EXTENDED-ABSTRACT

Forgotten Again: Addressing Accessibility Challenges of Generative AI Tools for People with Disabilities

BEDOUR ALSHAIGY, Uppsala University, Uppsala, Uppsala, Sweden

VIRGINIA GRANDE, Uppsala University, Uppsala, Uppsala, Sweden

Open Access Support provided by:

Uppsala University

Published: 13 October 2024

Citation in BibTeX format

NordiCHI Adjunct 2024: Nordic Conference on Human Computer Interaction
October 13 - 16, 2024
Uppsala, Sweden

Forgotten Again: Addressing Accessibility Challenges of Generative AI Tools for People with Disabilities

Bedour Alshaigy
Uppsala University
Uppsala, Sweden

Virginia Grande
Uppsala University
Uppsala, Sweden

ABSTRACT

This paper critically examines the persistent inequities between the rapid development of GenAI technologies and the accessibility needs of people with disabilities in a professional setting. We draw our criticism from the literature and accounts of individuals who have shared their challenges. Additionally, we critique how these tools were predominantly developed by able-bodied individuals, alongside the notable absence of design guidelines specifically tailored for the inclusivity of GenAI tools, which are relatively new innovations. As a community, we must commit to educating about accessibility and elevating the voices and experiences of people with disabilities, to ensure their needs are prioritised and addressed. This commitment will bridge the existing gap and foster a more inclusive approach to GenAI. Otherwise, the cycle of exclusion will persist.

CCS CONCEPTS

• **Human-centered computing** → **Accessibility**.

KEYWORDS

GenAI, accessibility, disability

ACM Reference Format:
Bedour Alshaigy and Virginia Grande. 2024. Forgotten Again: Addressing Accessibility Challenges of Generative AI Tools for People with Disabilities. In *Adjunct Proceedings of the 2024 Nordic Conference on Human-Computer Interaction (NordiCHI Adjunct 2024), October 13–16, 2024, Uppsala, Sweden.* ACM, New York, NY, USA, 6 pages. https://doi.org/10.1145/3677045.3685493

1 INTRODUCTION

Despite the extensive evidence from research, literature, individuals with disabilities, and their advocates emphasising the importance of integrating accessibility early in the design process, this crucial aspect continues to be overlooked in the development of new generative artificial intelligence (GenAI) technologies. This oversight indicates a possible shortfall in educational systems, where emerging professionals might either lose interest in or not receive adequate instruction on the importance of accessibility. This issue is often exacerbated by educators who demonstrate indifference towards accessibility, such as failing to address it in their courses. Consequently, as these individuals progress into their careers, their perspectives on accessibility may be eclipsed by industry practices that prioritise profit over inclusivity.

Recent reports from the World Economic Forum [34] and global consultancy firms are suggesting a significant change in the workplace landscape due to the emergence of sophisticated GenAI tools. This shift towards incorporating these technologies in daily operations is expected to enhance task efficiency and redefine job roles, allowing employees to concentrate on more creative and innovative tasks. Given the increasing emphasis on making workplaces more accessible, underscored by efforts like the European Accessibility Act [7], there is a huge potential to leverage GenAI technologies, for example, Microsoft's CoPilot, Google's Gemini, and OpenAI ChatGPT to streamline and automate various tasks such as research, documentation, scheduling, and note-taking [2, 13, 22]. Yet, amidst the rapid expansion of these tools, a crucial element of technological progress has been inadvertently neglected: ensuring accessibility for all users [10, 18, 24] .

The lack of digital accessibility in the workplace can create significant barriers and challenges for employees with disabilities[1] or impairments [17]. Without accessible digital tools and platforms, individuals with visual, auditory, motor, or cognitive impairments are often excluded from fully participating in their work environment or might not be considered for employment to begin with.

With an estimated 386 million working-age individuals globally having some form of disability [30] and facing unemployment rates as high as 80% in certain regions, the urgency for inclusive technological solutions is paramount. In Sweden[2] alone [26], 10% of the population aged 16–64 years report having a disability, with a substantial portion, 71%, feeling that their disability reduces their ability to work or leads to discrimination in employment. One in three people with disability have felt discriminated against in their working life related to their disability with the most common type of discrimination is not getting a job a person was adequately qualified for [9]. Research by Accenture [1] revealed that 76% of employees with disabilities often choose not to fully reveal their conditions in the workplace, such as to HR personnel, colleagues, and managers.

