagement and retention (Bakker et al., 2023; Demerouti & Bakker, 2022). The absence of a clear independent telework effect indicates that telework alone, without addressing underlying demands or providing complementary resources, may not alter retention trajectories.

Several factors may be ascribed to why telework does not demonstrate stronger independent effects on retention for workers with disabilities. First, the quality and adequacy of telework accommodations likely vary considerably. Simpson (2011) and Josephat (2024) emphasize that inadequate organizational support and poorly structured telework policies can exacerbate isolation and reduce retention among disabled workers. Remote work may inadvertently reduce visibility, limit access to informal mentoring and networking opportunities, and create communication barriers that disproportionately affect workers with certain disabilities (Ki & Lee, 2025; Kwon et al., 2021). Without intentional inclusive design in remote work environments, telework may simply relocate rather than eliminate workplace barriers. Research on social exchange and organizational resources supports this assertion. Kwon and Kim-Goh (2023) found that flexible work arrangements enhance satisfaction and performance when employees perceive them as signals of organizational trust and support.

However, Kwon et al. (2021) observed that telework becomes a meaningful accommodation for disabled employees only when supported by inclusive leadership and positive coworker interactions, demonstrating how social resources amplify the benefits of

structural resources like telework. The lack of face-to-face interaction can make it more difficult for disabled workers to advocate for their needs, build relationships with supervisors who might champion their advancement, and demonstrate their capabilities in ways that overcome implicit biases (Choi, 2020; Thomas & Morgan, 2021; Auton & Sturman, 2024). Furthermore, weak managerial engagement or isolation can erode telework's benefits by creating new social and emotional demands that undermine retention (Kwon et al., 2021).

Additionally, the technological infrastructure supporting telework appears insufficient for many disabled workers. The association of home internet access with retention showed not statistical significance, suggesting that connectivity alone does not address the full spectrum of technological barriers once other factors are accounted for. White et al. (2011) identified that technology access encompasses not merely connectivity but also adaptive equipment, accessible interfaces, and digital literacy training, elements that extend beyond what standard internet service offers. Many mainstream collaboration tools, video conferencing platforms, and productivity software may lack adequate accessibility features or fail to integrate seamlessly with assistive technologies.

Also, the digital divide literature (Damoah, 2025; Helsper, 2021; Hargittai, 2022; Mossberger et al. 2017; Robinson et al., 2015; Scanlan, 2022) emphasizes how intersecting disadvantages related to race, income, and geography compound technology access issues, potentially explaining why telework benefits fail to materialize for many disabled workers despite having internet connectivity. Robinson et al. (2015) argued that digital inequalities

contribute to labor market exclusion by constraining access to telework-compatible jobs and career advancement opportunities, reflecting how structural inequities compound across multiple dimensions of disadvantage. Even when internet access exists, bandwidth limitations, unreliable connections, or data caps can make it difficult to participate fully in virtual work environments, creating performance challenges that may be misattributed to worker capability rather than infrastructure inadequacy.

Furthermore, from a Social Equity Framework perspective, these findings reveal how unequal resource distribution perpetuates employment disadvantages for disabled workers. Fong and Swick (2022) and Scanlan (2022) asserted that limited broadband access disproportionately affects minority and low-income communities, thereby reducing opportunities for remote work. Without structural supports such as digital infrastructure, inclusive policies, and adaptive management practices, telework may inadvertently strengthen existing inequalities by being accessible only to those already advantaged by education, occupation, and economic resources (Josephat, 2024; Simpson, 2011). Again, industry contexts fundamentally shape employment retention, though the analysis showed limited industry-level variation.

Compared to workers in Agriculture, Forestry, Fishing, and Hunting, only those in Real Estate and Rental and Leasing showed significantly higher odds of retention. This limited industry variation may reflect the complexity of within-industry heterogeneity or insufficient statistical power to detect differences across sectors with varying telework compatibility. Research by Bloom et al. (2024) and Makridis and Schloetzer (2022) shows

that telework yields stronger retention effects in white-collar and cognitive roles than in manual or service occupations, where physical presence is essential. The limited industry effects observed here may suggest that individual-level characteristics such as education and income matter more for retention than sector of employment, or alternatively, that industry effects operate through more nuanced pathways not captured by broad industry categories.

In addition to the above, the disaggregated analysis by disability type shows nuances often obscured in aggregate studies. In models controlling only for disability types and telework, ambulatory disabilities, hearing disabilities, and multiple disabilities showed significant negative associations with retention. However, after introducing demographic, socioeconomic, internet access, and industry controls, only multiple disabilities maintained statistical significance, representing a 67% reduction in the odds of employment retention. This suggests two key dynamics. First, much of the retention disadvantage associated with ambulatory, cognitive, and hearing disabilities appears to be influenced by lower educational attainment, reduced household income, limited internet access, or concentration in less stable industries. Second, workers with multiple disabilities face retention barriers that persist even after accounting for these factors, indicating that the compounding of functional limitations creates employment instability.

These findings align with theoretical perspectives on telework's variable effectiveness across disability types (Moon et al., 2014). For individuals with mobility impairments, telework should theoretically eliminate commuting challenges and physical workplace

barriers (Moon et al., 2014). Yet the retention disadvantage suggests that other factors, perhaps the physical demands within certain occupations, inadequate home workspace adaptations, or employer biases, continue to undermine job stability. Many jobs classified as "telework-compatible" still require periodic on-site presence for meetings, training, or collaborative work, and these expectations may not be accompanied by adequate transportation support or flexible scheduling. Additionally, homes may not be structured to accommodate both living and working needs for individuals with mobility impairments, and the cost of creating an accessible home workspace may exceed what workers can afford or what employers are willing to subsidize (Kim et al., 2020).

The heterogeneity in disability-specific outcomes supports the broader JD-R principle that demands and resources interact in complex ways, with effectiveness depending on the fit between specific job characteristics and individual functional capacities (Demerouti & Bakker, 2023). What functions as a resource for one disability type may not address the specific demands faced by another, underlining the need for individualized accommodations. Tran et al. (2022), using a machine-learning approach, identified that individualized and context-specific accommodations were more effective than standardized interventions, supporting the importance of personalized support strategies. Wong et al. (2021) similarly found that accommodations such as modified schedules, assistive technology, and task restructuring significantly enhance job retention when tailored to specific needs rather than applied uniformly.

The paper makes some contributions to the disability employment literature. First, it provides empirical evidence that challenges assumptions about telework as a straightforward solution to disability employment barriers. The finding that telework's association with retention is largely influenced by worker characteristics and industry context, combined with the non-significant interaction between disability and telework suggests that telework availability alone does not automatically translate into improved outcomes for disabled workers (Ameri et al., 2023; Kruse et al., 2022; Ozimek, 2022). This finding shifts the conversation from whether telework helps disabled workers to how telework must be implemented to deliver equitable benefits, echoing concerns raised by Simpson (2011) and Josephat (2024) about implementation quality.

Additionally, by disaggregating disability types, it underscores heterogeneity that aggregate analyses obscure. The finding that only multiple disabilities maintained significant association with lower retention after full adjustments demonstrates that workers facing compounding functional limitations encounter employment challenges that extend beyond those captured by education, income, and industry factors (Ponzio et al., 2024; Tran et al., 2022). This nuanced understanding supports with calls from Wong et al. (2021) and Kim et al. (2020) for individualized and context-specific accommodations that match specific functional needs rather than applying standardized approaches.

Again, this study integrates insights from multiple theoretical frameworks, specifically Job Demands-Resources theory and the Social Equity Framework, to develop a more comprehensive understanding of disability employment retention. By simultaneously

examining individual characteristics, household resources, internet access, and industry contexts through these theoretical lenses, the analysis reveals the multi-level barriers that perpetuate employment inequality. The JD-R framework explains how telework functions as a job resource that can reduce demands and enhance personal resources, but only when properly implemented and supported by adequate organizational practices (Bakker et al., 2023; Demerouti & Bakker, 2023).

