



Research article

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Digital Inclusion for People with Autism Spectrum Disorders: Review of the Current Legal Models and Doctrinal Concepts

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Abstract

Objective: today, a significant part of professional tasks are performed in the digital environment, on digital platforms, in virtual and other meetings. This necessitates a critical reflection of traditional views on the problem of accessible environment and digital accessibility, taking into account the basic universal needs of persons with disabilities.

Methods: a gap between the traditional legal perspective on special working conditions for persons with disabilities and the urgent need of a digital workplace (digital environment) clearly shows lacunas in the understanding of accessibility, which are identified and explored with formal-legal and doctrinal methods. The multifaceted aspects of digital inclusion are revealed based on an informative approach to legislation. It leads, among other things, to searching for recommendations which would fill this gap and contribute to the creation of a more inclusive and responsible legal, social and technological environment.

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Results: the research has led to a conclusion that the existing legal, social and technological paradigms need to be re-evaluated. This reevaluation should aim to develop a more inclusive and benevolent concept of accessible environment that takes into account the diversity of human experience and needs, and a wide range of behavioral and cognitive characteristics. Creating special conditions in the workplace for those with overt and covert health problems should become an integral part of the employer's focus, along with improving management efficiency.

Scientific novelty: covert (hidden) health problems have traditionally been understudied, although they include a range of mental and physical impairments, which, like explicit health problems, vary in their origin, intensity, and permanent or episodic character. This study fills a gap in the issues of disability and its legal protection, taking into account the trend of digital inclusion, the dynamic labor activity of today, and the wide range of human abilities and needs.

Practical significance: the aspects of hidden or latent disability considered in the study provide a different perspective at employment, focusing on the workplace conditions that could be created. Employers may be unaware of the need to create special working conditions for those with hidden health problems. This results in negative effects on unemployment, increased sick leave, limited opportunities in the workplace, and more. Employees are often reluctant to disclose their non-obvious health problems to employers; hence, employers should facilitate disclosure of such information by creating relevant conditions. Such an approach will contribute to the legal protection of this category of employees and to further development of the existing legislative regulation, since the latter does not fully comply with today's needs and changed reality.

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Introduction

Invisible disabilities encompass a spectrum of mental and physical impairments that, akin to observable disabilities, diverge in their origin, intensity, and permanence or episodic nature. Concerning disability in the workplace, the argument is advanced that absent from the discourse are individuals with one of the most concealed disabilities—specifically, individuals with autism—and the corresponding legal obligations (Neely & Hunter, 2014). Past international research efforts in Canada have posited that invisible impairments may be present in as many as 40% of individuals with disabilities (Matthews & Harrington, 2000). Furthermore, the subject of invisible disability warrants attention due to its disputed status as both a valid condition and diagnosis, with implications extending into the spheres of individual existence, cultural attitudes, public policies, and occupational practices. Reeve & Gottselig (2011) observed, “Because invisible disabilities have traditionally not received the recognition that other forms of disability have, employers may not be aware of the need to accommodate people with invisible disabilities. Lack of accommodation results in lower employment rates, increased work-related absences and a restriction of capabilities within the workplace, among other things.” The concealed or latent aspect of disability offers a lens through which the matter of employment may be explored, with particular emphasis on the accommodations that might be devised within the labor market’s workplaces.

Furthermore, there is a conspicuous absence in much of the conventional literature concerning employment and disability in an examination of decisions to disclose a concealed disability on the part of the employee to an employer. Disclosure, although a pathway to workplace accommodation and potentially beneficial for the employee with a disability, remains fraught with risks, carrying both potential advantages and disadvantages. The resultant scenario forms a dilemma concerning disclosure for employees with invisible disabilities (Prince, 2017). The onus is on employers to foster a workplace environment that encourages the disclosure of invisible disabilities. This can be achieved through clarity in delineating the competencies requisite for a role, providing comprehensive information in accessible formats beforehand, and permitting opportunities for disclosure throughout the recruitment and selection procedures. Accommodation in the workplace for individuals with visible or invisible disabilities often transcend mere exceptions. Rather, the focus is on effective management, characterized by explicit expectations, transparent communication, and inclusive practices. Such an approach is in line with legal protections afforded this population of workers (Patton, 2022).

A segment of the population that has been notably overlooked in the discourse surrounding invisible disabilities pertains to individuals associated with Autism Spectrum Conditions (ASC). While legislative and societal advancements have been made in addressing certain disabilities, the complex and multifaceted needs of those with ASC are frequently marginalized. Autism, by its nature, defies generalization, encompassing a wide range of behavioral and cognitive traits that can vary significantly among individuals. The subtle and often misunderstood manifestations of ASC may lead to misconceptions

and a lack of tailored support in both the workplace and broader societal contexts. Current legal frameworks, such as the Americans with Disabilities Act (ADA), have shown limitations in addressing these specific and nuanced needs. The failure to adequately recognize and support individuals with ASC is indicative of a broader systemic flaw, wherein legal, societal, and technological paradigms fail to fully comprehend and cater to a diverse spectrum of neurodivergent experiences. Therefore, there exists an urgent necessity to expand the prevailing understanding of accessibility beyond traditional perspectives, to create an environment that is genuinely inclusive and responsive to the real-world complexities associated with ASC.

The present study endeavors to both challenge and enrich prevailing viewpoints concerning accessibility, with a central argument positing that what are often referred to as «special» or «disabled» needs are fundamentally human and universal. While recognizing the significant progress made by the Americans with Disabilities Act (ADA) in delineating guidelines for physical accessibility and accommodations for visual impairments, the research highlights a conspicuous deficiency in addressing the multifaceted requirements of neurodivergent populations. This deficiency extends to individuals with conditions such as dyslexia and color blindness. The current tendency to label these needs as «special» emerges as a concerning phenomenon within the discourse, one that risks unintentional marginalization and relegation to a secondary status. In addition, the study undertakes a critical examination of the hiring practices of accessibility officers within the domains of technology and UI/UX. Current recruitment strategies, the study finds, are frequently narrowed to specific considerations, such as low-vision readability, thereby neglecting a broader spectrum of neurodivergent accessibility that encompasses information processing and cognitive overload. This lacuna points to a disconcerting disconnect between existing legal statutes and the intricate, lived experiences of neurodivergent individuals. Through an exhaustive exploration, the study advocates for a profound reassessment of legal, societal, and technological paradigms. Such a reevaluation aims to foster a more inclusive and compassionate conceptualization of accessibility, one that transcends mere design considerations to engage with the vast array of human experiences and needs.

