



ARTIFICIAL INTELLIGENCE AND DISABILITY INCLUSION

Opportunities, Risks, and the Future of Accessible Communication

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ABSTRACT :

Artificial Intelligence (AI) is transforming how information is produced, processed and communicated. For persons with disabilities, AI-enabled technologies such as speech recognition, automated captioning, text-to-speech, computer vision, optical character recognition and generative AI offer new possibilities for accessible communication. At the same time, these technologies may create new barriers through algorithmic bias, inaccurate outputs, inaccessible interfaces, privacy concerns, excessive cognitive demands and unequal access. This article examines the opportunities and risks associated with AI-enabled accessible communication from a disability-inclusion perspective. A PRISMA 2020-informed integrative literature review approach was adopted to examine peer-reviewed literature published between 2020 and 2026, together with relevant international accessibility and disability-rights frameworks. The literature was analysed thematically across six areas: AI as an accessibility enabler, personalised and multimodal communication, disability-specific applications, algorithmic bias, privacy and autonomy, and digital inequality. The review indicates that AI can expand communication choices and support greater independence, but technological capability alone does not guarantee meaningful inclusion. The article proposes a Disability-Inclusive AI Communication Framework based on accessibility, AI capability, communication access, user agency and meaningful inclusion, supported by cross-cutting safeguards such as accuracy, transparency, privacy, bias mitigation, human oversight and disability-led co-design. The article argues that persons with disabilities should participate not merely as users of AI technologies but as active contributors to their design, testing and governance.

1. Introduction

Communication is fundamental to participation in education, employment, social life, public services and democratic processes. When information is presented in a form that a person cannot perceive, understand or interact with, communication becomes a barrier to equal participation.

For persons with disabilities, such barriers may arise in different ways. A video without captions can restrict access for deaf or hard-of-hearing users; an image without an appropriate text alternative can exclude blind users; complex information can create difficulties for people with cognitive or intellectual disabilities; and automated voice systems that do not recognise atypical speech can create barriers for people with speech disabilities.

The World Health Organization estimates that approximately 1.3 billion people, or 16% of the global population, experience significant disability (World Health Organization, 2022). Accessibility is therefore a major global concern rather than a specialised technological issue.

Artificial Intelligence has introduced new possibilities for addressing communication barriers. Speech recognition can convert speech into text, text-to-speech can convert written information into audio, computer vision can interpret visual information, and generative AI can transform information into different formats according to user requests.

However, AI does not automatically produce accessibility. A captioning system can generate inaccurate captions; an image-description system can omit important information; a speech-recognition system may perform poorly for atypical speech; and a generative AI system may produce inaccurate or biased information.

The central question is therefore not whether AI is beneficial or harmful to persons with disabilities, but: Under what conditions can AI support reliable, meaningful and equitable communication accessibility?

This article examines this question by considering AI as both an accessibility enabler and a potential source of new exclusion.

2. Research Gap and Objectives

Recent literature demonstrates increasing interest in AI and disability. However, research remains uneven across disability groups and communication modalities. A systematic review by El Morr et al. (2024) identified significant potential for AI in disability-related applications while also highlighting concerns relating to bias, privacy, accessibility and user participation. Similarly, Chemnad and Othman (2024) found that AI research in digital accessibility has concentrated substantially on visual accessibility, with comparatively less attention to other forms of disability.

Research on speech recognition also demonstrates that AI systems may perform differently for people with atypical speech. Studies have shown that personalised models can improve recognition, but significant challenges remain (Green et al., 2021; Krause et al., 2024).

The literature therefore indicates a need for a broader communication-centred examination of AI and disability inclusion.

3. Theoretical and Conceptual Foundations

The article draws on four complementary perspectives: the Social Model of Disability, Universal Design, Digital Inclusion and Human-Centred AI.

The Social Model of Disability shifts attention from individual impairment to barriers created by social, physical and technological environments. Applied to AI, it encourages researchers to examine whether communication difficulties arise because of a person's impairment or because the technology has been designed without considering diverse users.

Universal Design emphasises creating products and services that can be used by people with diverse abilities. For AI, accessibility should therefore be incorporated during initial design rather than added after development.

Digital inclusion involves more than technological availability. It includes affordability, accessibility, usability, digital skills and meaningful participation.