Meanwhile, the Social Equity Framework reveals how systemic inequalities in education, technology access, occupational opportunities, and economic resources create structural barriers that limit who can access and benefit from telework as an accommodation (Fong & Swick, 2022; Robinson et al., 2015; Scanlan, 2022). Together, these frameworks show that employment retention for disabled workers requires both optimizing workplace resources and addressing broader social inequities that shape labor market participation.

Beyond these theoretical contributions, the study has some practical policy implications. The revelation of retention disadvantages for workers with disabilities, particularly those with multiple disabilities, combined with the strong protective effects of education and family income, underscores how human capital investments and economic resources buffer employment instability, yet these same factors remain systematically less accessible to disabled individuals due to educational barriers, occupational segregation, and compounded economic disadvantages (Kudla et al., 2024; Park & Park, 2021). The mediation of telework effects through worker characteristics highlights that simply offering remote work options without addressing underlying inequities in access to education,

technology, and economic security will not close disability employment gaps (Makridis & Schloetzer, 2022). By documenting these interconnected barriers empirically, the study provides an evidence-based foundation for comprehensive policy interventions that address not only workplace accommodations but also the structural inequalities in education, technology access, and occupational opportunity that perpetuate disability employment gaps.

Additionally, there are some organizational-level implications that are significant. Research establishes that disability management programs emphasizing early intervention, job coaching, and ongoing communication promote higher retention rates (Habeck et al., 2010; Lefever et al., 2018; Thomas & Morgan, 2021). The findings suggest that telework policies must be integrated into these broader disability management frameworks rather than treated as standalone accommodations. Organizations need to ensure that remote work arrangements are accompanied by inclusive leadership, accessible technology platforms, regular communication, and social integration mechanisms that prevent isolation and maintain the quality of workplace relationships (Kwon et al., 2021; Kwon & Kim-Goh, 2023). The application of JD-R theory further suggests that effective telework implementation requires careful attention to both reducing demands and enhancing resources. Simply allowing remote work does not automatically reduce all relevant job demands or provide necessary resources. Organizations must actively manage potential telework-related demands such as professional isolation, communication barriers, and technological challenges. At the same time, they should strengthen resources through

supervisor support, peer connections, clear performance expectations, and accessible digital tools (Auton & Sturman, 2024; Chen, 2024).

Conclusion

This study shows that workers with disabilities face persistent employment retention disadvantages that are not explained by differences in demographics, education, household income, internet access, industry placement, or telework participation. The 48-62% reduction in retention odds for disabled workers, even after extensive controls, reveals fundamental labor market barriers that extend beyond individual characteristics or access to remote work arrangements. The analysis provides no strong statistical evidence that telework differentially benefits or harms disabled workers compared to their non-disabled peers.

Nonetheless the results above suggest potential differential effects which demand investigation with larger samples. More critically, telework's association with retention appears largely mediated by the characteristics of workers' accessibility, education, income, and industry placement, rather than functioning as an independent protective factor. This suggests that telework's availability alone, without addressing the educational, economic, and occupational barriers that determine who can access quality telework opportunities, will not close disability employment gaps.

Through the integrated lenses of Job Demands-Resources theory and the Social Equity Framework, these findings reveal that telework's potential as an inclusive job resource

depends on both organizational implementation quality and equitable access to supporting infrastructure. Telework can theoretically reduce key job demands such as commuting and physical workplace barriers while increasing personal resources like autonomy and flexibility (Demerouti & Bakker, 2023; Moon et al., 2014). However, without adequate organizational support, accessible technology, inclusive management practices, and attention to the social dimensions of remote work, these resource-generating benefits may fail to materialize or may be offset by new demands (Josephat, 2024; Kwon et al., 2021; Simpson, 2011).

Further, from a social equity perspective, the findings underscore that telework cannot function as an equalizing mechanism when underlying structural inequalities persist. Digital inequality, occupational segregation, educational and economic inequalities systematically constrain who can access and benefit from telework (Fong & Swick, 2022; Kruse et al., 2022; Robinson et al., 2015; Scanlan, 2022). Addressing these intersecting disadvantages requires comprehensive policy interventions that extend beyond workplace accommodations to encompass digital infrastructure investments, educational access, income support, and efforts to reduce occupational segregation (White et al., 2011).

The disaggregated analysis revealing that only workers with multiple disabilities maintained significantly lower retention highlights the vulnerability of those facing compounding functional limitations. This finding emphasizes that standardized accommodations cannot address the diverse and intersecting challenges different disabilities present. Effective interventions require individualized approaches that match

specific functional needs, workplace demands, and available resources (Moon et al., 2014; Tran et al., 2022; Wong et al., 2021). These findings are germane for researchers and practitioners, the post-pandemic expansion of telework represents a missed opportunity if implementation gaps remain unaddressed.

Realizing telework's inclusive potential requires moving beyond just availability to ensure accessible technology, adequate accommodations, inclusive virtual cultures, and supportive organizational practices that recognize and address the specific barriers faced by workers with different disabilities. Organizations must integrate telework policies into comprehensive disability management frameworks that provide ongoing support, maintain social connections, and ensure that remote work arrangements function as genuine resources rather than sources of new demands (Habeck et al., 2010; Kwon & Kim-Goh, 2023; Lefever et al., 2018). Only through such comprehensive approaches, combined with broader structural interventions addressing educational access, economic security, and occupational equity, can telework fulfill its promise as a tool for advancing disability employment equity rather than reproducing existing inequalities.

The above notwithstanding some limitations of the study need attention. First, the cross-sectional design prevents causal inference about telework's effects on retention; perhaps a quasi experiment examining the relation between telework and disability employment retention would strengthen conclusions. Additionally, the study cannot directly observe accommodation quality, employer attitudes, or workplace culture, all likely mediators of the disability-retention relationship (Ki & Lee, 2025). Future research could examine these

dimensions through mixed methods approaches combining quantitative panel data with qualitative investigation of disabled workers lived experiences (Josephat, 2024; Ponzio et al., 2024).

Finally, the non-significant findings for several disability types and the interaction of disability and telework may reflect sample size limitations rather than genuine null effects. Workers with independent living disabilities, vision disabilities, and certain other categories are underrepresented in the sample, making definitive conclusions difficult. The wide confidence intervals for these results appears to suggest uncertainty. Consequently, larger datasets or oversampling in terms of people with disabilities would perhaps help generate reliable estimates and potentially detect differential telework effects that this analysis could not.

CHAPTER 5

CONCLUSION

This dissertation began by advancing the argument that public administration faces a fundamental paradox: the same digital innovations that promise efficiency, inclusion, and expanded access have simultaneously exacerbated inequalities for millions of citizens, particularly people with disabilities (Damoah, 2025; Hargittai, 2022; Mossberger et al., 2017; Goncalves et al., 2018; Scholz et al., 2017). Through three interconnected essays examining digital inclusion patterns, online political participation, and employment retention, this research has documented not only the persistence of digital inequality but also the complex and multifaceted mechanisms through which exclusion operates. The findings based on the essays revealed that addressing digital inequality requires moving beyond solutions focused solely on technology provision, toward comprehensive interventions that recognize the intersecting barriers across technical access, psychological empowerment, and structural equity. The following sections summarize the key takeaways from each essay, draw out their common themes and collective contributions, and identify productive directions for future inquiry.

Key Takeaways from the Essays

Essay 1: Digital Inclusion or Digital Drift? Internet Use Patterns among People with Disabilities

This essay leveraged nearly a decade of nationally representative data from the CPS's Computer and Internet Use Supplements to document patterns of digital participation among disabled individuals. The central and perhaps the most consequential finding is that

when digital technologies genuinely reduce barriers to participation, disabled individuals not only adopt those technologies but maintain usage at levels approaching, or even similar, to those of their non-disabled peers. This is for instance shown in usage regarding telehealth, where patterns among disabled individuals seem to converge with those of non-disabled users following the COVID-19 pandemic and remained elevated thereafter. Additionally, a similar pattern was observed for telework participation.