1. Invisible Disabilities

The scholarship on disabilities and their legal protection has largely focused on physical disability. For instance, episodic disabilities denote lifelong health conditions that exert a considerable influence on the capability of an individual to engage in employment and various other social facets. In a Canadian study, McKee et al. (2006) characterizes episodic disability as «a serious mental or physical condition characterized by fluctuating periods and degrees of wellness and impairment. These periods are often unpredictable in severity, duration and potential for resolution» (p. 35). Further elucidating the nature of episodic disability, Boyce asserts, «an episodic disability can be permanent or temporary,

life-threatening or chronic, progressive or stable. What makes disability 'episodic' is that it produces recurring, sometimes cyclical, usually unpredictable periods of good and poor health» (p. 45). Boyce contends that compared to those with different forms of disability, individuals with episodic impairments encounter a unique disadvantage due to the longstanding inadequacy in the conceptualization, articulation, and address of this specific impairment within the frameworks of disability policies and programs (p. 34). Organizations focusing on episodic disability serve individuals living with an array of conditions, including but not limited to arthritis, specific types of cancer, Crohn's disease, diabetes, hepatitis C, HIV/AIDS, mental illness, mood disorders, and multiple sclerosis.

Alternatively, the delineation between visible disability and invisible disability hinges on the observability of the impairment. While a person with a visible disability exhibits an impairment that is readily perceptible to others, invisible disabilities remain concealed, lacking physical characteristics or behaviors that render them apparent. Since these impairments remain relatively hidden, they do not automatically transmit information about the individual to others, nor do they delineate a situation or mold initial anticipations during social encounters. The health condition or impairment does not conspicuously alter the appearance or demeanor of an individual, leading to a situation where the disability remains undetected and unrevealed in social interactions. Implicit in this understanding is the notion that there may be a concomitant absence of discriminatory or stereotypical reactions towards the individual (Prince, 2017).

Invisible disability, however, is not classified as a definitive clinical category or a separate social identity. Rather, some scholars propose a conceptualization that places visible and invisible disabilities on a continuum of conditions and particular contexts. Mollow (2010) accentuates «the impossibility of any absolute binary between 'visible' and 'invisible' disabilities» (p. 502), highlighting the complexity inherent in this dichotomy. A condition that might be concealed from a casual observer in a social context may become discernible to healthcare professionals through diagnostic evaluations. Mollow enumerates conditions such as "mental illnesses; some cognitive disabilities; and physical conditions such as chronic fatigue syndrome, repetitive strain injury, Environmental illness, and fibromyalgia, which don't produce objectively observable bodily changes" as constituting invisible disabilities (p. 502). In addition, certain gendered dimensions exist in relation to the perceptibility or concealment of impairments. For instance, Krogh and Johnson (2006) posit that women with disabilities are more susceptible to experiencing non-visible impairments, such as chronic illness and fatigue, compared to their male counterparts. This multifaceted understanding of invisible disabilities underscores the nuanced nature of how impairments manifest and are perceived across different contexts and demographics.

Specific to the study at hand, autism spectrum condition (ASC) (previously autism spectrum disorder (ASD)) covers a range of invisible disabilities, including ADHD, dyslexia, dysgraphia and dyscalculia (Hodges et al., 2020). The stigma of a diagnosis has been pointed to as another reason an employee does not disclose in fear of further alienation

(Hurley-Hanson et al., 2020). Moreover, the symptomatic experiences that workers within the ASC may encounter is a multifaceted and complex matter, which requires attention to various cognitive and speech-related facets. In the realm of cognitive disabilities, a significant percentage of individuals experience restricted comprehension. Limitations in comprehension may manifest in an inability to grapple with intricate concepts, metaphors, or abstract language; or in difficulties understanding certain idiomatic expressions or slang (Smith & White, 2020). Paradoxically, some individuals may display extraordinary abilities in specific cognitive domains, such as numerical memory, even while struggling with more fundamental areas like social skills or emotional perception (McCauley et al., 2020). The dichotomy between these high and low cognitive functions highlights the heterogeneity and complexity of cognitive disabilities within the context of ASC.

Furthermore, the phenomenon of low tolerance for cognitive overload constitutes a critical aspect of cognitive disabilities. Individuals who are prone to cognitive overload may react with frustration or distress to multifaceted situations or an environment replete with simultaneous stimuli (Higgins et al., 2021). The need for simplicity and straightforwardness in their surroundings is paramount; an overabundance of choices or complexity can result in a paralyzing inability to act or a protracted emotional disturbance (Hutson & Hutson, 2023). Turning to the domain of speech disabilities, a wide array of conditions presents additional challenges. Stuttering, characterized by involuntarily repeated, prolonged, or blocked speech sounds, affects the fluency of speech (Kharismadewi et al., 2023). Similarly, "cluttering," sometimes classified as a language disability, disrupts fluency through rapid, rhythmically inconsistent, and syntactically disorganized speech (Maruthy & Kelkar, 2023). Both Apraxia, a motor speech disability marked by difficulty in forming speech sounds, and Dysarthria, resulting from brain damage and leading to slurred or slow speech, further illustrate the multifaceted nature of speech disabilities within the ASC spectrum (Shriberg et al., 2019).

