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AI and the Inclusion of Deaf People in Brazil: A Qualitative Study

By Israel Bispo dos Santos, Everton de Morais, Silvana Elisa de Morais Schubert, Eugenio da Silva Lima, Ringo Bez de Jesus, Amanda Monteiro Magrini, Jéssica Raignieri, Ana Carla Oliveira Garcia, Giselle Massi & Adriana Lacerda

Federal Institute of Paraná (IFPR)

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Keywords: *deafness, brazilian sign language, artificial intelligence, digital inclusion, qualitative analysis.*

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AI and the Inclusion of Deaf People in Brazil: A Qualitative Study

Israel Bispo dos Santos [α], Everton de Morais [σ], Silvana Elisa de Morais Schubert [ρ], Eugenio da Silva Lima [ω], Ringo Bez de Jesus [¥], Amanda Monteiro Magrini [§], Jéssica Raignieri [χ], Ana Carla Oliveira Garcia [ν], Giselle Massi [θ] & Adriana Lacerda [ζ]

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Keywords: deafness, brazilian sign language, artificial intelligence, digital inclusion, qualitative analysis.

I. Introduction

Artificial Intelligence (AI) has been consolidating itself as one of the most prominent technologies of the 21st century, with applications in translation, recognition, and communicative mediation of sign languages (Campos et al., 2023; Fonseca, 2024; Aquerreta Montoro, 2024). International initiatives, such as the creation of community-based datasets for automatic sign recognition (Desai et al., 2023), demonstrate the growing relevance of this field. At the same time, projects on automatic translation (Tagliabue et al., 2025; Torres López, 2023) seek to bring AI closer to the social practices of Deaf communities.

The advancement of AI in the 21st century has triggered profound transformations across multiple domains, ranging from education and health to communication and entertainment. The ability to automate processes, recognize complex patterns, and provide personalized responses positions AI as a strategic tool for building more inclusive societies. For the Deaf community in particular, these transformations may represent either a risk of deepening exclusion or an opportunity for expanded social participation, depending on how such technologies are designed, mediated, and appropriated (Cicharska et al., 2024; Ibrahim, Ali & Baballe, 2025).

In Brazil, the inclusion of Deaf people is supported by a robust legal framework. Law nº 10.436/2002 recognized Brazilian Sign Language (Libras) as a legal means of communication and expression, later regulated by Decree nº 5.626/2005, which mandated its implementation in educational institutions, public services, and training processes. More recently, the Brazilian Inclusion Law (Law nº 13.146/2015) further expanded this scope by guaranteeing the right to accessibility across all areas of social life. Nevertheless, these legal guarantees, while essential, have not been

Author α: Ph.D. in Communication Disorders, Professor and Interpreter. Federal Institute of Paraná (IFPR). e-mail: israelbbispo@gmail.com
ORCID: https://orcid.org/0000-0001-9346-5664
Author σ: Ph.D. in Communication Disorders.
e-mail: everton.morais@utp.br
ORCID: https://orcid.org/0000-0001-8188-3121
Author ρ: Ph.D. in Education, Professor at Universidade Tuiuti do Paraná. e-mail: silschubert@yahoo.com.br
ORCID: https://orcid.org/0000-0003-1448-5638
Author ω: Professor of Portuguese and Libras – Instituto Federal do Paraná (IFPR). e-mail: eugenio.lima@ifpr.edu.br
ORCID: https://orcid.org/0000-0001-7172-6771
Author ¥: Ph.D. in Translation Studies, Universidade Federal de Santa Catarina (UFSC). e-mail: ringobez@hotmail.com
ORCID: https://orcid.org/0000-0002-0062-0002
Author §: Secretaria de Saúde Pública do Estado do Pará, Brazil.
e-mail: ammfono@gmail.com
ORCID: https://orcid.org/0009-0000-2659-9224
Author χ: Ph.D. Candidate, Pontifícia Universidade Católica de São Paulo (PUC-SP), Brazil. e-mail: jessicaraignieri@outlook.com.br
ORCID: https://orcid.org/0000-0002-4291-7592
Author ν: Centre de Recherche – Institut Universitaire de Gériatrie de Montréal, Canada. e-mail: anacarlagarciausa@gmail.com
ORCID: https://orcid.org/0000-0003-4664-0073
Author θ: Professor at Universidade Tuiuti do Paraná.
e-mail: giselle.massi@utp.br
ORCID: https://orcid.org/0000-0002-3017-3688
Author ζ: Professor and Researcher, School of Speech-Language Pathology and Audiology – University of Montreal.
e-mail: adriana.lacerda@umontreal.ca
ORCID: https://orcid.org/0000-0002-6660-4902

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accompanied by technological policies at the same pace as innovations—particularly in the field of AI.