Over the study period, people spent more time using the internet for a wide range of activities. Especially, the gap between disabled and non-disabled users was smallest in areas like telehealth and telework, where online tools directly reduced barriers to participation. Although inequalities in access and use did not disappear, the overall increase in engagement reflects a meaningful shift that should not be overlooked. Internet use rose substantially across the board, mirroring broader trends in digital adoption that affected all groups, not just those with disabilities. Activities such as online doctor visits and virtual classes also became more common. However, even as participation grew, these increases were not enough to fully close the gap between disabled and non-disabled individuals.

These findings appear to be incongruent with deficit-based narratives that frame digital inequality primarily as a product of individual limitation; instead, they highlight perhaps how income-tested subsidies for subscriptions and devices, as well as accessible and barrier-reducing design can expand the material supports needed for capabilities and real freedoms, consistent with Sen's (1975, 2015) capabilities approach. One important caveat is that the data reflect patterns of adoption and use, not whether users had the skills or

independent capabilities to use these technologies, as defined by Dobransky and Hargittai (2021). As a result, similar levels of usage may not necessarily mean that platforms were fully accessible or used independently, since some individuals may have relied on help from others. A more plausible explanation for the observed increases maybe lies in material supports: income-tested subsidies for internet service and devices have been shown to boost adoption across the broader population. Because people with disabilities are disproportionately low-income, many likely qualified for programs such as the Affordable Connectivity Program, making subsidization a credible and well-supported driver of the patterns observed here.

Another important takeaway regards intersectionality. The findings showed that education and gender significantly moderate the relationship between disability and internet use, underscoring that disability does not operate in isolation from other axes of social stratification. Policies that target disability alone, without accounting for the compounding effects of limited educational attainment or gender-based disadvantage, are therefore unlikely to achieve equitable outcomes (Helsper, 2021; Goggin & Soldatic, 2022).

Moreover, persistent gaps in online education, shopping, and social media, in contrast to the almost equal use of both groups relating to telehealth, underpins the fact that digital progress is uneven and activity specific. The distinction between activities performed online where gaps have closed and those where they persist may point to differences in how services are designed or differences in priorities for going online, with health care and accessible work being especially critical for disabled individuals. Finally, device usage

heterogeneity, particularly the high reliance on mobile phones together with persistent gaps in laptop access, suggests that comprehensive digital inclusion strategies must address multiple forms of access simultaneously, recognizing that mobile-only access is insufficient for full participation in education and employment.

Essay 2: Online Political Participation and Disability: Examining Barriers, Predictors, and the Role of Political Efficacy

Essay 2 applied the Civic Voluntarism Model to examine the role of resources, engagement, and recruitment in online political participation among disabled individuals, using the Heckman Selection Model to address potential selection bias. Findings from this essay show that the relationship between disability and online political participation is complex and highly conditional. Although disabled individuals exhibited higher participation odds when only demographic controls were included, this advantage disappeared once psychological engagement variables were introduced. Political efficacy emerged as the dominant predictor of online participation, surpassing the effects of socioeconomic resources. This finding reframes the debate around digital democracy: the question is not simply whether disabled individuals have internet access, but whether they possess the psychological interest and efficacy to leverage that access for civic participation. Those who were more likely to participate offline were also most likely to post about political issues online.

Furthermore, an important takeaway is that social network, a key recruitment mechanism in the traditional CVM framework, is not a significant predictor of participation function for disabled individuals in the online context. This suggests that the mechanisms driving

participation in digital spaces diverge from those established in offline political participation research, necessitating adaptations to existing theoretical frameworks when applied to digital environments.

Again, the disaggregated analysis by disability type uncovered meaningful heterogeneity: individuals with independent living disabilities showed the strongest and most consistent associations with online participation, those with multiple disabilities exhibited positive but reduced odds, and other disability types produced inconsistent patterns across model specifications. This variation may reveal that online platforms do not uniformly reduce barriers across all functional limitations, and that accessibility in digital civic spaces remains uneven.

Summing it up, the essay demonstrates that disabled individuals with high political efficacy show substantially greater odds of participation than non-disabled individuals, amplifying the transformative potential of psychological empowerment. Policies that help strengthen political efficacy may therefore be as important as ensuring technical accessibility for realizing inclusive digital democracy.

Essay 3: Bridging Employment Gaps: The Role of Telework in Employment Retention among People with Disabilities

The third essay examined the relationship between telework and employment retention among disabled individuals. The findings show a persistent disadvantage in employment retention for workers with disabilities. Disabled individuals exhibited 48 to 62 percent lower odds of retaining employment compared to their non-disabled counterparts, even after controlling for demographics, socioeconomic resources, internet access, industry, and

telework participation. This persistent gap reveals that fundamental labor market barriers confronting disabled workers extend well beyond individual characteristics or simple access to remote work arrangements.

In addition to the above, while telework is associated with higher employment retention overall, the analysis found no statistically significant evidence that telework differentially benefits or harms workers with disabilities relative to their non-disabled peers. The non-significant interaction between disability status and telework seems to suggest that, under current implementation conditions, telework does not independently function as an equalizing accommodation. Evidently, telework's association with retention appears to be largely mediated by the characteristics of workers who access it, specifically their education, household income, and industry, rather than functioning as an independent protective factor. This shifts the conversation from whether telework helps disabled workers, to how telework must be implemented to deliver equitable benefits. Further, the disaggregated analysis by disability type revealed that workers with multiple disabilities maintained significantly lower odds of retention. This shows that disabled individuals with multiple impairments may face compounding barriers and standardized accommodation may not be adequate for them.

The Bigger Picture

Stepping back from the individual findings, three themes emerge that collectively tell us about digital inequality and disability in the United States. First, in a period during and immediately after the pandemic, when internet use overall rose in the U.S., there was a

parallel increase for disabled individuals as well. Given lower rates of employment, subsidies from 2020 onward likely helped in this uptake in internet adoption, for both disabled and non-disabled individuals. While many aspects of daily life moved online, it is notable that disabled individuals nearly closed usage gaps during the pandemic for telehealth and telework. This finding about telehealth and telework would have been impossible to observe even a decade ago, when neither had reached the scale or mainstream use needed to reveal population-level patterns across disability status. What this study uniquely shows is that, under the combined pressures of major structural change, pandemic-driven necessity, federal subsidy programs, and a rapid shift toward online healthcare and work, long-standing gaps in participation for disabled individuals can narrow in clear and measurable ways.

The first essay demonstrated that some changes have occurred, and with some increases in internet use, there may be a foundation for future change. Across different areas, the capacity of digital tools to reduce inequality for disabled individuals may depend on how those tools are designed, implemented, and supported. The nearly equal use of telehealth may be because health care is so critical for disabled individuals. Its persistent attraction is perhaps because of how it was structured, in a way that directly eliminated the transportation and scheduling barriers that had long excluded many disabled individuals from healthcare access (Mason et al., 2021; Pettersson et al., 2023). Beyond telehealth, there were also increases in overall internet use and in activities such as online classes and virtual consultations. However, gaps between disabled and non-disabled users remained in

many of these areas, highlighting that greater participation does not yet translate into equal participation.

Device ownership likewise increased over this period, with smartphones playing an especially important role for lower-income and newly connected users, including many people with disabilities. Although mobile-only access has well-documented limitations for education and employment (Mossberger et al., 2007), these gains in device ownership may nonetheless provide a foundation for continued expansion in online uses and activities moving forward.

By contrast, telework, despite its theoretical potential to reduce commuting burdens and physical workplace demands, did not translate into improved employment retention for disabled workers, possibly because its implementation remains insufficiently supported by accessible technology, inclusive management practices, and complementary organizational resources (Kwon et al., 2021; Kwon & Kim, 2020; Simpson, 2011). At first glance, posting about political issues on social media seems to be as common among people with disabilities. This is an activity on the internet that would also promote the ability of disabled individuals to advocate on their own behalf. Yet , regarding online political participation, once we control for other factors, it is apparent that the mere availability of online platforms appears not to democratize participation; meaningful engagement required the additional catalyst of psychological empowerment, particularly political efficacy.