Articulation disorders, phonemic disorders, and non-vocal challenges constitute additional layers of complexity. Articulation disorders pertain to the physical production of speech sounds, resulting in omissions, additions, substitutions, or distortions (Griffen et al., 2022). Phonemic disorders, on the other hand, revolve around difficulties in distinguishing speech sounds, affecting word meaning and communication. Non-vocal disabilities, characterized by an utter inability to produce speech, emphasize the breadth and depth of invisible disabilities that may be encountered by ASC workers (van Rensburg et al., 2020).

Collectively, these observations underscore the intricate and diverse nature of invisible disabilities, both cognitive and speech-related, within the ASC context. The acknowledgment and understanding of these challenges necessitate a nuanced approach to supporting individuals in both personal and professional environments, emphasizing empathy, accommodation, and recognition of the inherent humanity of these so-called «special» needs.

2. Legal Protection

The Americans with Disabilities Act (ADA) has demonstrated efficacy in the establishment of building standards that furnish accessible spaces for individuals with physical impairments (Morgan, 2021). However, these guidelines have neglected the unique needs of those with mental, emotional, and developmental disabilities, including autism spectrum condition (ASC). Legal protections for individuals with disabilities constitute a complex landscape, marked by an interplay between civil rights, procurement regulations, industry-specific laws, and various tiers of governmental legislation, both domestic and international. These protections aim to ensure accessibility, equality, and non-discrimination across various facets of life, but often overlook the population under review here (Hawkins, 2023).

Civil rights laws serve as the foundation for legal protections, emphasizing the equal rights of persons with disabilities. These laws commonly prohibit discrimination in diverse contexts such as employment, accessibility to buildings, government services, and public accommodations, including eateries, retail, and entertainment venues. Notably, the ADA exemplifies a civil rights law that seeks to eradicate discrimination against individuals with disabilities, providing technical standards in some instances, while omitting them in others (Murphy, 2020).

Procurement laws represent another essential category, focusing on accessibility considerations in the acquisition of products or the contracting of services. Under such statutes, accessibility standards must be met, particularly by government entities. For example, Section 508 of the Rehabilitation Act in the United States and EN 301 549 in the European Union mandate that only products meeting accessibility criteria be considered for purchase. These laws significantly influence both governmental and private business purchasing decisions (Bosio et al., 2022).

Industry-specific laws introduce another layer of complexity, tailored to particular sectors deemed vital to accessibility. In the United States, the 21st Century Communications and Video Accessibility Act (CVAA) governs telecommunications, while the Air Carrier Access Act (ACAA) regulates airplane travel (Burks, 2013). These laws underscore the recognition that different industries may necessitate distinct and carefully crafted legal measures to ensure accessibility.

At the nexus of federal, state, and international laws, a comprehensive framework emerges to require accessibility for websites and Information Communications Technology (ICT) (Nath & Liu, 2017). The ADA mandates accessibility for various digital platforms and customer services, including sales, entertainment, and education. The CVAA expands upon this by encompassing communications products, services, and devices (Brooks, 2017). U.S. Section 508 of the Federal Rehabilitation Act, along with related state laws, mandates the procurement of the most accessible technology within the public sector (Olalere & Lazar, 2011). Specific state laws, such as Disabled Persons Act and Unruh Act of California, further enhance this landscape, complemented by international ADA-like

laws in countries like Korea, Canada, the U.K., and Australia (Schoen, 2022). The European Accessibility Act, presently in drafting stages, promises to have broad implications on products, services, and devices across the European Union.

Additionally, an important distinction should be made between the ADA and Section 508 of the Rehabilitation Act stand out as significant, yet distinctly different legislative instruments. An examination of both will shed light on their unique characteristics and contributions to the broader landscape of disability rights (Taylor & Bicak, 2021). The ADA represents a comprehensive civil rights law aimed at eliminating discrimination against individuals with disabilities across various spheres of public life in the United States (Schall, 1998). This act is subdivided into five major titles, each addressing specific domains:

Title I – Employment. This section emphasizes the prohibition of discrimination in all aspects related to employment, including hiring, firing, advancement, compensation, and training.

Title II – Public Services, State, and Local Government. This title focuses on non-discrimination in all programs, services, and activities offered by public entities.

Title III – Public Accommodations and Services Operated by Private Entities. This encompasses private places of public accommodation, including a wide array of establishments such as hotels, restaurants, and movie theaters.

Title IV – Telecommunications. This section mandates the provision of services facilitating communication over the telephone for people with hearing and speech disabilities and includes regulations on closed captioning.

Title V – Miscellaneous Provisions. This title captures various miscellaneous aspects related to the ADA, including its relationship with other laws, state immunity, and provisions on illegal drug use and attorney's fees.

Contrastingly, Section 508 of the Rehabilitation Act is a specific federal law mandating accessibility in electronic and information technology (EIT) employed by the federal government. This encompasses websites, software, hardware, electronic documents, and more (Jaeger, 2008). Its relevance to web accessibility was enhanced in January 2017 when the Web Content Accessibility Guidelines (WCAG) level A and AA were incorporated, replacing a modified subset of WCAG 1.0 (Caldwell et al., 2008). European legislation such as EN 301 549 shares similarities with Section 508, focusing on accessibility requirements for public procurement of Information and Communication Technology (ICT) products and services (Kous et al., 2021).

The critical differences between the ADA and Section 508 of the Rehabilitation Act can be clearly articulated by examining four key dimensions. In terms of technology, the ADA does not extensively address modern digital technology, whereas Section 508 has specific provisions relating to accessibility within this domain. The scope of the ADA is considerably broader, encompassing all areas of public life; in contrast, Section 508's focus is more

confined, targeting federal electronic and information technology exclusively. With regard to applicability, the ADA's reach extends to a wider range of entities, such as employers, governments, and businesses open to the public, while Section 508's applicability is primarily centered on federal agencies and those entities receiving federal funding or contracts. Finally, the enforcement mechanisms for these two laws are markedly different: under the ADA, any individual who believes they have faced discrimination can file a complaint, while under Section 508, grievances must be lodged with the particular federal department or agency responsible for the non-compliant electronic technology or information.