Within this context, studies on digital accessibility and Deaf communication point out that, despite normative advances, significant gaps remain in the enforcement of these rights (Mainieri et al., 2022). Recent reviews also emphasize that the social participation restrictions experienced by adults and elderly people with hearing loss affect not only communicative interactions but also the way new technologies are perceived and used (Dos Santos et al., 2022). Thus, the relationship between deafness and AI needs to be analyzed not only from a technical perspective but also from the lived experiences of Deaf individuals themselves.

International literature already presents various initiatives involving AI in accessibility contexts. Campos et al. (2023), Fonseca (2024), and Aquerreta Montoro (2024) describe the development of automatic translators between sign and spoken languages, while Albino (2023) explores gesture recognition algorithms applied to communication in Libras. On a global scale, efforts such as the ASL Citizen Dataset (Desai et al., 2023) and the bidirectional DEEP translator (Tagliabue et al., 2025) demonstrate the relevance of large-scale data collection and analysis for improving recognition and translation systems. These initiatives directly align with the need to break down communication barriers faced by Deaf communities.

However, the perceptions of Deaf people regarding such innovations remain underexplored. Skyer (2021) warns that social values and experiences strongly shape how Deaf individuals relate to technologies, emphasizing that innovation is not always automatically perceived as positive. Similarly, studies on digital discourse highlight the oscillation between optimistic expectations and dystopian fears associated with technologies applied to deafness (Mainieri et al., 2022). This ambivalence can also be observed in Brazil, where part of the Deaf community has access to advanced technological tools, while other groups remain on the margins, reproducing historical inequalities of access and digital literacy.

The present study is situated within this scenario by proposing a qualitative analysis of Deaf users of Libras and their perceptions of AI. Beyond describing technical applications, the objective is to understand how individuals of different ages relate to this technology: whether they recognize it as an ally for inclusion, perceive it as a threat, or remain indifferent due to lack of knowledge. This investigation is essential, as it aligns technological development with the real needs and expectations of the Deaf community, avoiding both the imposition of decontextualized solutions and the perpetuation of unfounded fears.

This research is justified on three main grounds: (1) the absence of studies that explore the voices of Deaf individuals themselves regarding AI; (2) the urgency of aligning technological advancements with accessibility policies already established by law; and (3) the need to propose educational initiatives in Libras that strengthen critical digital literacy, reduce resistance, and promote more equitable social participation. By situating itself at this intersection of legislation, technology, and social experience, this study seeks to contribute to the construction of an inclusive perspective on artificial intelligence and its implications for the lives of Deaf communities.

II. Methodology

This study employed a qualitative research design, emphasizing semi-structured online interviews conducted in Brazilian Sign Language (Libras). The primary objective was to explore Deaf individuals' perceptions, knowledge, and expectations regarding artificial intelligence (AI), based on a guiding script with nine central questions:

1. What is AI?
2. Do you know AI?
3. What do you think AI does?
4. Do you use AI?
5. Do you know what AI does? Please describe.
6. How do you think AI will be used in the future?
7. Would you like to learn more about AI?
8. Would you take a course on AI in Libras?
9. Do you think AI could help Deaf people? In what ways?

A total of 12 Deaf participants took part in the study, ranging in age from 8 to 65 years. All were users of Libras but represented different educational levels (from incomplete elementary education to postgraduate training) and diverse occupations (students, general service workers, teachers, retirees, and homemakers).

The diversity of the sample enabled the capture of perceptions across generations and social contexts, including children and adolescents in school, adults pursuing higher education, and elderly participants with limited formal education. This heterogeneity broadened the understanding of how meanings attributed to AI vary within the Deaf community.