Human-centred AI places human needs, autonomy and values at the centre of technological development. In disability contexts, this requires meaningful participation by persons with disabilities.

Together, these perspectives support a shift from technology-centred accessibility to user-centred communication inclusion.

4. Methodology

The article uses a PRISMA 2020-informed integrative literature review. Peer-reviewed literature published between January 2020 and September 2026 was considered, alongside authoritative documents concerning disability rights and digital accessibility.

Relevant databases for the literature search included Scopus, Web of Science, PubMed, IEEE Xplore, ACM Digital Library and ScienceDirect. Search concepts combined terms relating to artificial intelligence, disability, accessibility, assistive communication, speech recognition, captioning, text-to-speech, generative AI and digital accessibility.

Studies were considered when they examined AI or AI-enabled technologies in relation to disability, accessibility, communication or inclusion. Studies unrelated to disability or communication accessibility were excluded.

The literature was synthesised thematically around six major themes: AI as an accessibility enabler; personalised and multimodal communication; disability-specific applications; algorithmic bias and accuracy; privacy, trust and autonomy; and digital inequality.

Because the review is integrative rather than a quantitative systematic review, no meta-analysis was undertaken.

5. AI as an Enabler of Accessible Communication

AI has applications across several areas of accessible communication. Speech recognition can convert speech into text; text-to-speech can convert text into audio; automated captioning can improve access to audiovisual content; computer vision can provide descriptions of visual information; OCR can convert printed text into digital text; text simplification can reduce linguistic complexity; translation can support multilingual access; and generative AI can personalise information transformation.

The literature suggests that AI can expand the range of communication modalities available to persons with disabilities. However, the benefit is conditional upon the quality and reliability of the technology.

6. Personalised and Multimodal Communication

One of AI's major advantages is its capacity for personalisation. A user may ask an AI system to simplify complex information, describe an image, generate captions, summarise a document, translate information or convert text into speech.

Generative AI can therefore function as an adaptive communication intermediary. However, personalisation should remain user-controlled. AI systems should not make assumptions about what a person with a particular disability needs.

The preferred principle is: Personalisation by preference, not personalisation by assumption.

Multimodal AI further strengthens this possibility by connecting different forms of information: Image → AI interpretation → Text → Speech; Speech → Recognition → Text → Caption; and Complex text → AI processing → Simplified text.

These transformations can reduce communication barriers, but the generated output must remain sufficiently accurate to preserve the meaning of the original information.

7. Disability-Specific Applications

Visual disabilities: Computer vision, OCR and AI-generated image descriptions can provide access to visual information. However, generated descriptions may omit information or introduce incorrect assumptions.

Hearing disabilities: Automated captioning and speech-to-text systems can improve access to meetings, classrooms, videos and public communication. However, inaccurate captions can distort important information.

Speech disabilities: Speech recognition is particularly important for people with atypical speech. Research demonstrates that personalised models can improve recognition performance (Green et al., 2021; Krause et al., 2024).

Cognitive and intellectual disabilities: Generative AI may simplify complex information and provide conversational assistance. Yet conversational AI

can also impose cognitive demands, requiring users to formulate prompts, evaluate responses and identify errors.

Augmentative and Alternative Communication: AI could support AAC through predictive text, personalised vocabulary, voice synthesis and adaptive communication. However, the technology raises important questions concerning autonomy and authorship.

8. Algorithmic Bias and Representation

Algorithmic bias is a significant risk in AI-enabled accessibility. Bias can originate from incomplete datasets, unrepresentative training data, inappropriate disability categories, design assumptions and evaluation methods.

Newman-Griffis et al. (2023) argue that the definition of disability itself can influence the design of AI systems and create mechanisms through which bias enters technological processes.

Speech recognition provides a clear example. Systems trained primarily on typical speech may not perform equally well for people with speech disabilities.

An AI system cannot be considered inclusive if it systematically performs less effectively for the people who depend upon it for communication access.

9. Privacy, Trust and Autonomy

AI-enabled accessibility may require processing highly personal information, including voice recordings, photographs, communication histories, personal documents and communication preferences.

Greater personalisation may require greater access to personal data, creating a privacy–personalisation tension. Users should not have to sacrifice unnecessary privacy simply to obtain accessible communication.