The comparison of the two acts highlights the complex legal landscape that individuals with ASC must navigate in the workplace. The critical distinctions between these two laws manifest in four key dimensions, each bearing significant implications for workers with autism and their protective rights. In the realm of technology, the lack of comprehensive provisions in the ADA for modern digital technology creates a potential void in the protection and support for individuals with ASC, who may require specific technological accommodations. Alternatively, the provisions of Section 508 targeting accessibility within the digital domain may, in some contexts, address these needs; however, its focus is confined exclusively to federal electronic and information technology, limiting its impact.

With regard to scope, the broader encompassment of all public life with the ADA might theoretically offer more substantial protection for workers with ASC. Conversely, the more narrow concentration of Section 508 potentially leaves gaps in addressing the unique needs of these individuals outside federal agencies. In terms of applicability, the former's wide reach, extending to employers, governments, and public businesses, seems to promise a more comprehensive coverage for workers with ASC. Yet, the latter's focus on federal agencies and those with federal funding or contracts may exclude significant sectors of employment from its purview, further marginalizing individuals with ASC within the workplace.

Finally, the distinct enforcement mechanisms between the two laws present additional challenges. The allowance for individual complaints with ADA regarding discrimination offers a direct avenue for redress. In contrast, Section 508's more convoluted grievance process, requiring complaints to be lodged with specific federal departments or agencies, may create barriers to justice for individuals with ASC who encounter non-compliance in the realm of electronic technology or information. Collectively, these dimensions paint a complex and often incongruent picture of the legal rights and protections afforded to workers with autism. The interplay and disparities between the ADA and Section 508 reveal an urgent need for a cohesive and nuanced approach that fully acknowledges and addresses the specific and multifaceted needs of individuals with ASC in the workplace. Such an approach requires a comprehensive reevaluation of existing legal frameworks, coupled with a robust commitment to fostering an inclusive and empathetic workplace culture that transcends mere legal compliance.

3. Support in Action

Other research has related the inadequacies of accommodations for the population under discussion post-pandemic. Capuano (2022), for instance, looked at the profound transformations in work patterns instigated by the COVID-19 pandemic and the concomitant challenges this presents to lawmakers and policymakers in Australia. The research and data examined in the article project a trend towards predominantly hybrid and shared workplaces in the post-pandemic era. A critical argument advanced in the article is that this paradigm shift in workplace design harbors specific risks of inequality and indirect discrimination based on invisible disability. Such a mode of working has been identified as inherently disadvantageous to employees with invisible disabilities, leading to new strata of workplace inequality. The analysis of Australian labor law and anti-discrimination law reveals that current legal structures are inadequately prepared to tackle these emerging inequalities. Thus, the existing law falls short in addressing the challenges faced by employees with invisible disabilities in the contemporary and post-pandemic workplace landscape. Furthermore, when employees with invisible disabilities attempt to establish adverse action under the Fair Work (FW) Act or indirect discrimination under existing legislation, their claims are often unjustly defeated. This is attributed not to the lack of merit in the claims but to deficiencies within the legal system itself. Proposals for reforming the FW Act and various state and territory anti-discrimination statutes are advocated, aiming to afford claimants with invisible disabilities equal coverage to those with visible disabilities (Farbenblum & Berg, 2017).

Along the same lines, and in light of the growing prevalence of autism diagnoses, there emerges an imperative for designers and architects to broaden their planning horizons to incorporate more universally applicable solutions. As such, Clouse et al. (2020) presented methodologies for designing beyond the ADA framework to cater to the needs of individuals with ASC. To achieve such a design, those in the architectural and design professions must recognize and address sensory challenges that could impede the ability of those with the condition to attain a regulatory state, thereby facilitating their effective interaction with neurotypical peers. Additionally, design considerations extend to teachers, therapists, and parents of children with autism to foster more successful interactions. An environment that overstimulates a child with ASD may impede the efforts of parents, caregivers, or therapists in realizing their respective goals.

One potential solution Mostafa advanced are seven design criteria, encapsulated in the acronym ASPECTSS, which stands for Acoustics, Spatial sequencing, Escape spaces, Compartmentalization, Transition spaces, Sensory zoning, and Safety (Mostafa, 2014). These criteria, specifically tailored for individuals with ASD, form the foundational principles for the established guidelines. As designers and architects, there resides an ethical obligation to fabricate inclusive environments. To this end, the authors spotlighted a vocational center, juxtaposing one plan that conforms to ADA guidelines with another that embodies supplementary environmental features catering to the needs of people with ASD. These design criteria, derived from a synthesis of evidence-based solutions procured

through a comprehensive literature review and personal interviews, underscore the sentiment that a sensitive approach to the needs of individuals with autism not only provides targeted solutions but enhances the built environment for all. It is a profound testament to the potential for design to transcend mere compliance and aspire to inclusivity and empathy.

Laws pertaining to disability accommodations, notably within the workplace, have historically been rooted in architectural or physical design considerations (Hawkins, 2023; Murphy, 2020). This perspective has shaped the legislation, informing guidelines and requirements primarily focused on rendering physical spaces accessible. From ramps and elevators to accessible restrooms, these tangible provisions have become emblematic of disability accommodations. However, this traditional approach overlooks a pivotal aspect of contemporary work-life: the digital domain.

4. Recommendations

In the modern workplace, a significant portion of daily interaction and job-related tasks have transitioned to digital platforms (Baptista et al., 2020). Activities such as typing on a keyboard, reading from a screen, or engaging in virtual meetings constitute an integral part of the work experience. Consequently, the accessibility landscape has fundamentally evolved, necessitating a reevaluation of existing legal frameworks. Thus, the present emphasis on architectural accommodations fails to capture the complexity of the digital environment, wherein accessibility may pertain to factors such as screen readability, keyboard functionality, or the cognitive demands imposed by user interfaces. For individuals with various disabilities, including neurodivergent conditions, these digital interactions may present barriers as significant as physical obstacles. Yet, prevailing legislation tends to lag in acknowledging and addressing these digital accessibility considerations (Inal et al., 2020).