The interviews were video-recorded, transcribed, and analyzed using Bardin's (2011) content analysis, a systematic and objective method that allowed the categorization of responses into five thematic axes:

1. Lack of knowledge,
2. Mistaken associations,
3. Practical uses,
4. Interest in learning,
5. Resistance and fear.

To ensure ethical confidentiality, participants were identified only as Participant 1 through 12,

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accompanied by basic sociodemographic information (age, education, and occupation).

The research was conducted in Brazil, in the city of Curitiba, at the Federal Institute of Paraná (IFPR – Curitiba Campus), between June 1 and September 1, 2025.

III. Results

The analysis of the interviews revealed five main axes related to perceptions of artificial intelligence (AI): (1) lack of knowledge, (2) mistaken associations, (3) practical uses, (4) interest in learning, and (5) resistance /fear.

1. Lack of knowledge

A significant number of participants reported never having had contact with or information about AI. This lack of knowledge was present across different age groups, from younger participants (Participant 1, 14 years old) to adults and older individuals (Participants 4, 6, 10, and 11). Their statements often included expressions such as "I've never seen it" or "I don't know how to explain," indicating an absence of digital literacy on the subject.

2. Mistaken Associations

Some participants associated AI with everyday technologies in a simplistic or mistaken manner. Participant 7 (12 years old) believed that AI was used only for video games; Participant 8 (32 years old) described AI as "the same as a computer"; and Participant 9 (30 years old) associated AI with WhatsApp. These accounts illustrate superficial interpretations but also point to potential learning pathways, since participants attempted to relate AI to familiar references within their own daily lives.

3. Practical Uses

Three participants—two teachers (Participants 2 and 12) and one adult (Participant 3)—reported using AI in their routines. The teachers emphasized employing AI for grading assignments, drafting texts, and providing pedagogical support, while Participant 3 reported using it for text revision. These accounts confirm the potential of AI as an instrumental tool in educational and academic contexts.

4. Interest in learning

The majority of participants expressed curiosity and willingness to learn about AI, especially if accessible courses in Libras were available. Participants such as 8, 9, and 11 explicitly stated their interest in attending such courses, even though their starting point was based on limited or mistaken knowledge. This openness to learning underscores the demand for training initiatives specifically tailored to the Deaf community.

5. Resistance and Fear

Participant 5 (a woman, over 50) expressed concern regarding AI, describing it as a threat: "a robot that could kill in the future." This view, closely aligned with dystopian narratives disseminated by the media, illustrates how the absence of critical information can reinforce symbolic and affective barriers to technological adoption.

Participant	Age	Education Level	Occupation	Knowledge of AI	Description / Association	Current Use	Interest in Course
1	14	Elementary	Student	Does not know	Never seen	Does not use	Yes (initial curiosity)
2	33	Higher Education (Teacher)	Teacher	Knows	Uses in classroom	Pedagogical support	Yes
3	34	Higher Education (in progress)	Worker	Partial knowledge	"Like a computer"	Text revision	Yes
4	45	Elementary	Informal worker	Does not know	Never seen	Does not use	Yes
5	50+	Elementary	Homemaker	Knows by hearsay	"Robots that could kill"	Does not use	No
6	65	Incomplete Elementary	Cleaner	Does not know	Cannot explain	Does not use	No
7	12	Elementary	Student	Superficial knowledge	Associates with videogames	Does not use	Yes
8	32	Higher Education (in progress)	Loader	Superficial knowledge	"Like a computer"	Does not use	Yes
9	30	High School	Stock clerk	Does not know	Associates with WhatsApp	Does not use	Yes
10	47	Elementary	Retired	Does not know	Never seen	Does not use	No
11	29	High School	Homemaker	Does not know	"Seems to be cool"	Does not use	Yes
12	40	Higher Education (Teacher, Postgraduate)	Teacher	Knows	Uses for grading, writing	Academic writing	Yes

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IV. Discussion

The findings of this study reveal a mosaic of perceptions among Deaf participants regarding artificial intelligence (AI), clustered into three main profiles: lack of knowledge (participants 1, 4, 6, 9, 10, and 11), functional use (participants 2, 3, and 12), and resistance/fear (participant 5). This heterogeneity reflects not only unequal access to digital information but also generational, educational, and social differences.