Responsible AI accessibility therefore requires informed consent, data minimisation, transparency, user control and secure data practices.

Trust is equally important. If users cannot understand how AI produces an accessibility output, they may find it difficult to determine whether that output can safely be relied upon.

10. The AI Accessibility Paradox

The central conceptual argument of this article is the AI Accessibility Paradox. AI may remove an existing communication barrier, yet the same process can produce another barrier through bias, error, inaccessible interaction or privacy risk.

For example, AI captioning can increase access but introduce transcription errors; AI image description can provide visual information but misinterpret an image; AI speech recognition can support voice interaction but fail to recognise atypical speech; AI text simplification can reduce complexity but remove essential meaning; and generative AI can personalise communication but generate biased or inaccurate information.

Automation does not automatically equal accessibility. The success of AI accessibility should therefore be evaluated according to its impact on meaningful communication participation.

11. Proposed Disability-Inclusive AI Communication Framework

This article proposes a five-layer framework: (1) Accessibility; (2) AI Capability; (3) Communication Access; (4) User Agency; and (5) Meaningful Inclusion.

Layer 1 – Accessibility: AI systems should be perceivable, operable, understandable and robust.

Layer 2 – AI Capability: Relevant capabilities include natural language processing, speech recognition, computer vision, machine learning, generative AI and multimodal AI.

Layer 3 – Communication Access: AI should support text, audio, captions, image descriptions, simplified language, translation, AAC and other preferred communication formats.

Layer 4 – User Agency: Users should retain choice, control, personalisation, privacy and the ability to correct or reject AI outputs.

Layer 5 – Meaningful Inclusion: The ultimate objective should be equal information access, participation, independence and communication autonomy.

Across all five layers, accuracy, bias mitigation, privacy, transparency, human oversight, disability-led co-design and accountability are necessary safeguards.

12. Discussion

The literature suggests three major conclusions. First, accessibility should move beyond format conversion towards meaningful communication participation. An AI-generated alternative is useful only when it enables the user to understand and act upon the information.

Second, personalisation should increase user choice rather than allow algorithms to determine what a disabled user supposedly needs.

Third, disability inclusion must become part of AI governance. Accessibility should be considered during procurement, design, development, testing, deployment and monitoring.

The implications are particularly significant for digital journalism and mass communication. AI is increasingly used for transcription, summarisation,

translation, content production and multimedia communication. These technologies could make news more accessible through captions, audio versions, simplified language and image descriptions.

At the same time, inaccurate summaries, biased descriptions and inaccessible AI interfaces could create new forms of exclusion. Media organisations should therefore treat AI-generated accessibility features as part of editorial and accessibility responsibility.

13. Implications

Theoretical implications: The study extends discussions of digital accessibility by positioning AI as both an accessibility mechanism and a potential source of exclusion.

Technological implications: AI developers should incorporate diverse datasets, accessibility testing, disability-led co-design, human oversight and user-controlled personalisation.

Communication and media implications: Media organisations should evaluate AI-generated captions, automated descriptions, summaries, translations and synthetic voices as part of their accessibility and editorial workflows.

Policy implications: Governments and regulators should encourage AI accessibility standards addressing output accuracy, algorithmic bias, transparency, privacy and user agency.

Disability-rights implications: AI accessibility should be approached as a matter of participation and equality rather than merely technological convenience.

14. Recommendations

1. Adopt accessibility-by-design throughout AI development.
2. Include persons with disabilities in co-design and testing.
3. Develop representative datasets covering diverse disability-related communication patterns.
4. Conduct regular accessibility and bias audits.
5. Maintain human oversight where inaccurate AI outputs could have significant consequences.
6. Provide user control over personalisation and AI-generated outputs.
7. Strengthen privacy protection through data minimisation and informed consent.
8. Improve affordability and availability of AI accessibility technologies.
9. Develop multilingual and culturally appropriate systems.
10. Establish AI-specific accessibility benchmarks alongside existing digital accessibility standards.

15. Limitations and Future Research

This review has several limitations. First, the literature was examined through an integrative approach rather than quantitative meta-analysis. Second, AI terminology varies substantially across disciplines, which may result in relevant studies being missed. Third, AI is developing rapidly, meaning that findings may change as technologies evolve. Fourth, published research remains uneven across disability groups and geographic regions.