The disconnect between traditional legal perspectives on disability accommodations and the emergent needs of the digital workplace illuminates a profound gap in the accessibility discourse. While architectural considerations undoubtedly remain essential, they no longer suffice as the exclusive focus of disability accommodations. The transition to a digitally-driven work environment calls for a comprehensive understanding of accessibility that extends beyond physical design to encompass the multifaceted nuances of digital inclusivity (de Melo et al., 2022). Such an understanding demands a proactive and informed approach to legislation, one that recognizes and responds to the dynamic nature of contemporary work practices and the diverse spectrum of human abilities and needs. The realization sets the stage for the exploration of recommendations that seek to bridge this gap, fostering a more inclusive and responsive legal, societal, and technological landscape.

Previous studies have outlined strategies to promote neuroinclusivity in the workplace. The accommodation of neurodivergent workers in contemporary work environments necessitates a significant shift from conventional practices. Recommendations for this transformation pivot around the principle of individualized, person-centered communication. Emphasizing explicit, well-defined guidelines, managers and colleagues are encouraged

to provide step-by-step instructions that minimize ambiguity and enhance comprehension. Sensitivity to work and communication preferences, such as offering clear timelines for projects and giving advance notice of meetings, fosters a supportive and predictable environment. Literal and direct instructions, devoid of abstract or ambiguous language, further contribute to clarity. Visual aids to reinforce key points and pre-meeting agendas align with diverse cognitive processing needs. Furthermore, recognizing the unique social interaction dynamics of neurodivergent individuals, recommendations include curtailing small talk, offering conversational exits, and considering the optional nature of camera usage in video conferences. Collectively, these recommendations coalesce into a comprehensive framework that acknowledges the distinctive needs and preferences of neurodivergent workers. This approach not only facilitates effective communication and collaboration but also reflects a profound respect for neurodiversity, enabling workplaces to transcend conventional norms and create a more inclusive, empathetic, and productive environment (Hutson & Hutson, 2023).

While previous recommendations focus on environmental considerations, digital accessibility accommodations should now be the primary focus given the nature of work in the Digital Age. At the same time, the multifaceted approach required to establish digital inclusivity needs to focus on five distinct thematic areas- perceivability, operability, understandability, robustness and specific technical measures- each of which plays a pivotal role in accommodating neurodivergent individuals within digital environments.

Perceivability within the context of digital design for neurodivergent individuals represents a multifaceted endeavor. The ultimate goal of enhancing perceivability is to make digital content accessible in various forms that cater to diverse perceptual needs. Providing text alternatives for non-text content exemplifies one avenue towards achieving perceivability. For example, including transcripts for video content allows those with auditory impairments to access the information, and providing alt text descriptions for images ensures that visually impaired users can comprehend visual content through screen readers (Kous et al., 2020). These text alternatives may further be converted into braille, speech, or large print, enhancing accessibility across various mediums.

Similarly, time-based media such as videos and animations must be complemented with alternatives like captions or sign language interpretation. A clear example can be seen in educational platforms that offer subtitled lectures, enabling both hearing-impaired individuals and non-native speakers to follow the content more effectively. Also, the arrangement of content on a webpage is essential in maintaining the integrity and structure of the information when presented in different formats (Duarte & Fonseca, 2019). For instance, utilizing flexible grid layouts ensures that content remains coherent when resized or rearranged for mobile viewing. This flexibility caters to users who may require larger text sizes or specific color contrasts, without compromising the overall structural integrity of the content (Lister et al., 2020).

Another pivotal aspect of perceivability lies in distinguishing between the background and foreground to enhance both visibility and auditory comprehension. An illustrative example can be found in websites that offer a 'dark mode,' catering to users who find bright backgrounds visually straining (Willmore & King, 2023). Additionally, ensuring clear

and distinct audio channels in multimedia content aids individuals who might struggle with auditory processing, allowing them to differentiate between multiple sound sources easily. Perceivability also entails multisensory engagement. For instance, incorporating tactile feedback in touchscreen interfaces can provide valuable cues to individuals with visual impairments. Haptic technology, which simulates touch sensations, represents an innovative avenue that broadens accessibility by engaging multiple senses (Michelsanti et al., 2021).

Operability within the context of digital design signifies the capacity to engage with and navigate digital content effectively. This concept encompasses various components, and it is paramount for ensuring an inclusive experience for neurodivergent individuals and other disabilities. A primary consideration within operability is the accessibility of all functionalities through diverse inputs, not confined solely to a keyboard. This includes alternative input methods such as voice commands, touch gestures, or eye-tracking technologies (Lowndes & Connelly, 2023). For example, voice recognition software like Dragon NaturallySpeaking provides individuals with mobility impairments the ability to navigate and control applications through voice commands (Vickers et al., 2022). Meanwhile, adaptive technologies like eye-tracking allow users with limited motor control to interact with digital content through eye movements.

Providing users with enough time to consume and interact with content is essential. Consider a banking website that utilizes timed sessions for security purposes; implementing features that allow users to request additional time ensures that those who may require longer to read or navigate are not prematurely logged out. Furthermore, adjustable playback speed in video content is a valuable feature, enabling users to consume media at a pace suited to their comprehension and comfort (Seo et al., 2021). At the same time, effective navigation is a cornerstone of operability. Incorporation of features such as breadcrumb trails, clear headings, consistent navigation menus, and descriptive link texts fosters an intuitive user experience. For instance, websites that provide 'skip to content' links enable screen reader users to bypass repetitive navigation links, facilitating quicker access to the main content (Pham et al., 2023).