The understanding that can be gleaned across all three essays is that technology availability is a necessary but insufficient condition for equity. Despite some advances in the past few years for internet use by disabled people, more needs to be done in terms of public policy, employers, and other institutions. What determines whether these technologies reduce or reproduce inequality may be the quality of their design, the adequacy of their supporting infrastructure, and the extent to which they are accompanied by structural interventions that address the deeper sources of disadvantage (Damoah, 2025; Hargittai, 2022; Helsper, 2021a; 2021b; Duplaga, 2017).

Additionally, there is the heterogeneity of disability experiences and its implications for policy design. Across the essays, treating people with disabilities as a uniform category obscured meaningful variation across disability types. Essay 1 found that individuals with independent living disabilities and multiple disabilities consistently faced the most severe digital access barriers, while those with certain sensory impairments exhibited patterns closer to non-disabled users in specific activities. Essay 2 found that independent living disabilities were most consistently associated with online political participation, while multiple disabilities showed a more complex pattern and other types produced inconsistent results. Essay 3 found that only people with multiple disabilities maintained significantly lower employment retention, while other disability types showed retention disadvantages that were largely attributable to socioeconomic and structural factors. These findings across three diverse domains strongly support the position that people with disabilities cannot be treated as a homogeneous group. Furthermore, effective interventions may necessitate co-design with disability communities and must be tailored to the varied functional

requirements and social contexts of specific subpopulations (Johansson et al., 2021; Tsatsou, 2022; Wong et al., 2021).

The third unifying thread is the multi-dimensionality of digital inequality and the cumulative effects of overlapping disadvantages. The results from all three studies indicate that digital exclusion does not function through a singular mechanism. Essay 1 demonstrated that education and gender exacerbate the impact of disability on internet usage. Essay 2 demonstrated that psychological disempowerment, manifested as diminished political efficacy, might negate the participatory advantages that disabled individuals could otherwise get from digital platforms. Essay 3 showed that the protective potential of telework is influenced by socioeconomic resources and human capital endowments, which are systematically less accessible to disabled workers due to educational barriers, occupational segregation, and compounded economic disadvantages (Kudla et al., 2024; Park & Park, 2021).

Collectively, these findings suggest that solutions focused just on a single measure of inequality will invariably be inadequate. Strategies for digital inclusion that only focus on broadband provision or device subsidies are necessary, but they cannot fix the psychological disempowerment that keeps people from participating in civic life or the occupational segregation that limits job options. Employment programs that encourage telework without addressing differences in education may just create new forms of the same problems. The full promise of digital technologies for inclusion can only be achieved

through comprehensive and integrated methods that address technical accessibility, psychological empowerment, and structural equity concurrently.

Contributions of the Dissertation

This dissertation contributes across three levels: theoretical, empirical, and policy. Theoretically, the dissertation demonstrates how Sen's capabilities approach, Social Equity theory, the Civic Voluntarism Model, and Job Demands-Resources theory can be productively applied and adapted to explain digital inequality as a structural rather than technical problem. These frameworks concentrate on how technology and processes facilitate or inhibit meaningful involvement, thereby influencing individuals' capacity to attain what Sen (1979, 2015) refers to as valued functionings, rather than emphasizing what disabled individuals lack.

Empirically, the dissertation provides a cross-domain examination of persistent digital inequality despite some recent progress, documenting its manifestation in internet use in general, civic participation, and employment, using large, nationally representative datasets. The use of pooled cross-sectional analysis across multiple survey years especially in Essay 1 enables a more reliable and temporally robust characterization of trends than single-year studies permit. Additionally, the application of the Heckman Selection Model in Essay 2 addresses selection bias in online participation research, strengthening the credibility of inferences about disability's relationship to digital civic engagement. The disaggregated analyses by disability type across all three essays provide empirical evidence that aggregate comparisons between disabled and non-disabled populations conceal, hence

advocating for more focused and data-driven policy formulation. It also analyzes a crucial period during which internet use expanded rapidly and policymakers implemented substantial interventions to promote adoption.

In addition to the above, at the policy level, the dissertation offers coherent evidence for public administrators and policymakers seeking to advance digital equity for people with disabilities. The finding that political efficacy outweighs socioeconomic resources in predicting online participation reveals the transformative potential of civic engagement programs that build political confidence alongside technical access. Again, the finding that telework's benefit regarding employment retention may depend on implementation quality and is mediated by socioeconomic resources highlights perhaps the need for policies that address educational access and organizational inclusion practices as complements to remote work accommodations. Overall, while internet use grew over the period of pandemic, the dissertation indicates that more targeted support may be needed for disabled individuals beyond affordable connections and devices.

Directions for Future Research

The afore notwithstanding, quantitative analyses undertaken here cannot directly observe some of the important mechanisms through which digital inequality operates. For instance, accommodation quality, employer attitudes, workplace culture, or the lived experience of disabled individuals navigating digital platforms with functional limitations are not directly captured by the data. Consequently, mixed-methods research combining survey with in-depth interviews and ethnographic observation may provide a richer understanding of both

barriers and facilitators, capturing dimensions that quantitative surveys maybe ill-equipped to measure (Josephat, 2024; Ponzio et al., 2024; Waltz & Schippers, 2021). Such qualitative components would be especially valuable for understanding why telework does not appear to differentially benefit disabled workers under current conditions, and what organizational and design changes would be necessary to realize its theoretical potential as an inclusive resource.

Furthermore, the relatively small sample sizes for certain disability subtypes, particularly independent living disabilities, vision disabilities, and self-care disabilities, resulted in wide confidence intervals and limited statistical power to detect disability-specific effects in Essays 2 and 3. Future research employing larger datasets, oversampling of disabled individuals may help generate more reliable estimates and could potentially detect differential telework effects, participation patterns, and retention trajectories that the present analyses could not. Federal statistical agencies, as noted above, could contribute significantly to this agenda by improving disability representation in national surveys and developing more refined measures of functional limitation types and accommodation quality.

Additionally experimental and quasi-experimental designs could be employed to allow researchers evaluate the effectiveness of specific programs in reducing digital inequality for people with disabilities. For example, studies examining the Affordable Connectivity Program (ACP), the Broadband Equity Access and Deployment Program (BEAD), digital literacy training programs tailored to disability communities, civic engagement initiatives

combining accessible tools with political efficacy development, and employer accommodation support programs could generate the causal evidence needed to guide policy investment.

Concluding Remarks

Public administration, as a field committed to democratic governance and social equity, must confront digital inequality as central to its mission. Digital inequality is not simply a technological challenge but a pervasive governance problem that shapes the ability of public administration to achieve its fundamental objectives of efficient service delivery, effective civic engagement, and equitable opportunity for all citizens, including those with disabilities. The findings of this dissertation demonstrate that digital technologies can serve as genuine tools of inclusion when designed with accessibility from the outset, when supported by psychological and structural resources that enable meaningful participation, and when accompanied by policy frameworks that address the intersecting disadvantages that determine who can access and benefit from digital environments. Conversely, when these conditions are absent, digital technologies risk reproducing and exacerbating existing inequalities in new forms. In an increasingly digital society, digital inequality means civic exclusion, economic exclusion, and social exclusion. Bridging digital divides is therefore not simply a technological imperative but a democratic one, essential to the realization of public administration's foundational commitments to equity and human dignity.