2 NAVIGATING BARRIERS: CHALLENGES USING GENAI TOOLS

GenAI interfaces significantly differ from traditional web interfaces due to the unique challenges presented by these technologies in terms of dynamic interaction and accessibility features to name a few.

NordiCHI Adjunct 2024, October 13–16, 2024, Uppsala, Sweden

ACM ISBN 979-8-4007-0965-4/24/10
https://doi.org/10.1145/3677045.3685493

[1] Guidelines for writing about people with disabilities: person first and disability second. URL: https://adata.org/
[2] Location of authors.

Imagine the following scenario[3] (Table 1) in which two employees use ChatGPT4 to assist in converting a detailed report into a slide presentation for an upcoming meeting. The first two columns in the table compare the use of ChatGPT4 between a person who is sighted and a person who is blind (thus highlighting a gap in *inclusion*). The second and third columns compare how a person who is blind would use ChatGPT4 vs Google Slides with accessibility features in a traditional web-based interface (thus highlighting a gap in *accessibility*). Based on the scenario, it is evident that there are varying levels of engagement and limitations between different interfaces and tools, particularly when accessibility features are absent or inadequately designed to cater to everyone's needs.

For individuals with visual impairments, inaccessible websites, software, and online collaboration platforms can prevent employees who rely on screen readers or other assistive technologies from independently accessing information, communicating with colleagues, and completing their job duties [11]. Obstacles such as non-intuitive user interfaces, the absence of descriptive alt-text, and the navigation of intricate text layouts present considerable hurdles. Many GenAI interfaces do not offer essential features like high contrast modes or font size customisation, which are crucial for enhancing usability for users with low vision. Screen readers, often used by visually impaired users to access text, may deliver erroneous or unclear outputs due to embedded formatting (like tables and lists).

Meg McMahon, a user experience researcher at Harvard University, reviewed a couple of GenAI chatbots' accessibility [20]. In the case of ChatGPT, the most popular chatbot, they discovered that:

- *"To have the screen reader read the text that ChatGPT generates, a user needs to bring the focus to the top of the window and then have the screen reader read the whole page from the top down. There is no way to specify which part of the conversation to read, which makes it hard for a user to easily navigate a long conversation within ChatGPT's interface"*.
- *"The buttons have no labels. It is impossible to know which buttons are the copy, edit, and rating buttons on ChatGPT"*.

GenAI can also fail people who are deaf or hard of hearing. One significant example involves automated transcription services that convert speech into text in real time, providing an essential service for those who rely on reading spoken content. However, these systems often struggle with accuracy, e.g. different accents. This is exacerbated in scenarios with background noise, multiple speakers, or dialects with less or no presence in the training data. This can result in transcriptions that are incomplete or contain numerous errors, making it difficult for people who are deaf or hard of hearing to follow conversations or access information accurately [15]. Moreover, the failure to correctly transcribe names, technical terminology, or context-specific language can lead to misunderstandings or miscommunication, significantly disadvantaging these groups in both personal and professional settings.

People with motor impairments face their own set of challenges, particularly with input methods and user interactions that demand precise manual coordination. Alternative input methods like voice commands, switch controls, or eye-tracking technology become essential for users with motor disabilities, yet GenAI's reliance on conventional input means like a mouse or keyboard can restrict their interaction with the technology. Gordon Richins, from the Center for Persons with Disabilities at Utah State University, shared his experience using the web as a person with quadriplegia [28]:

- *"As an individual with quadriplegia that uses a computer both for pleasure and at work, I find it very frustrating to surf the web, go to different web pages for different reasons both here at work and at home"*.
- *"I've tried using a mouse and my arm... the fatigue after a few minutes gets to where it's more bother than it's worth. So I use a mouth stick, which works effectively to get around on a computer, but it doesn't help me if I'm on the Internet"*.
- *"When surfing the web I find it difficult because many web pages are inaccessible without the use of a mouse, which requires tabbing from link to link to link"*.

The lack of control over how the GenAI output is received, such as long texts rapidly being shown on the screen, can contribute to increased levels of stress (as the authors experienced to different extents). This, in turn, can impair cognitive functions such as decision-making, attention, and memory, making it difficult to process and understand the complex or ambiguous outputs from these tools. The unpredictable nature of GenAI responses might also be unsettling for individuals who thrive on routine. The extensive and rapid information that GenAI can produce may be overwhelming for those who get easily distracted or have trouble maintaining focus.