Careful attention must be paid to the design elements that might cause seizures. The incident involving a Pokémon episode causing seizures in 685 children, as highlighted in the Seizure Prevention Guidelines (1997), serves as a poignant reminder of the potential risks associated with rapid flashing visuals or specific color patterns. Modern web design guidelines often stress adherence to safe color contrasts and limiting the frequency of flashing elements to avoid such health risks. Therefore, responsiveness to individual user preferences further illustrates the depth of consideration required for operability (Ferlazzo et al., 2021). Features like customizable font sizes, color schemes, or layout options empower users to tailor the interface to their specific needs. For example, platforms like BBC's My Web, My Way¹ allow users to set their preferences for text size, color, and other display options, enhancing readability and comfort. In all, operability

¹ <https://goo.su/ynhV7>

within digital design transcends mere functionality; it embodies a user-centric approach that acknowledges and accommodates the diverse needs and preferences of all users (Proença et al., 2021).

Understandability, in the context of digital design, denotes the ease with which users can interpret, comprehend, and engage with the content. For individuals with cognitive disabilities, including those with ASC, factors affecting understandability can profoundly impact their experience and ability to navigate digital environments. The following delineates various aspects of understandability, providing examples to illuminate their significance (Zubala et al., 2021). For instance, ensuring that the text is easily readable is foundational to understandability. Factors such as font size, typeface, line length, and color contrast play crucial roles in readability. For example, websites employing dyslexia-friendly fonts and sufficient spacing between lines cater to the unique reading needs of individuals with dyslexia. Furthermore, adherence to WCAG (Web Content Accessibility Guidelines) contrast ratios, as tested by tools like accessiBe, can make the difference between text being legible or indecipherable for users with visual impairments (Panda & Chakravarty, 2020).

Employing semantic headings and maintaining a logical structure contribute to the ease of navigation and comprehension. Properly nested headings (e.g., H1 followed by H2, H3) not only create a visual hierarchy for sighted users but also allow screen readers to interpret the content's structure, facilitating navigation for visually impaired users. Additionally, clear section divisions and a consistent layout enable users to predict where information is likely to be found, reducing cognitive load (Fayyaz & Khusro, 2023). Along the same lines, Accessible Rich Internet Applications (ARIA) landmarks provide critical support for assistive technologies, defining distinct regions of web content such as banners, main content, navigation, and search. For example, by marking the main content area with the ARIA role=»main», screen reader users can directly navigate to that section, bypassing repetitive navigation links. This targeted navigation enhances efficiency and comprehension for users relying on assistive technology (Blanco et al., 2022).

Providing clear guidance to prevent errors and aiding users in correcting mistakes enhances understandability. For instance, an e-commerce site might employ real-time validation on forms, highlighting incorrect fields and providing specific error messages like «Invalid email format.» Such immediate feedback supports users in understanding and rectifying errors without confusion or frustration. Ensuring that web pages operate in a predictable manner minimizes confusion and cognitive overload. This can include consistent navigation menus across different sections of a site, predictable responses to user actions (such as clicking a button), and clear warnings for significant changes, like opening a new window or tab. Automated tools such as Keros facilitate adherence to understandability principles through features like color contrast analysis, ensuring

that designers adhere to best practices and standards without requiring specialized knowledge in accessibility (Teh & Ramli, 2023). Thus, understandability as a dimension of digital design involves an intricate balance of visual aesthetics, content structure, user guidance, and technological support. By employing practices such as semantic headings, ARIA landmarks, and automated testing, designers and developers can create digital environments that are not merely accessible but comprehensible and engaging for all users, including those with cognitive disabilities (Blanco et al., 2022).

Robustness in digital design refers to the resilience and adaptability of a system in providing a consistent user experience across various platforms and technologies, including assistive tools. This attribute extends beyond mere functional operability to encompass a nuanced integration of visual aesthetics and functional accessibility. Here, an exploration of key elements that contribute to robust design is presented, complete with examples to elucidate the practical implementation of these principles. In designing for robustness, accommodations must be made for individuals who may rely on one-handed keyboard navigation. This can include those with temporary conditions such as a broken arm or more permanent disabilities affecting hand usage. Websites and applications that support key commands, shortcuts, and tab navigation enhance the user experience for this demographic. For instance, the application of 'Sticky Keys' in operating systems allows sequential rather than simultaneous key presses, facilitating one-handed operation. The application of this accessibility feature in computing environments has garnered significant attention due to its potential to enhance the user experience for individuals with physical disabilities or motor impairments (Thompson & Copeland, 2020).

The provision of alt text for images ensures that content remains accessible to users who rely on screen readers or have images turned off, as in some low-bandwidth environments. Descriptive alt text, such as «A group of employees collaborating around a conference table,» provides context and information, maintaining content richness and meaning. This approach aligns with the principle of robustness, ensuring that visual content remains perceivable across diverse user experiences. Likewise, incorporating invisible labels for form elements enhances accessibility without disrupting visual design. These labels are hidden visually but accessible to screen readers, enabling users with visual impairments to understand and interact with forms. An example would be a login form where the fields «Username» and «Password» are visually hidden but still narrated by assistive technologies (Gleason et al., 2020).

Tables can present complex data in an easily digestible format, but without careful design, they can become a barrier for users with disabilities. Utilizing appropriate table headers and ensuring proper row and column associations make the information accessible to screen readers. Tools such as the 'scope' attribute within HTML define relationships between headers and cells, making the information comprehensible for users relying on assistive technologies. Robust design entails not only compliance with current

technologies but also consideration of future advancements. Utilizing standard coding practices, avoiding deprecated elements, and testing across various browsers and devices ensure that content remains accessible and consistent over time. Moreover, compliance with evolving standards like WCAG ensures alignment with best practices in accessibility (Zhang & Balog, 2020).

Robustness transcends technical specifications to become a collaboration between aesthetics and functionality. The seamless integration of visual design with user-centered considerations reflects a holistic approach to accessibility that accommodates various inputs, user preferences, and technological environments. By implementing strategies such as one-handed keyboard accessibility, alt text, invisible labels, and standards-compliant coding practices, designers and developers can create resilient and adaptable digital experiences. Such robust design not only ensures legal compliance but also aligns with ethical considerations, emphasizing the dignity and diversity of all users.