Future studies should examine AI accessibility in low- and middle-income countries, particularly in relation to affordability, multilingual communication and regional languages.

Empirical studies should also investigate AI speech recognition for diverse speech disabilities, cognitive accessibility of generative AI, AI-enabled AAC, AI-generated image descriptions, automated caption accuracy, privacy perceptions, disability representation in AI datasets and accessible AI in journalism.

16. Conclusion

Artificial Intelligence has considerable potential to transform accessible communication. Speech recognition, text-to-speech, computer vision, automated captioning, OCR and generative AI can expand the range of communication formats available to persons with disabilities.

However, technological capability alone cannot guarantee inclusion. AI systems may reproduce inequality through biased datasets, inaccurate outputs, inaccessible interfaces, privacy risks and limited participation of persons with disabilities in their development.

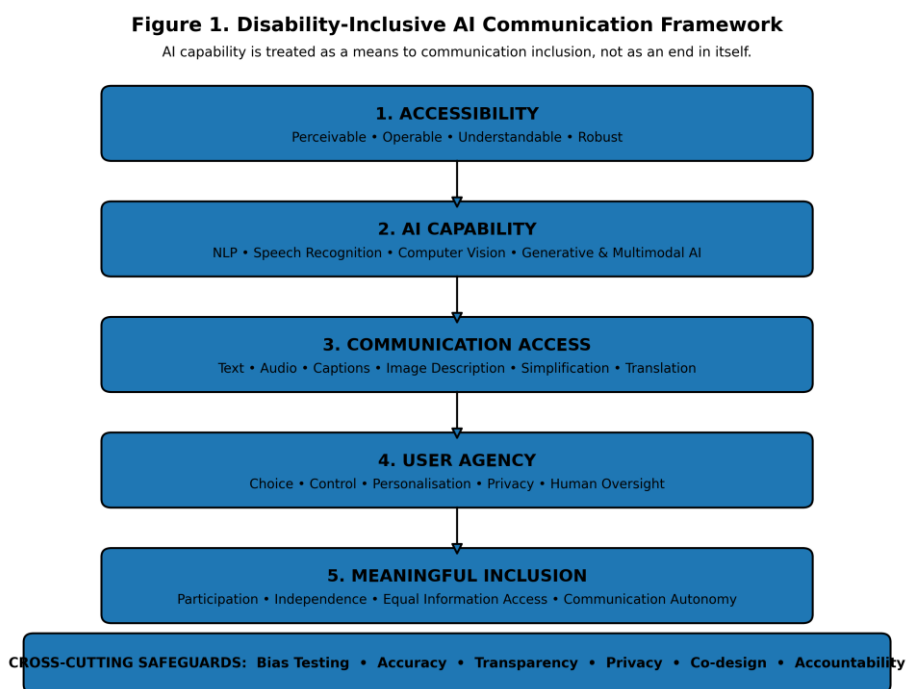
The central argument of this article is therefore that meaningful AI accessibility requires more than technological conversion. It requires accurate communication, user control, privacy, transparency, participation and equal opportunity to engage with information.

The proposed Disability-Inclusive AI Communication Framework places accessibility, AI capability, communication access, user agency and meaningful inclusion within a single model. Its central premise is that AI should adapt communication to human diversity rather than requiring persons with disabilities to adapt themselves to technology.

The future of accessible communication should consequently be measured not by how advanced AI becomes, but by whether its development expands communication autonomy, participation, dignity and equality for people with diverse disabilities.

Table 1. AI Applications, Accessibility Benefits and Risks

AI Application	Potential Benefit	Major Concern
Speech recognition	Converts speech into text	Poor recognition of atypical speech
Text-to-speech	Converts text into audio	Voice quality and personalisation
Automated captioning	Improves access to audiovisual content	Transcription errors
Computer vision	Provides descriptions of visual information	Incorrect interpretation
OCR	Converts printed text into digital text	Recognition errors
Text simplification	Reduces linguistic complexity	Loss of important meaning
Translation	Supports multilingual access	Cultural/linguistic inaccuracies
Generative AI	Personalised information transformation	Hallucination and bias
AI-enabled AAC	Supports alternative communication	Limited empirical evidence

Figure 1. Disability-Inclusive AI Communication Framework

Source: Author's conceptual framework developed from the literature reviewed in this article.

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