The ongoing marginalisation of the disabled population not only affects individuals' ability to access and utilise these tools effectively but also erases them from the fabric of society, preventing them from reaching their full potential. Developers often overlook the diverse needs of people with disabilities, resulting in a world shaped without their input or consideration in the long run. In addition, denying access to GenAI technologies to individuals with disabilities, particularly those with great potential, is not just a theoretical concern. A well-known example is Stephen Hawking, who revolutionized our understanding of black holes and cosmology despite the barriers he encountered due to his physical disabilities. His example shows how vital accessibility is for tapping into the unique perspectives and intellectual capabilities of all individuals. Without the proper accommodations to make these advanced technologies accessible, we risk not only the exclusion from the workforce of a valuable segment of the population but also the potential stifling of novel ideas and breakthroughs that could emerge from their unique experiences and insights. In essence, ensuring that GenAI tools are accessible to everyone, including those with disabilities, is not just a matter of equality[4] but also equity[5].

3 EXCLUSION BY DESIGN: HOW GENAI DEVELOPMENT SIDELINES ACCESSIBILITY

As GenAI technologies become increasingly integrated into consumer products, major companies such as Google, Microsoft, and Apple have crafted and shared their inclusivity guidelines. While these guidelines often claim universal applicability, they notably lack a focus on accessibility. For GenAI developers, the focus on

[3]Simplistic scenario to demonstrate a single use case.

[4]Equality means everyone has access to the same resources.

[5]Equity recognises individual needs based on their circumstances.

Feature/Task	ChatGPT4 (Person who is sighted)	ChatGPT4 (Person who is blind)	Traditional web-based interface using Google Slides with accessibility features (Person who is blind)
Incorporating Detailed Charts and Graphs	Can assist in generating content and descriptionsfor charts/graphs; person visualises and creates in slides.	Cannot directly generate or interpret visual elements like charts and graphs.	Supports insertion of charts/graphs; screen readers can navigate and read out titles, text, and alt text for images.
Use of Color to Convey Information	Can suggest thematic colour schemes and their significance; person applies visually in slides.	Lacks capability to handle or convey the impact of colour application in a visual context	Supports colour schemes for visual distinction; screen readers can help navigate and apply these based on descriptions.
Embedding Dynamic Content	Can generate scripts or descriptions for dynamic content;person embeds actual content in slides.	Cannot interact with dynamic content such as videos or animations.	Allows embedding of videos and animations; screen readers announce these elements for descriptions.
Use of Non-Inclusive Language	May generate non-inclusive terms.	May generate non-inclusive terms.	N/A - The tool itself doesn't generate content.
Potential for Discriminatory Outputs	AI models are trained on non-diverse data sets that can inadvertently produce biased and racist outputs.	AI models are trained on non-diverse data sets that can inadvertently produce biased and racist outputs.	N/A - Google Slides doesn't generate content.

Table 1: Comparison of experiences of people creating presentations using ChatGPT4 and Google Slides with accessibility features

improving performance, scalability, and application [3] has relegated accessibility to a secondary concern [14]. This neglect of accessibility is not merely accidental but stems from several factors within the development landscape.

GenAI tools rely heavily on large datasets to train their algorithms. These datasets typically encompass vast amounts of textual, visual, or auditory information collected from various sources. However, a significant challenge arises when these datasets do not adequately represent the diversity of human experiences, especially those of people with disabilities. For instance, image recognition systems trained predominantly on images of able-bodied individuals may fail to recognize or misinterpret images involving disability aids or gestures commonly used by people with disabilities. Similarly, language models might not accurately understand or generate text that reflects the nuanced language used within the disabled community, such as terms related to accessibility or personal experiences of disability. This lack of diverse data leads to GenAI systems that perpetuate biases and fail to serve the entire population effectively.

> *"If the data includes bias, the algorithm will copy the bias. You can't tell it to not be biased, because it doesn't understand what bias is"* - Janelle Shane, AI Researcher[6]

Given that most developers are able-bodied means they may not instinctively consider the accessibility needs that diverge from their own experiences [32]. In addition, the focus on catering to the broadest segment of mainstream able-bodied "users" [27] leads to the deprioritisation of accessibility features. In response to this criticism, when OpenAI announced the OpenAI Forum, a new initiative aimed at bringing together domain experts and students to discuss and collaborate on the present and future of AI for the benefit of humanity, it was described as an invitation-only community forum with specific membership criteria [4]. This approach positions it more as an exclusive group of enthusiasts rather than a broadly inclusive community dedicated to enhancing OpenAI's services for all.