Specific Technical Measures, as the final thematic area in enhancing digital inclusivity, encompass a variety of specialized techniques that serve to augment accessibility. This domain represents a synthesis of components that require careful attention to detail. In the realm of accessibility, comprehensive solutions must be tailored to meet individual needs. Here, an exploration of specific technical measures, including examples, helps to delineate this complex domain. To begin with, the Accessible Rich Internet Applications (ARIA) suite provides a way to make web content more accessible to people with disabilities. ARIA's role, state, and property attributes can be added to HTML, thereby enhancing the accessibility of JavaScript widgets like sliders, menus, and dialog boxes (Chiou et al., 2021). For instance, by integrating ARIA roles such as «slider» or «button,» developers can ensure that assistive technologies like screen readers interpret these widgets correctly.

Other accessible considerations include adequate color contrast between text and background is critical for individuals with visual impairments, including color blindness. Tools such as the WebAIM color contrast checker can assess and ensure appropriate contrast ratios, in line with WCAG guidelines. For example, ensuring that text color has a 4.5:1 contrast ratio against its background can make reading more comfortable for users with low vision (Frey & Mancilla, 2023). A similar consideration should be made on social media platforms have become integral to modern communication, and accessibility within these platforms is vital. Strategies such as providing image descriptions on Twitter² or using camel case in hashtags (e.g., #DigitalAccessibility) enhance readability for screen readers (Kausar et al., 2021). These practices enable users with visual or cognitive disabilities to engage fully with social media content.

² A social network blocked in the territory of the Russian Federation for disseminating illegal information.

This approach involves enhancing the HTML syntax with WAI-ARIA attributes to provide additional accessibility information. Utilizing roles, states, and properties that define accessible relationships between elements ensures compatibility with assistive technologies. The realm of specific technical measures in digital accessibility requires a nuanced understanding and careful execution of various strategies (Table 1). From ARIA integration to social media accessibility, each component plays a vital role in crafting an inclusive digital experience (Žuliček et al., 2021). By adopting these practices, developers and designers can construct web content that is not only compliant with legal standards but also responsive to the multifaceted needs of all users.

Table 1. Factors for Enhancing Digital Accessibility for Neurodivergent Individuals

Factor	Associated Recommendations for Digital Accessibility
Perceivability	<ul style="list-style-type: none"> – Provide text alternatives for non-text content (e.g., braille, speech). – Offer alternatives for time-based media. – Arrange content to allow different presentations without loss of information. – Enhance background and foreground separation for visibility and auditory comprehension
Operability	<ul style="list-style-type: none"> – Ensure all functionalities are accessible via various inputs (keyboard, touch, voice, etc.). – Provide users ample time to consume content. – Prevent design elements that may cause seizures. – Facilitate navigation and content finding
Understandability	<ul style="list-style-type: none"> – Ensure text readability and web page predictability. – Employ semantic headings and utilize ARIA landmarks. – Use tools like Keros for color contrast analysis
Robustness	<ul style="list-style-type: none"> – Facilitate interaction through strategies like one-handed keyboard accessibility. – Use alt text for images and invisible labels for form elements. – Ensure compatibility with current and future user agents, including assistive technologies. – Use appropriate table headers and other design elements without altering visual design
Specific Technical Measures	<ul style="list-style-type: none"> – Integrate ARIA for JavaScript widgets. – Ensure color contrast consideration, e.g., with WebAIM Color Contrast Checker. – Enhance social media accessibility, including image descriptions and camel case in hashtags. – Provide links to skip navigation. – Consider cognitive disabilities in design. – Integrate WAI-ARIA into HTML syntax for compatibility with assistive technologies

In the effort to create an inclusive and accessible digital environment for neurodivergent individuals, an extensive consideration of the five salient factors – perceivability, operability, understandability, robustness, and specific technical measures – offers a structured approach to addressing diverse needs. The recommendations delineated within this discourse illuminate the myriad dimensions that must be addressed to ensure

the comprehensive inclusion of all users, regardless of their neurodivergent status. Embracing such a multifaceted approach resonates with the broader commitment to fostering inclusivity and equality in the virtual world. The confluence of visual aesthetics, functional accessibility, and meticulous attention to detail encapsulates a universally designed user experience that transcends mere compliance with existing standards. The pursuit of these principles, illuminated through specific examples and expert insights, establishes a foundation for designers, developers, and policymakers to create a future where the digital realm is an extension of societal values of inclusivity and empathy. The future of digital design lies in recognizing and embracing the inherent diversity of human experience, and the articulated recommendations offer a blueprint for such an enlightened path.

Conclusion

The analysis herein turns attention toward the significant concern of invisible disabilities in the workplace and the implications surrounding Autism Spectrum Condition (ASC). In doing so, the discourse emphasizes a critical examination of the current limitations of the Americans with Disabilities Act (ADA) and contemplates the recommendations as detailed in a specified article. This intricate synthesis culminates in an articulation of the next steps for research, thus fortifying the understanding of this multifaceted subject matter.

Invisible disabilities in the workplace represent a complex challenge that often goes unrecognized. These disabilities, which include conditions such as ASC, are not readily apparent but can significantly impact the ability of an individual to function in a traditional workplace environment. The ramifications of this issue extend to the broader theme of inclusivity, as it poses the question of how workplaces can foster an environment where all employees, regardless of any invisible disabilities, can thrive. Concerning the ASC, and neurodivergence in particular, the nuances become more complex, particularly considering the broad range of manifestations and how they might interact with the workplace environment. There is a necessity to appreciate the unique strengths and challenges of individuals with ASC and to create supportive structures tailored to these unique characteristics. This necessitates an acknowledgment that the workplace must extend beyond mere accommodation and work towards a more inclusive and embracing environment.