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APPENDIX A
SAMPLE SIZE PER YEAR (ESSAY 1)

Year	Unweighted Frequencies
2015	102,188
2017	102,197
2019	95,373
2021	82,874
2023	81,407

APPENDIX B

DESCRIPTIVE STATISTICS BY DISABILITY TYPE

Variable	Category	No Disability	Ambulatory Disability	Cognitive Disability	Hearing Disability	Independent Living Disability	Multiple Disability	Self-Care Disability	Vision Disability
Internet Use	No	17.1	31.2	23.2	26.3	38.8	42.5	30.7	25.4
Internet Use	Yes	82.9	68.8	76.8	73.7	61.2	57.5	69.3	74.6
Education	Less than High School Diploma	12.0	15.1	18.2	11.3	23.7	21.7	8.7	16.4
Education	High School Diploma or Equivalent	27.2	35.5	34.8	32.0	38.5	36.9	38.9	31.7
Education	Some College or Associate Degree	26.7	29.5	28.2	29.4	21.3	25.1	29.4	27.7
Education	Bachelor's Degree	21.7	12.2	12.9	15.9	11.2	10.4	12.0	15.8
Education	Graduate Degree	12.4	7.6	5.8	11.5	5.3	6.0	11.0	8.4
Employment	Unemployed	3.9	6.7	12.9	4.4	7.6	10.4	10.6	5.4
Employment	Employed	96.1	93.3	87.1	95.6	92.4	89.6	89.4	94.6
Race/Ethnicity	White	61.6	69.1	67.1	82.1	63.3	67.5	67.5	59.5
Race/Ethnicity	Black	11.9	15.4	12.6	4.7	15.1	14.3	13.4	16.5
Race/Ethnicity	Hispanic	17.6	10.2	13.2	7.8	13.6	12.0	15.9	17.5
Race/Ethnicity	Asian American	6.5	2.3	2.0	2.8	5.8	3.0	2.0	3.4
Race/Ethnicity	Amer Indian/AK Ntv	0.7	1.1	1.0	0.9	0.8	1.3	0.1	1.0
Race/Ethnicity	Other	1.8	1.9	4.1	1.7	1.4	2.0	1.1	2.1

¹Percentages are survey-weighted to represent the U.S. population.

APPENDIX C

LOGISTIC REGRESSION RESULTS OF ASSOCIATION BETWEEN DISABILITY
AND INTERNET USE

Logistic Regression Results				
	<i>Dependent variable:</i>			
	Internet User			
	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
Disability	0.38*** (0.01)	0.62*** (0.01)	1.04*** (0.03)	0.70*** (0.13)
Age		0.98*** (0.0003)	0.99*** (0.001)	0.99*** (0.001)
Male		0.98*** (0.01)	0.90*** (0.01)	0.91*** (0.01)
High School Diploma or Equivalent		1.75*** (0.02)	1.47*** (0.03)	1.46*** (0.03)
Some College or Associate Degree		3.35*** (0.02)	2.36*** (0.03)	2.32*** (0.03)
Bachelor's Degree		4.31*** (0.02)	2.67*** (0.03)	2.63*** (0.03)
Graduate Degree		5.36*** (0.02)	2.97*** (0.04)	2.92*** (0.04)
Employed			0.97*** (0.03)	0.96*** (0.03)
Household size			0.96*** (0.01)	0.96*** (0.01)
Black			0.79*** (0.03)	0.79*** (0.03)
Hispanic			0.72*** (0.03)	0.72*** (0.03)
Asian American			0.78*** (0.04)	0.78*** (0.04)
American Indian/AK Ntv			0.68*** (0.08)	0.66*** (0.08)
Other			1.02*** (0.06)	0.99*** (0.06)
Family Income (logged)			1.49*** (0.02)	1.49*** (0.02)
Disability:Black				0.89*** (0.09)
Disability:Hispanic				1.05*** (0.10)
Disability:Asian American				0.90*** (0.20)

Disability:American Indian/AK Ntv				1.54***
				(0.28)
Disability:Other				1.49***
				(0.23)
Disability:Employed				1.18***
				(0.10)
Disability:Male				0.83***
				(0.06)
Disability:High School Diploma or Equivalent				1.07***
				(0.09)
Disability:Some College or Associate Degree				1.31***
				(0.10)
Disability:Bachelor's Degree				1.39***
				(0.12)
Disability:Graduate Degree				1.58***
				(0.14)
Disability:2017				1.12***
				(0.09)
Disability:2019				1.10***
				(0.09)
Disability:2021				1.31***
				(0.09)
Disability:2023				1.53***
				(0.10)
2017			1.18***	1.17***
			(0.03)	(0.03)
2019			1.26***	1.25***
			(0.03)	(0.03)
2021			1.22***	1.21***
			(0.03)	(0.03)
2023			1.46***	1.43***
			(0.03)	(0.03)
Constant	4.85***	5.65***	2.52***	2.60***
	(0.01)	(0.02)	(0.06)	(0.06)
Observations	464,039	464,039	285,721	285,721
Note:	$p<0.05$; $p<0.01$; $p<0.001$			

Coefficients are presented as odds ratios.

Model 1: Nagelkerke R² 0.03 | Adjusted R² 0.03 | R: 0.17

Model 2: Nagelkerke R² 0.12 | Adjusted R² 0.12 | R: 0.35

Model 3: Nagelkerke R² 0.06 | Adjusted R² 0.06 | R: 0.25

Model 4: Nagelkerke R² 0.06 | Adjusted R² 0.06 | R: 0.25

APPENDIX D

LOGISTIC REGRESSION RESULTS OF ASSOCIATION BETWEEN DISABILITY
TYPE AND INTERNET USE

Logistic Regression Results			
	<i>Dependent variable:</i>		
	Internet User		
	Model 5	Model 6	Model 7
	(1)	(2)	(3)
Ambulatory Disability	0.46*** (0.02)	0.76*** (0.02)	1.10*** (0.06)
Cognitive Disability	0.68*** (0.04)	0.76*** (0.04)	1.17*** (0.09)
Hearing Disability	0.58*** (0.03)	0.93*** (0.03)	1.00*** (0.06)
Independent Living Disability	0.33*** (0.06)	0.53*** (0.06)	1.09*** (0.19)
Multiple Disability	0.28*** (0.02)	0.49*** (0.02)	0.92*** (0.06)
Self-Care Disability	0.46** (0.17)	0.60*** (0.16)	2.04*** (0.51)
Vision Disability	0.61*** (0.05)	0.82*** (0.06)	1.08*** (0.09)
Age		0.98*** (0.0004)	0.99*** (0.001)
Male		0.97*** (0.01)	0.90*** (0.01)
High School Diploma or Equivalent		1.73*** (0.02)	1.46*** (0.03)
Some College or Associate Degree		3.31*** (0.02)	2.36*** (0.03)
Bachelor's Degree		4.26*** (0.02)	2.67*** (0.03)
Graduate Degree		5.28*** (0.02)	2.97*** (0.04)
Employed			0.97*** (0.03)
Household size			0.96*** (0.01)
Black			0.79*** (0.03)
Hispanic			0.72*** (0.03)
Asian American			0.78*** (0.04)

American Indian/AK Ntv			0.68***
			(0.08)
Other			1.02***
			(0.06)
Family Income (logged)			1.49***
			(0.02)
2017			1.18***
			(0.03)
2019			1.26***
			(0.03)
2021			1.22***
			(0.03)
2023			1.46***
			(0.03)
Constant	4.85***	5.69***	2.52***
	(0.01)	(0.02)	(0.06)
Observations	464,039	464,039	285,721
Note:	<i>p</i> <0.05; <i>p</i> <0.01; <i>p</i> <0.001		
Coefficients are presented as odds ratios.			
Model 5: Nagelkerke R0.04 Adjusted R0.04 R: 0.19			
Model 6: Nagelkerke R0.13 Adjusted R0.13 R: 0.35			
Model 7: Nagelkerke R0.13 Adjusted R0.13 R: 0.35			

APPENDIX E

DEVICE USAGE BY DISABILITY STATUS OVER TIME

Device Usage by Disability Status Over Time						
Percentage of Users by Disability Status and Year						
Year	Disability Status	Device Type				
		Desktop	Laptop	Tablet	Mobile Phone	Mobile Only
2015	Without Disability	37.89	52.54	30.38	78.24	14.00
2015	With Disability	27.70	28.98	18.07	58.05	19.35
2017	Without Disability	32.91	52.35	32.37	74.67	12.77
2017	With Disability	25.44	30.70	22.35	48.74	12.68
2019	Without Disability	31.26	52.80	30.52	78.40	15.13
2019	With Disability	23.17	30.32	22.67	54.66	16.26
2021	Without Disability	31.70	54.65	29.86	80.13	15.20
2021	With Disability	25.38	33.70	24.65	63.44	17.90
2023	Without Disability	22.99	59.82	32.03	83.34	16.17
2023	With Disability	19.71	40.03	27.51	69.40	20.04