Another factor to consider is that the rapid iteration cycles common in GenAI development can lead to frequent changes that disrupt the usability of these tools for people with disabilities. If accessibility considerations are not integrated into the development process, updates may inadvertently introduce new barriers, making it hard for these users to adapt to changes or continue using the tools effectively. According to the Centre of Inclusive Design [5], the cost of modifying an existing product or service to make it inclusive can increase up to 10,000 times than the cost of introducing inclusivity from the beginning. Compounding these issues is the absence of strict policies or regulations [6] specifically tailored to ensure GenAI platforms meet comprehensive accessibility standards, leaving a gap in mandatory inclusivity protocols.

The lack of dialogue and consultation with the disability community during the design and testing phases is another critical issue. Engaging with users who have diverse accessibility needs can provide invaluable insights that enhance the usability of GenAI tools. Without this input, developers risk overlooking practical challenges and nuanced requirements that affect how accessible their products are. These issues are not new and have been raised by the disabled community several times. In his talk [23] *How AI fails people with disabilities – and how to fix it*, Samuel Proulx, an accessibility expert and a person who is blind, explored strategies for effectively involving people with disabilities in the development of AI products. His recommendations included:

- Incorporate accessibility considerations into the training models to enhance the functionality and inclusivity of AI systems.
- Include people with disabilities in the training and design stages to ensure their needs and perspectives shape AI development.
- Conduct inclusive testing and implementation, involving diverse user groups to validate and improve the system's accessibility.
- Provide fallback options in AI systems to ensure reliability and usability, especially in scenarios where AI may fail or encounter limitations.

4 THE WILD WEST OF GENAI: NAVIGATING WITHOUT DESIGN GUIDELINES

The current research in developing inclusive guidelines for accessible GenAI tools is still emerging, with limited specific literature available [19] due to the novelty of the field and its constant development state. Existing studies tend to be either too general [14], addressing design or accessibility without specific reference to

[6]Source: https://bit.ly/JanelleShaneBias

GenAI tools, or they focus narrowly on specific groups, thus lacking a holistic approach to inclusivity. Additionally, a significant portion of the literature is dedicated to discussing the ethical considerations, potential threats, and harms associated with GenAI [8], rather than practical guidelines. IBM's recent publication [31] offered a starting point by presenting broad "design for…" principles, which are overarching design considerations rather than detailed guidelines. These principles suggest essential guidelines to be considered during the design process of GenAI applications but do not delve into specific methodologies or frameworks for inclusivity.

While there are established guidelines for web accessibility, such as the Web Content Accessibility Guidelines (WCAG) set forth by the World Wide Web Consortium (W3C) [35], these standards often fall short when applied to the newer and more complex interactions involved with GenAI technologies. For instance, the guidelines may cover basic web design and interaction but do not extensively address the needs arising from advanced GenAI interfaces, such as dynamic content generation, real-time interaction, or complex data visualisation which GenAI tools often employ. As a result, developers may not have clear or sufficient guidance on how to make sophisticated AI functionalities accessible, leading to products that are difficult, if not impossible, for some people with disabilities to use effectively.

Jakob Nielsen, a prominent figure in user experience research and a key influencer in digital accessibility boldly stated *"Accessibility Has Failed: Try Generative UI = Individualized UX"* in his recent blog [21] to highlight the persistent challenges and shortcomings in improving computer usability for people with disabilities. Nielsen's assertion calls for a reevaluation and innovation in accessibility practices, particularly emphasising the potential for GenAI technologies to create more adaptive and personalised user interfaces that could better meet individual needs. In response to his statement, there has been a range of reactions[7] from various stakeholders, including those from the disabilities community, technology experts, and accessibility advocates[8]:

- *"Jakob Nielsen has done more in one article to tear down accessibility and delude people into thinking we really should be using GenAI instead of making things accessible than he has built in his entire career"* - Sheri Byrne-Haber, Accessibility Engineer with a disability
- *"Technology alone is never a solution to problems introduced by prior technologies"* - Don Winiecki, Principal of Handid Braille Services
- *"B.S.! As usual, a person that does not understand the uniqueness of disabilities being sucked into the A.I. hysterial trap! Unless A.I. can rewrite and code on the fly each bit of content displayed on each page, then this won't happen! The nuances of requirements for our myriad users is way too vast to evn conceive of this now. Heck, accessibility checker catch about 35 percent of defects and it's believed that advanced A.I. might get up to about 48 percent. We're still assisting in the design and testing manually as we humans tend to be a little to unique to truly quantify!"* - Vincent Martin, Accessibility and Usability Engineer who is blind
- *"I've used accessibility AI for many projects. I found through manual testing after it was completed that it wasn't perfect. For instance the screen reader would not read headings in some documents.. Some content wouldn't read it all. And those are just a couple things. Some of these issues were tracked down to the conversion process between different software, and other project tools. There is still a long way to go. The manual testing still needs to be done."* - Michele Simon, Web Accessibility Specialist

One of the main criticisms is that it oversimplifies the complex challenges and systemic issues that contribute to accessibility barriers. Critics argue that accessibility is not a binary concept of success or failure but rather a continuous process of improvement and adaptation. Additionally, some have pointed out that Nielsen's statement fails to acknowledge the progress that has been made in accessibility over the years, particularly in the development of assistive technologies and the increasing awareness of accessibility issues in various industries. Furthermore, his statement has been criticised for its potential to perpetuate negative stereotypes and stigma around disability, suggesting that accessibility is a problem that only affects a small subset of users rather than a fundamental aspect of inclusive design. On the other hand, some could argue that Nielsen's statement highlights the need for a more critical and nuanced approach to accessibility, recognising the limitations and challenges of current technologies and design practices.

Overall, Nielsen's statement has sparked a broader conversation about the importance of accessibility, the challenges and opportunities in designing inclusive technologies, and the need for ongoing collaboration and innovation to address the diverse needs and experiences of everyone.

5 BEYOND SINGLE ISSUE: EXPANDING ACCESSIBILITY TO INCLUDE INTERSECTIONALITY

The intersectionality of a large population with both visible and invisible disabilities, as well as individuals without any disabilities, highlights the pressing need for inclusive GenAI tools that also account for accessibility. Moreover, it is essential to recognise that disability or impairment isn't solely a matter of permanent conditions as people can experience temporary or fluctuating challenges that affect their abilities, regardless of having a recognised disability. As individuals age, they might encounter new challenges in interacting with technology and other systems due to changes in physical or cognitive capabilities. Similarly, accidents can abruptly alter one's ability to perform tasks they once found easy. Rethinking disability as a mismatch [29] between an individual and their need would be more beneficial for the development of these technologies moving forward.

Disability is frequently overlooked in discussions about intersectionality [33]. An intersectional approach highlights how different facets of identities for example gender, race, and age can affect the experiences and needs of people. In light of this, intersectional accessibility issues should be addressed in the design of GenAI

[7]Source: https://bit.ly/nielsencriticism
[8]We believe it is especially important to amplify the voices, rather than talk over, people with disabilities that are not represented by the authors.

tools considering perspectives of inclusion, diversity, and gender identity.

Recently, several tech companies have implemented cuts to their Diversity, Equity, Inclusion and Accessibility (DEIA) programs, often citing economic pressure or shifting corporate priorities [16]. These cuts have raised concerns amongst advocates and employees alike, as they threaten to stop and even reverse the progress that has been made toward creating more inclusive workplaces. For people with disabilities, the impact of DEIA cuts is particularly severe. These initiatives often serve as a critical platform for advocating for accessibility and inclusive practices, ensuring that the needs and rights of individuals with disabilities are recognised and addressed. Without these efforts, there is a significant risk that accessibility considerations will be deprioritised or ignored altogether, leading to environments, both physical and digital, that are less accessible and accommodating. This can increase the barriers that people with disabilities already face, limiting their opportunities for employment. Significant strides have been made in integrating *accessibility* [25] into DEIA initiatives, ensuring that the needs of people with disabilities were included in the decision-making process. With the recent cuts, that progress is being reversed, and the advancements are at risk of being undone, potentially leading to deepening inequality and exclusion.