However, the limitations of the existing ADA legislation become evident within this context. The ADA, although pioneering in its vision, has been found to be insufficient in addressing the specific needs of those with invisible disabilities, including ASC. The focus of the act on physical accessibility sometimes overshadows the nuanced requirements of those with cognitive or developmental disabilities, leading to gaps in accommodation and support. The recommendations outlined in the article under consideration serve to address some of these gaps. These suggestions emphasize a reevaluation of the existing legal framework, a call for more extensive collaboration between employers and disability advocates, and the importance of creating supportive

community networks. However, these recommendations are not without challenges, and implementing them requires a careful and thoughtful approach that considers the complex interplay of individual needs, organizational culture, and legal requirements.

The way forward, therefore, must entail a multifaceted research agenda that aligns with the aforementioned challenges and recommendations. Future research should delve into an empirical examination of workplace practices in accommodating invisible disabilities, including ASC. There is also an immediate need for legal scholarship that critically evaluates the effectiveness of ADA in the context of invisible disabilities and recommends possible amendments or supplements. Additionally, an interdisciplinary approach, engaging with fields such as psychology, sociology, organizational behavior, and law, will be instrumental in creating a more nuanced understanding. Furthermore, collaboration with organizations, disability advocates, and individuals with disabilities will provide a more authentic and grounded perspective.

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Authors' contributions

James Hutson drafted the manuscript and critically revised it with valuable intellectual comments; developed the methodology design; conducted comparative analysis; collected literature; analyzed the United States legislation; drafted and edited the article; formulated the key findings, suggestions, and recommendations; and drafted the manuscript.

Piper Hutson formulated the idea, research objectives, and goals; participated in the research design; reviewed and summarized literature; analyzed the United States legislation; interpreted the specific and general research findings; critically reviewed and edited the manuscript; approved the final version of the article.

Conflict of interest

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Цифровая инклюзия для людей с расстройствами аутистического спектра: пересмотр существующих правовых моделей и доктринальных концепций

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Ключевые слова

аутизм,
доступная среда,
законодательство,
инвалидность,
право,
расстройство
аутистического спектра,
социальное обеспечение,
цифровая доступность,
цифровая инклюзия
(инклюзивность),
цифровые технологии

Аннотация

Цель: в современном мире значительная доля профессиональных задач выполняется в цифровой среде, на цифровых площадках, в виртуальных и прочих собраниях, что обуславливает необходимость критического осмысления традиционных взглядов на проблему доступной среды и цифровой доступности с учетом базовых общечеловеческих потребностей инвалидов.

Методы: разрыв между традиционной правовой точкой зрения на особые условия труда для инвалидов и насущными потребностями «цифрового рабочего места» (цифровой среды) ярко показывает пробелы в понимании концепции доступности, которые выявляются и исследуются посредством формально-юридического и доктринального методов. Многогранные аспекты цифровой инклюзии раскрываются на основе информационного подхода к законодательству, который приводит в том числе к необходимости поиска имеющихся рекомендаций, направленных на заполнение указанного пробела и способствующих созданию более инклюзивной и ответственной правовой, общественной и технологической среды.

✉ Контактное лицо

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Статья находится в открытом доступе и распространяется в соответствии с лицензией Creative Commons «Attribution» («Атрибуция») 4.0 Всемирная (CC BY 4.0) (<https://creativecommons.org/licenses/by/4.0/deed.ru>), позволяющей неограниченно использовать, распространять и воспроизводить материал при условии, что оригинальная работа упомянута с соблюдением правил цитирования.

Результаты: исследование темы привело к выводу о необходимости переоценки существующих правовых, общественных и технологических парадигм. Эта переоценка должна быть нацелена на выработку более инклюзивной и доброжелательной концепции доступной среды, которая учитывала бы разнообразие человеческого опыта и потребностей, широкий спектр поведенческих и когнитивных особенностей. Создание особых условий на рабочем месте для лиц с явными и скрытыми проблемами со здоровьем для работодателя должно стать неотъемлемой частью его внимания наряду с вопросами повышения эффективности управления.

Научная новизна: неявные (скрытые) проблемы со здоровьем традиционно не изучаются в должной мере, хотя они охватывают целый спектр психических и физических нарушений, которые, как и явные проблемы со здоровьем, различаются по своему происхождению, интенсивности, постоянному или эпизодическому характеру. Данное исследование восполняет пробел в части поиска ответов на вопросы об инвалидности и ее правовой защите с учетом тренда цифровой инклюзивности, динамического характера современной трудовой деятельности и широкого спектра способностей и потребностей людей.

Практическая значимость: рассматриваемые в исследовании аспекты скрытой или латентной инвалидности позволяют взглянуть на проблему занятости с иной точки зрения, обращая особое внимание на условия, которые можно было бы создать на рабочих местах. Работодатели чаще всего могут не осознавать необходимости создания особых условий труда лицам со скрытыми проблемами со здоровьем, в результате чего увеличивается безработица, растет число больничных; ограничиваются возможности на рабочем месте и многое другое. Сотрудники часто не стремятся по своему желанию раскрывать работодателям информацию о своих неочевидных проблемах со здоровьем, поэтому работодатели должны содействовать раскрытию такой информации, создавая необходимые условия для этого. Такой подход будет способствовать правовой защите данной категории работников и дальнейшему развитию существующего законодательного регулирования, которое не вполне отвечает современным потребностям и изменившейся реальности.

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Вклад авторов

Джеймс Хатсон осуществлял составление черновика рукописи и его критический пересмотр с внесением ценных замечаний интеллектуального содержания; разработку дизайна методологии; проведение сравнительного анализа; сбор литературы; анализ законодательства Соединенных Штатов Америки; подготовку и редактирование текста статьи; формулировку ключевых выводов, предложений и рекомендаций; оформление рукописи.

Пайпер Хатсон осуществляла формулирование идеи, исследовательских целей и задач; участие в научном дизайне; анализ и обобщение литературы; анализ законодательства Соединенных Штатов Америки; интерпретацию частных результатов исследования; критический пересмотр и редактирование текста рукописи; интерпретацию общих результатов исследования; утверждение окончательного варианта статьи.

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