APPENDIX F

DEVICE USAGE BY DISABILITY TYPE OVER TIME

Device Usage by Disability Type Over Time						
Percentage of Users by Disability Type and Year						
Year	Disability Type	Device Type				
		Desktop	Laptop	Tablet	Mobile Phone	Mobile Only
2015	No Disability	37.89	52.54	30.38	78.24	14.00
2015	Ambulatory Disability	30.82	29.92	19.42	63.87	21.04
2015	Cognitive Disability	27.72	38.48	21.37	66.70	20.58
2015	Hearing Disability	39.16	36.82	22.11	67.98	15.95
2015	Independent Living Disability	26.80	25.77	15.12	47.86	19.92
2015	Multi_Dis	22.36	24.11	15.32	50.43	19.26
2015	Self-Care Disability	29.47	31.98	19.68	59.58	15.65
2015	Vision Disability	33.15	34.33	22.83	67.45	20.12
2017	No Disability	32.91	52.35	32.37	74.67	12.77
2017	Ambulatory Disability	28.93	32.75	25.37	54.14	12.77
2017	Cognitive Disability	23.15	37.38	24.45	62.73	17.42
2017	Hearing Disability	33.64	37.90	27.79	55.37	10.63

2017	Independent Living Disability	18.96	28.48	20.94	48.57	16.25
2017	Multi_Dis	21.63	25.33	18.35	40.04	12.02
2017	Self-Care Disability	36.99	32.16	24.73	46.56	8.40
2017	Vision Disability	30.83	42.92	29.42	65.72	14.07
2019	No Disability	31.26	52.80	30.52	78.40	15.13
2019	Ambulatory Disability	26.00	32.81	24.46	59.18	17.16
2019	Cognitive Disability	21.70	40.76	24.97	68.54	19.06
2019	Hearing Disability	32.21	39.90	27.77	62.86	12.83
2019	Independent Living Disability	17.39	28.54	21.65	50.39	20.19
2019	Multi_Dis	19.79	23.66	19.95	46.59	15.62
2019	Self-Care Disability	28.91	44.15	17.57	63.06	14.56
2019	Vision Disability	25.71	39.86	24.28	69.33	21.14
2021	No Disability	31.70	54.65	29.86	80.13	15.20
2021	Ambulatory Disability	29.22	36.29	27.68	68.78	17.87

2021	Cognitive Disability	27.81	45.62	27.43	75.66	18.21
2021	Hearing Disability	33.37	40.87	29.67	70.13	14.35
2021	Independent Living Disability	23.36	29.68	21.95	58.10	18.21
2021	Multi_Dis	20.19	26.76	21.27	55.67	18.90
2021	Self-Care Disability	24.19	40.69	11.95	61.05	17.57
2021	Vision Disability	30.40	42.86	25.57	71.42	18.51
2023	No Disability	22.99	59.82	32.03	83.34	16.17
2023	Ambulatory Disability	21.21	40.10	30.16	72.23	21.05
2023	Cognitive Disability	22.78	55.88	29.83	80.89	17.07
2023	Hearing Disability	24.98	48.68	30.64	76.86	16.74
2023	Independent Living Disability	15.38	35.22	26.30	63.23	22.74
2023	Multi_Dis	16.80	32.71	24.81	62.34	21.18
2023	Self-Care Disability	16.76	56.29	41.05	75.65	16.75
2023	Vision Disability	22.50	49.82	27.95	80.88	19.94

APPENDIX G

ONLINE DOCTOR CONSULTATION BY DISABILITY STATUS OVER TIME

Online Doctor Consultation by Disability Status Over Time		
Percentage of Users by Disability Status and Year		
Year	Disability Status	Consulted a Doctor Online (%)
2015	Without Disability	27.40
2015	With Disability	26.12
2017	Without Disability	27.59
2017	With Disability	27.65
2019	Without Disability	30.92
2019	With Disability	28.33
2021	Without Disability	49.80
2021	With Disability	47.05
2023	Without Disability	52.72
2023	With Disability	51.47

APPENDIX H

TELEWORK PARTICIPATION BY DISABILITY STATUS OVER TIME

Telework Participation by Disability Status Over Time		
Percentage of Workers by Disability Status and Year		
Year	Disability Status	Teleworked (%)
2015	Without Disability	33.68
2015	With Disability	28.70
2017	Without Disability	35.32
2017	With Disability	31.10
2019	Without Disability	36.92
2019	With Disability	33.02
2021	Without Disability	44.56
2021	With Disability	39.98
2023	Without Disability	43.79
2023	With Disability	39.68

APPENDIX I

ONLINE JOB SEARCH BY DISABILITY STATUS OVER TIME

Online Job Search by Disability Status Over Time		
Percentage of Individuals by Disability Status and Year		
Year	Disability Status	Searched for Jobs Online (%)
2015	Without Disability	26.71
2015	With Disability	17.24
2017	Without Disability	20.15
2017	With Disability	12.26
2019	Without Disability	19.79
2019	With Disability	11.46
2021	Without Disability	20.36
2021	With Disability	14.48
2023	Without Disability	19.25
2023	With Disability	13.52

APPENDIX J

ONLINE CLASS PARTICIPATION BY DISABILITY STATUS OVER TIME

Online Class Participation by Disability Status Over Time		
Percentage of Individuals by Disability Status and Year		
Year	Disability Status	Took Online Classes (%)
2015	Without Disability	21.14
2015	With Disability	10.66
2017	Without Disability	18.88
2017	With Disability	9.74
2019	Without Disability	20.06
2019	With Disability	8.82
2021	Without Disability	25.11
2021	With Disability	13.83
2023	Without Disability	24.51
2023	With Disability	12.55

APPENDIX K

ONLINE SHOPPING BY DISABILITY STATUS OVER TIME

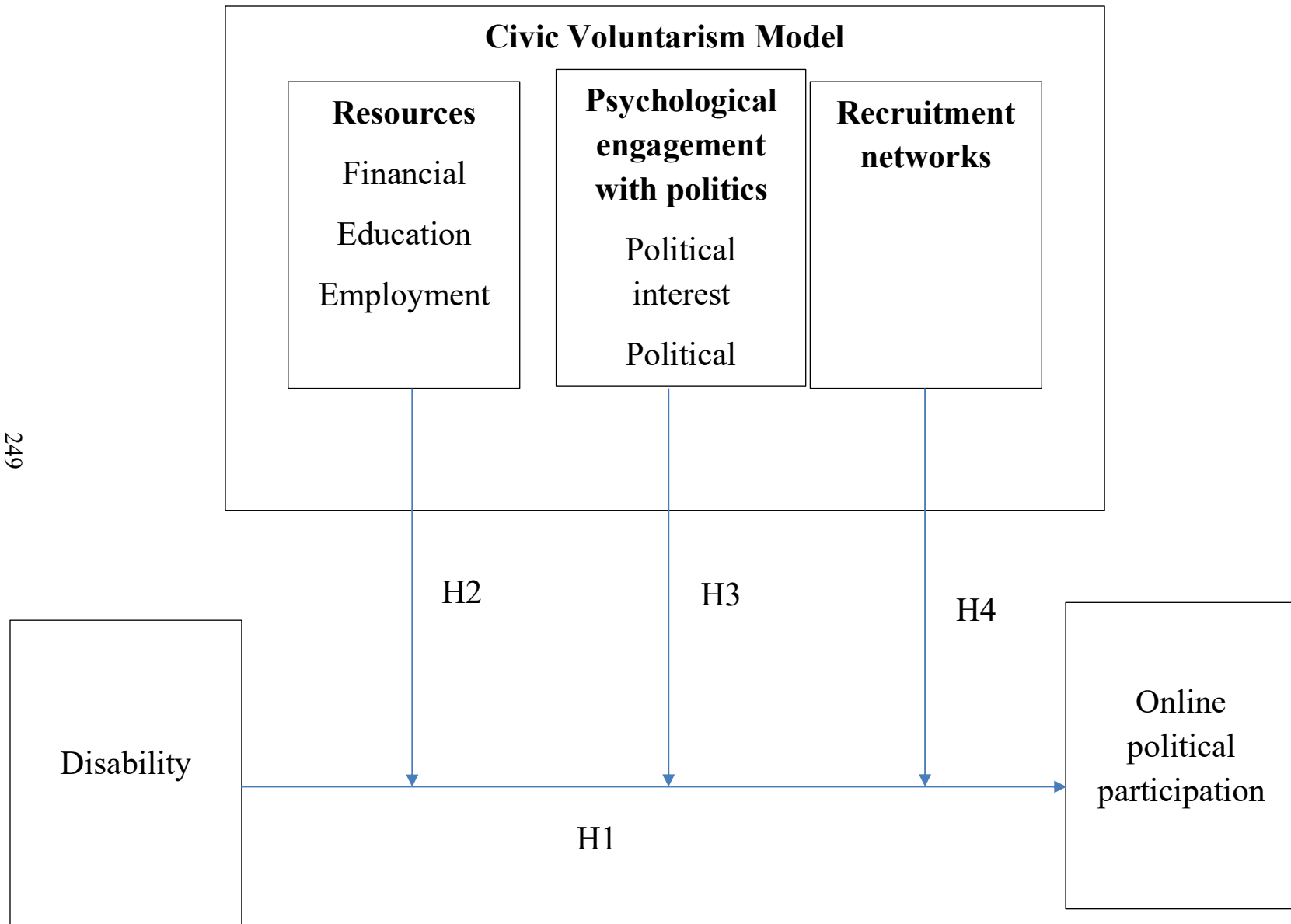
Online Shopping by Disability Status Over Time		
Percentage of Individuals by Disability Status and Year		
Year	Disability Status	Shopped Online (%)
2015	Without Disability	70.78
2015	With Disability	55.14
2017	Without Disability	70.45
2017	With Disability	56.16
2019	Without Disability	74.26
2019	With Disability	57.72
2021	Without Disability	75.92
2021	With Disability	62.12
2023	Without Disability	77.93
2023	With Disability	62.09