6 ACCESSIBLE FUTURES: A CALL TO ACTION FOR INCLUSIVE GENAI TOOLS

In 1981, Frank Herbert, the acclaimed science fiction author, wrote in his book *Without Me You're Nothing: The Essential Guide to Home Computers* [12] a visionary statement about the burgeoning necessity of technology in everyday life. He argued:

> *"Before long it will at least be a matter of self-defense for you to have your own computer and be able to use it. You are already being taken advantage of by people with computers. You will not be able to meet that challenge or keep up with other changes unless you acquire a computer yourself".*

This notion, although rooted in the early days of personal computing, is strikingly relevant to today's context of GenAI and accessibility. He suggested that the mastery of such technologies is not merely a convenience but a necessity, framing it as a defensive measure against being marginalised by those who are technologically equipped. Just as the personal computer became essential for individual autonomy and competitiveness, accessible GenAI tools are vital to ensure that no one is disadvantaged or left behind in an increasingly digital world that is increasingly relying on GenAI.

Given the inherent tendencies within capitalist systems to prioritise product-market fit, it is often the case that accessibility considerations fall by the wayside, overlooked in favour of catering to a majority of able-bodied individuals. However, this approach not only sidelines a significant portion of the population but also undermines the moral imperative of inclusivity. We must challenge this status quo and advocate for the integration of accessibility from the ground up in the development of GenAI tools. It is crucial to recognise that true innovation and progress cannot be achieved unless they are inclusive. As stakeholders in technology, we must push for policies and practices that ensure GenAI tools are accessible to all, advocating for changes that not only meet market demands but also uphold our collective ethical responsibilities.

The accessibility gap in GenAI has broader implications for the future workforce, particularly for university students close to graduation. These soon-to-be professionals are entering an increasingly competitive job market where proficiency with advanced technologies like GenAI is often a prerequisite. Students who face accessibility barriers are at a distinct disadvantage compared to their peers who are already utilising these tools, potentially impacting their career opportunities and professional growth. This issue could also trickle down to the educational level, where schools may begin to integrate GenAI into their curricula. Without accessible interfaces, students with disabilities will face challenges from an early age, further exacerbating educational and social disparities.

Furthermore, it is essential for government policies to take a proactive stance on the issue of accessibility in GenAI, rather than merely following the rapid advancement of these technologies. Governments have historically played a crucial role in enforcing accessibility standards in various sectors, and this responsibility extends into the realm of emerging technologies. Policymakers must not only embrace GenAI for its potential to transform public and private sectors but also ensure that these transformations are inclusive. By integrating accessibility mandates into the regulatory frameworks governing GenAI development and deployment, governments can prevent the perpetuation of existing inequalities and promote a more inclusive future. This approach will ensure that as GenAI technologies become more integrated into everyday life, they enhance the lives of all citizens, not just those who are able-bodied. In areas with an absence of governmental policies, company or institutional policies become even more significant: the decision-making on accessibility should not be solely left to individuals (such as managers or any employee), but rather, these inclusive practices should be part of the work culture from a systemic perspective.

7 FUTURE PERSPECTIVES: THE IMPERATIVE FOR INCLUSIVE DESIGN INTEGRATION

As we navigate the evolving landscape of GenAI and other technological advancements, the integration of accessibility within educational curricula and project courses becomes not only beneficial but essential. The continued marginalisation of accessibility considerations threatens to perpetuate and even exacerbate existing disparities in both academic and later professional spheres. If current trends persist without a deliberate shift towards inclusivity, the future may see a generation of professionals ill-equipped to recognise or address accessibility, thus continuing a cycle of exclusion.

Educators play a pivotal role in shaping the mindset and practices of tomorrow's workforce. When accessibility is treated as an afterthought or, worse, ignored within the educational environment, it sends a powerful, albeit detrimental, message to students: that accessibility is not a priority. This attitude, once ingrained, can be difficult to reverse and may carry over into professional practices, where accessibility is often viewed through the lens of compliance rather than as a cornerstone of ethical design and innovation. The future must, therefore, involve a concerted effort to educate and empower students to not only understand accessibility

but to champion it. This requires a paradigm shift where accessibility is embedded in all facets of education and professional training, ensuring that it is not an optional add-on but a fundamental aspect of all design and development processes.

In envisioning a more inclusive future, we must also consider the role of companies and regulatory bodies. Organisations must view accessibility as a key factor in innovation, not as a secondary consideration. By doing so, they can create products and services that truly cater to the diverse needs of everyone, including those with disabilities, so potential applicants feel comfortable disclosing their disability when applying for jobs. Regulatory bodies, on the other hand, have a responsibility to enforce and possibly expand accessibility standards to keep pace with technological advancements, ensuring that new technologies enhance the lives of everyone, not just the majority.