APPENDIX L

SOCIAL MEDIA USE BY DISABILITY STATUS OVER TIME

Social Media Use by Disability Status Over Time		
Percentage of Individuals by Disability Status and Year		
Year	Disability Status	Used Social Media (%)
2015	Without Disability	69.42
2015	With Disability	57.12
2017	Without Disability	73.60
2017	With Disability	63.02
2019	Without Disability	73.15
2019	With Disability	60.74
2021	Without Disability	74.26
2021	With Disability	61.60
2023	Without Disability	76.60
2023	With Disability	63.20

APPENDIX M
THEORETICAL FRAMEWORK- CVM



APPENDIX N

LOGISTIC REGRESSION OF ASSOCIATION BETWEEN DISABILITY AND
ONLINE POLITICAL PARTICIPATION

Logistic Regression Results				
	<i>Dependent variable:</i>			
	Online political participation			
	Model 1	Model 2	Model 3	Model 4
Disability	1.31*** (0.14)	1.35*** (0.14)	1.20*** (0.14)	0.79 (1.25)
Age		0.99*** (0.003)	1.00*** (0.01)	1.00*** (0.01)
Male		0.88*** (0.07)	0.94*** (0.07)	0.93*** (0.07)
High School Diploma or Equivalent		1.53*** (0.26)	0.49 (0.47)	0.47 (0.47)
Some College or Associate Degree		1.61*** (0.29)	0.29 (0.61)	0.29 (0.61)
Bachelor's Degree		2.01*** (0.31)	0.30 (0.63)	0.29 (0.63)
Graduate Degree		1.99*** (0.32)	0.23 (0.67)	0.24 (0.67)
Employed			0.96*** (0.20)	0.92*** (0.21)
Black			1.59*** (0.20)	1.60*** (0.20)
Hispanic			1.50*** (0.13)	1.51*** (0.13)
Asian American			1.06*** (0.16)	1.06*** (0.16)
American Indian/AK Ntv			2.15*** (0.46)	2.16*** (0.46)
Other			1.31*** (0.25)	1.30*** (0.24)
Divorced			0.99*** (0.13)	0.99*** (0.13)
Married			0.73*** (0.10)	0.73*** (0.10)
Separated			0.84** (0.31)	0.86** (0.31)
Widowed			0.92*** (0.25)	0.90*** (0.25)
Family income (logged)			0.43 (0.29)	0.43 (0.29)
Political interest			1.10***	1.10***

			(0.01)	(0.01)
Social network			1.07***	1.08***
			(0.05)	(0.05)
Political efficacy			1.58***	1.56***
			(0.03)	(0.03)
IMR	0.22	1.41	0.002	0.002
	(0.49)	(0.83)	(2.80)	(2.80)
Disability:Social network				0.87***
				(0.20)
Disability:Political efficacy				1.37***
				(0.15)
Disability:Political interest				0.96***
				(0.05)
Disability:High School Diploma or Equivalent				1.98*
				(0.83)
Disability:Some College or Associate Degree				0.95
				(0.82)
Disability:Bachelor's Degree				1.89*
				(0.85)
Disability:Graduate Degree				0.37
				(0.87)
Disability:Employed				1.31*
				(0.56)
Disability:Family income (logged)				0.95***
				(0.28)
Constant	0.31***	0.19	5.98***	6.32***
	(0.09)	(0.35)	(1.47)	(1.47)
Observations	7,439	7,439	7,439	7,439
Akaike Inf. Crit.	7,194.90	7,185.46	6,719.14	6,717.02
<p><i>Note: $p < 0.05$; $p < 0.01$; $p < 0.001$</i></p> <p>Coefficients are presented as odds ratios.</p> <p>Model 1: Nagelkerke R² Adjusted R² R: 0.06</p> <p>Model 2: Nagelkerke R² Adjusted R² R: 0.09</p> <p>Model 3: Nagelkerke R² Adjusted R² R: 0.33</p> <p>Model 4: Nagelkerke R² Adjusted R² R: 0.33</p>				

APPENDIX O

LOGISTIC REGRESSION OF ASSOCIATION BETWEEN DISABILITY TYPES
AND ONLINE POLITICAL PARTICIPATION

Logistic Regression Results			
	<i>Dependent variable:</i>		
	Online political participation		
	Model 5	Model 6	Model 7
	(1)	(2)	(3)
Ambulatory Disability	0.64 (0.41)	0.67 (0.41)	0.64 (0.38)
Cognitive Disability	1.72*** (0.27)	1.69*** (0.26)	1.38*** (0.27)
Hearing Disability	1.03*** (0.28)	1.12*** (0.28)	0.99*** (0.30)
Independent Living Disability	2.97*** (0.56)	3.15*** (0.56)	2.94*** (0.59)
Multiple Disability	1.72*** (0.25)	1.74*** (0.25)	1.59*** (0.26)
Vision Disability	0.75 (0.46)	0.75 (0.46)	0.66 (0.49)
Age		0.99*** (0.003)	1.00*** (0.01)
Male		0.89*** (0.07)	0.94*** (0.07)
High School Diploma or Equivalent		1.55*** (0.26)	0.50 (0.47)
Some College or Associate Degree		1.63*** (0.30)	0.30 (0.61)
Bachelor's Degree		2.04*** (0.31)	0.32 (0.63)
Graduate Degree		2.02*** (0.33)	0.24 (0.67)
Employed			0.98*** (0.20)
Black			1.58*** (0.20)
Hispanic			1.50*** (0.13)
Asian American			1.07*** (0.16)
American Indian/AK Ntv			2.13*** (0.46)
Other			1.35*** (0.24)

Divorced			0.98***
			(0.13)
Married			0.72***
			(0.10)
Separated			0.84**
			(0.31)
Widowed			0.90***
			(0.25)
Family income (logged)			0.43
			(0.29)
Political interest			1.10***
			(0.01)
Social network			1.07***
			(0.05)
Political efficacy			1.58***
			(0.03)
IMR	0.22	1.44	0.002
	(0.49)	(0.83)	(2.79)
Constant	0.31***	0.18	5.27***
	(0.09)	(0.36)	(1.47)
Observations	7,439	7,439	7,439
Akaike Inf. Crit.	7,194.11	7,185.62	6,721.34
<p><i>Note: $p < 0.05$; $p < 0.01$; $p < 0.001$</i></p> <p>Coefficients are presented as odds ratios.</p> <p>Model 5: Nagelkerke R0.01 Adjusted R0.01 R: 0.08</p> <p>Model 6: Nagelkerke R0.01 Adjusted R0.01 R: 0.11</p> <p>Model 7: Nagelkerke R0.11 Adjusted R0.11 R: 0.33</p>			