The future of technology and innovation hinges on our ability to integrate accessibility into the fabric of education and professional practice. By cultivating an environment where accessibility is valued and prioritised, we can foster a generation of professionals equipped to dismantle barriers and create truly inclusive technologies. This is not merely a hopeful vision but a necessary strategy to ensure a fair and equitable digital future for everyone.

8 DISCLAIMER

ChatGPT was used exclusively for the purpose of refining the language used in this paper.

REFERENCES

[1] Accenture. 2023. The Disability Inclusion Imperative. Online. https://www.accenture.com/content/dam/accenture/final/accenture-com/document-2/Disability-Inclusion-Report-Business-Imperative.pdf.

[2] Faizan Ali et al. 2023. Let the devil speak for itself: Should ChatGPT be allowed or banned in hospitality and tourism schools? *Journal of Global Hospitality and Tourism* 2, 1 (2023), 1–6.

[3] Emily M Bender, Timnit Gebru, Angelina McMillan-Major, and Shmargaret Shmitchell. 2021. On the dangers of stochastic parrots: Can language models be too big?. In *Proceedings of the 2021 ACM conference on fairness, accountability, and transparency*. 610–623.

[4] Carl Franzen. 2024. OpenAI announces invitation-only community forum. Online. https://venturebeat.com/ai/openai-announces-invitation-only-community-forum/.

[5] Centre for inclusive design. 2020. Report: Research reveals Inclusive Design can expand customer reach fourfold. Online. https://centreforinclusivedesign.org.au/index.php/services/reports/2020/03/31/report-research-reveals-inclusive-design-can-expand-customer-reach-fourfold/.

[6] Yogesh K Dwivedi, Nir Kshetri, Laurie Hughes, Emma Louise Slade, Anand Jeyaraj, Arpan Kumar Kar, Abdullah M Baabdullah, Alex Koohang, Vishnupriya Raghavan, Manju Ahuja, et al. 2023. "So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management* 71 (2023), 102642.

[7] European Commission. [n. d.]. European accessibility act - Employment, Social Affairs and Inclusion. Online. https://ec.europa.eu/social/main.jsp?catId=1202.

[8] E Ferrara. [n. d.]. GenAI against humanity: Nefarious applications of generative artificial intelligence and large language models. arXiv 2023. *arXiv preprint arXiv:2310.00737* ([n. d.]).

[9] Kate Glazko, Yusuf Mohammed, Ben Kosa, Venkatesh Potluri, and Jennifer Mankoff. 2024. Identifying and Improving Disability Bias in GAI-Based Resume Screening. *arXiv preprint arXiv:2402.01732* (2024).

[10] Kate S Glazko, Momona Yamagami, Aashaka Desai, Kelly Avery Mack, Venkatesh Potluri, Xuhai Xu, and Jennifer Mankoff. 2023. An Autoethnographic Case Study of Generative Artificial Intelligence's Utility for Accessibility. In *Proceedings of the 25th International ACM SIGACCESS Conference on Computers and Accessibility*. 1–8.

[11] Till Halbach, Kristin Skeide Fuglerud, Tonje Fyhn, Kristin Kjæret, and Terje André Olsen. 2022. The role of technology for the inclusion of people with visual impairments in the workforce. In *International Conference on Human-Computer Interaction*. Springer, 466–478.

[12] Frank Herbert and Max Barnard. 1981. *Without Me You're Nothing: The Essential Guide to Home Computers*. Simon and Schuster. Page 14.

[13] Jingshan Huang and Ming Tan. 2023. The role of ChatGPT in scientific communication: writing better scientific review articles. *American journal of cancer research* 13, 4 (2023), 1148.

[14] Ben Hutchinson, Vinodkumar Prabhakaran, Emily Denton, Kellie Webster, Yu Zhong, and Stephen Denuyl. 2020. Social biases in NLP models as barriers for persons with disabilities. *arXiv preprint arXiv:2005.00813* (2020).

[15] Julia Jones Huyck, Kelsey L Anbuhl, Brad N Buran, Henry J Adler, Samuel R Atcherson, Ozan Cakmak, Robert T Dwyer, Morgan Eddolls, Fadhel El May, Juergen-Theodor Fraenzer, et al. 2021. Supporting equity and inclusion of deaf and hard-of-hearing individuals in professional organizations. In *Frontiers in education*, Vol. 6. Frontiers, 755457.

[16] Jennifer Elias. 2023. Tech companies like Google and Meta made cuts to DEI programs in 2023 after big promises in prior years. Online. https://www.cnbc.com/2023/12/22/google-meta-other-tech-giants-cut-dei-programs-in-2023.html.

[17] A Jetha, S Bonaccio, A Shamaee, CG Banks, U Bültmann, PM Smith, E Tompa, LB Tucker, C Norman, and MAM Gignac. 2023. Divided in a digital economy: Understanding disability employment inequities stemming from the application of advanced workplace technologies. SSM-Qualitative Research in Health, 3 (June), 100293.

[18] Os Keyes. 2020. Automating autism: Disability, discourse, and artificial intelligence. *The Journal of Sociotechnical Critique* 1, 1 (2020), 8.

[19] Kim Marriott, Bongshin Lee, Matthew Butler, Ed Cutrell, Kirsten Ellis, Cagatay Goncu, Marti Hearst, Kathleen McCoy, and Danielle Albers Szafir. 2021. Inclusive data visualization for people with disabilities: a call to action. *Interactions* 28, 3 (2021), 47–51.

[20] McMahon, Meg. 2023. Review of Generative AI accessibility. Online. https://urc.library.harvard.edu/blog/review-generative-ai-chatbots-accessibility.

[21] Nielsen, Jakob. 2024. Accessibility Has Failed: Try Generative UI = Individualized UX. Online. https://jakobnielsenphd.substack.com/p/accessibility-generative-ui?ref=axbom.com.

[22] John V Pavlik. 2023. Collaborating with ChatGPT: Considering the implications of generative artificial intelligence for journalism and media education. *Journalism & mass communication educator* 78, 1 (2023), 84–93.

[23] Samuel Proulx. 2023. How AI fails people with disabilities and how to fix it, axe-con 2022. Online. https://www.youtube.com/watch?v=eWa9VYJOURU.

[24] Peter Smith and Laura Smith. 2021. Artificial intelligence and disability: too much promise, yet too little substance? *AI and Ethics* 1, 1 (2021), 81–86.

[25] Morgan S Sorenson. 2023. From DEI to DEIA: Why Adding Accessibility Is So Important. *Science Editor* 46 (2023).

[26] Statistics Sweden. 2023. Every third person with disability has faced discrimination at work. Online. https://www.scb.se/en/finding-statistics/statistics-by-subject-area/labour-market/disabled-persons/the-labour-market-situation-for-people-with-disabilities/pong/statistical-news/the-labour-market-situation-for-people-with-disability-2022/.

[27] Eswaran Subrahmanian, Yoram Reich, and Sruthi Krishnan. 2020. *We are not users: dialogues, diversity, and design*. MIT Press.

[28] The ASD project. [n. d.]. Keeping Web Accessibility In Mind. Online. https://www.d.umn.edu/itss/training/online/transcripts/webaim.html.

[29] The Inclusive Design Guide. [n. d.]. Disability as Mismatch. Online. https://guide.inclusivedesign.ca/insights/disability-as-mismatch/.

[30] United Nations. 2024. Factsheet on Persons with Disabilities - United Nations Enable. Online. https://www.un.org/development/desa/disabilities/resources/factsheet-on-persons-with-disabilities.html.

[31] Justin D Weisz, Jessica He, Michael Muller, Gabriela Hoefer, Rachel Miles, and Werner Geyer. 2024. Design Principles for Generative AI Applications. *arXiv preprint arXiv:2401.14484* (2024).

[32] Meredith Whittaker, Meryl Alper, Cynthia L Bennett, Sara Hendren, Liz Kaziunas, Mara Mills, Meredith Ringel Morris, Joy Rankin, Emily Rogers, Marcel Salas, et al. 2019. Disability, bias, and AI. *AI Now Institute* 8 (2019).

[33] Mary Wickenden. 2023. Disability and other identities?—how do they intersect? *Frontiers in Rehabilitation Sciences* 4 (2023).

[34] World Economic Forum. 2023. Generative AI holds great potential for those with disabilities - but it needs policy to shape it. Online. https://www.weforum.org/agenda/2023/11/generative-ai-holds-potential-disabilities.

[35] World Wide Web Consortium. 2023. WCAG 3 Introduction, Web Accessibility Initiative (WAI). Online. https://www.w3.org/WAI/standards-guidelines/wcag/wcag3-intro.