APPENDIX P

LOGISTIC REGRESSION OF ASSOCIATION BETWEEN DISABILITY AND
EMPLOYMENT RETENTION

Logistic Regression Results			
	<i>Dependent variable:</i>		
	Employment retention		
	Model 1	Model 2	Model 3
Disability	0.38*	0.44*	0.52*
	(0.17)	(0.21)	(0.23)
Telework	1.49***	1.57***	1.20***
	(0.11)	(0.12)	(0.13)
Age			0.97***
			(0.005)
Male			1.31***
			(0.13)
High School Diploma or Equivalent			1.66***
			(0.22)
Some College or Associate Degree			1.91***
			(0.20)
Bachelor's Degree			2.03***
			(0.22)
Graduate Degree			2.51***
			(0.25)
Black			0.87***
			(0.20)
Hispanic			1.20***
			(0.20)
Asian American			1.08***
			(0.31)
American Indian/AK Ntv			2.43***
			(0.56)
Other			0.65*
			(0.31)
Home Internet			1.56***
			(0.39)
Divorced			1.30***
			(0.20)
Married			1.10***
			(0.15)
Separated			1.26**
			(0.45)
Widowed			1.27***
			(0.31)
Family income (logged)			1.52***

			(0.14)
Accommodation and Food Services			1.02*
			(0.50)
Arts, Entertainment, and Recreation			1.04
			(0.56)
Construction			1.22**
			(0.47)
Educational Services			1.03*
			(0.45)
Finance and Insurance			1.90***
			(0.43)
Health Care and Social Assistance			1.24**
			(0.45)
Information			1.40*
			(0.59)
Management and Administrative Services			1.39**
			(0.47)
Manufacturing - Durable Goods			1.65***
			(0.48)
Manufacturing - Nondurable Goods			1.20*
			(0.50)
Mining			14.25***
			(1.51)
Other Services			1.20*
			(0.47)
Professional, Scientific, and Technical Services			1.55***
			(0.44)
Public Administration			1.31**
			(0.50)
Real Estate and Rental and Leasing			4.08***
			(0.67)
Retail Trade			0.84
			(0.45)
Transportation and Warehousing			1.64**
			(0.51)
Utilities			1.06
			(0.62)
Wholesale Trade			1.64**
			(0.56)
Disability:Telework		0.65	0.68

		(0.37)	(0.38)
Constant	10.25***	10.05***	3.78***
	(0.08)	(0.08)	(0.74)
Observations	5,772	5,772	5,772
<p><i>Note: $p < 0.05$; $p < 0.01$; $p < 0.001$</i></p> <p>Coefficients are presented as odds ratios.</p> <p>Model 1: Nagelkerke R0.02 Adjusted R0.02 R: 0.15</p> <p>Model 2: Nagelkerke R0.02 Adjusted R0.02 R: 0.15</p> <p>Model 3: Nagelkerke R0.08 Adjusted R0.08 R: 0.29</p>			

APPENDIX Q

LOGISTIC REGRESSION OF ASSOCIATION BETWEEN DISABILITY TYPES
AND EMPLOYMENT RETENTION

Logistic Regression Results		
	<i>Dependent variable:</i>	
	Employment retention	
	Model 4	Model 5
Ambulatory Disability	0.29	0.41
	(0.47)	(0.53)
Cognitive Disability	0.50	0.49
	(0.40)	(0.43)
Hearing Disability	0.44	0.53
	(0.33)	(0.33)
Independent Living Disability	0.23	0.20
	(0.94)	(1.01)
Multiple Disability	0.25	0.33
	(0.27)	(0.30)
Self-Care Disability	0.0000	0.0000
	(6.47)	(7.84)
Vision Disability	1.10	1.16*
	(0.59)	(0.59)
Telework	1.49***	1.15***
	(0.11)	(0.12)
Age		0.97***
		(0.005)
Male		1.30***
		(0.12)
High School Diploma or Equivalent		1.68***
		(0.22)
Some College or Associate Degree		1.92***
		(0.21)
Bachelor's Degree		2.05***
		(0.22)
Graduate Degree		2.56***
		(0.26)
Black		0.87***
		(0.20)
Hispanic		1.19***
		(0.20)
Asian American		1.08***
		(0.31)
American Indian/AK Ntv		2.36***
		(0.57)
Other		0.67*

		(0.31)
Home Internet		1.59***
		(0.39)
Divorced		1.32***
		(0.20)
Married		1.10***
		(0.15)
Separated		1.26**
		(0.45)
Widowed		1.29***
		(0.30)
Family income (logged)		1.48***
		(0.14)
Accommodation and Food Services		1.00*
		(0.50)
Arts, Entertainment, and Recreation		1.02
		(0.56)
Construction		1.20*
		(0.47)
Educational Services		0.99*
		(0.45)
Finance and Insurance		1.87***
		(0.43)
Health Care and Social Assistance		1.20**
		(0.45)
Information		1.35*
		(0.58)
Management and Administrative Services		1.35**
		(0.47)
Manufacturing - Durable Goods		1.60***
		(0.48)
Manufacturing - Nondurable Goods		1.18*
		(0.50)
Mining		13.74***
		(1.51)
Other Services		1.19*
		(0.48)
Professional, Scientific, and Technical Services		1.52***
		(0.45)
Public Administration		1.27*

		(0.50)
Real Estate and Rental and Leasing		4.07***
		(0.66)
Retail Trade		0.82
		(0.45)
Transportation and Warehousing		1.57**
		(0.51)
Utilities		1.05
		(0.61)
Wholesale Trade		1.53**
		(0.56)
Constant	10.26***	4.12***
	(0.08)	(0.73)
Observations	5,772	5,772
<p><i>Note:</i> $p < 0.05$; $p < 0.01$; $p < 0.001$</p> <p>Coefficients are presented as odds ratios.</p> <p>Model 4: Nagelkerke R0.03 Adjusted R0.03 R: 0.16</p> <p>Model 5: Nagelkerke R0.09 Adjusted R0.08 R: 0.29</p>		

APPENDIX R
DISCLOSURE OF ARTIFICIAL INTELLIGENCE USE

Artificial intelligence (AI) platforms were employed as supplementary tools to mainly support the editing of this dissertation. The following AI systems were used for specific, limited purposes:

1. Claude AI (Anthropic)- Used for coding assistance and grammatical refinement
2. ChatGPT (OpenAI)- Employed for coherence checking, grammatical refinement, and coding assistance
3. QuillBot- Used for paraphrasing to improve linguistic clarity
4. ConnectedPapers- Used for identifying related literature and mapping scholarly connections
5. Copilot (Microsoft)- Used for paraphrasing to improve linguistic clarity
6. Grammarly- Used for grammatical refinement

It is essential to emphasize that these AI tools were employed exclusively to polish and refine the presentation of my own original thoughts and arguments. AI was not used to generate substantive content, theoretical frameworks, analytical insights, and scholarly arguments. Every knowledge and intellectual contribution presented in this dissertation originates from my independent research, critical thinking, and disciplinary expertise. Further, the use of the AI tools was strictly limited to enhancing the articulation of my writing, including grammar correction, sentence structure refinement, coding support, and literature discovery. Again, every suggestion by use of AI was critically reviewed to ensure congruence with my intended meaning and academic standards. The research design, methodology, data analysis, findings, and conclusions represent entirely original work shaped by my engagement with existing literature. Lastly, I believe the aforementioned approach maintains the highest standards of academic integrity consistent with ASU's [Digital Trust guidelines for Generative Artificial Intelligence use](#) and ensured that AI only served as a tool for refinement rather than a replacement for authentic scholarly work. The intellectual substance and originality of this dissertation remain wholly my work.