According to Bardin (2011), content analysis seeks not merely to organize data but to uncover underlying structures of meaning in participants' discourses. In this sense, lack of knowledge and mistaken associations—such as linking AI to videogames, WhatsApp, or computers—illustrate how the absence of critical digital literacy in Libras leads individuals to fill gaps with familiar, everyday, or media-driven references.

The interviews were therefore structured into five thematic axes that emerged from participants' responses: (1) lack of knowledge, (2) mistaken associations, (3) practical uses, (4) interest in learning, and (5) resistance or fear. These axes do not appear in isolation but intersect, revealing how the Deaf community perceives and interacts with AI based on everyday experiences, cultural references, and structural conditions of access.

Each dimension will be discussed in the following sections, interweaving representative excerpts from participants with the specialized literature to critically ground the findings and highlight both the challenges and the potential of the subject.

1. Lack of Knowledge

Lack of knowledge about artificial intelligence (AI) was one of the most salient findings of this study, cutting across generations within the Deaf community. Adolescents and young adults frequently responded "I don't know" or "I've never seen it," while older adults likewise reported never having had contact with the technology or references to describe its function or usefulness. This pattern shows that ignorance cannot be attributed solely to age or schooling; rather, it constitutes a broader, transversal phenomenon.

This informational void reflects the social participation constraints discussed by Dos Santos et al. (2022). When Deaf individuals face barriers to communication and access to information, they lose the opportunity to follow technological changes that shape social and professional life. Such distancing from technological debate produces what might be called "silent digital exclusion": not only the absence of devices, but also the absence of accessible, critical materials in Libras explaining what AI is and how it works.

The "not knowing" reported by participants is not neutral. It carries direct consequences for professional and educational trajectories. Hall, Brick, and Millios (2024) argue that a lack of language equity pushes Deaf professionals toward lower-prestige occupations, perpetuating historical inequalities. This dynamic was present in our corpus: while teachers reported some practical use of AI, most respondents—manual workers, homemakers, or retirees—had never engaged with the technology. Inequitable access to technological information thus translates into inequitable opportunities.

In contexts of greater economic vulnerability, as noted by Pinto (2022), limited access to linguistic and technological resources deepens this lack of knowledge. Statements such as "I've never seen it" or "I don't know it" signal not merely individual deficits, but the absence of public policies ensuring equitable access to innovation. Lack of knowledge becomes a structural mechanism of exclusion.

International literature underscores the gravity of this scenario. Gadkari, Bhable, and Jadhav (2023) highlight the need for sign-language datasets to train AI systems; without them, Deaf communities remain invisible in technological development. Similarly, Desai et al. (2023) show how community-sourced corpora (ASL Citizen) strengthen sign recognition and narrow the gap between technology and reality. The scarcity of analogous initiatives in Brazil contributes to the unfamiliarity observed among our participants.

Implications extend beyond education and employment. In health care, for example, Alarcón and Torres Pedraza (2022) discuss AI-based translation of Colombian Sign Language bodily expressions during medical encounters, enabling more effective communication between clinicians and Deaf patients. If Deaf individuals remain unaware of such tools, they are excluded from improvements with direct effects on quality of life. Here, lack of information is not a mere cognitive gap but a concrete risk to fundamental rights, including access to health.

In sum, the lack of knowledge identified here should be understood as the result of informational exclusion. It is both cause and consequence of inequality: it prevents active participation in technological debates and stems from the absence of policies and investments in accessible Libras materials. Overcoming this landscape requires critical digital education from early schooling, professional upskilling, and accessible digital environments that turn curiosity into genuine appropriation.

2. Mistaken Associations

Beyond outright unfamiliarity, a second recurrent pattern was the presence of mistaken associations about AI. Participants described AI as "a videogame," "a computer," or even "WhatsApp."

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These responses reveal that, even when the term is recognized, understanding remains superficial and grounded in immediate daily references rather than in conceptual or critical grasp.

Bardin's (2011) lens helps interpret this phenomenon: discourse conveys not only explicit knowledge but also social representations produced in specific contexts. When a youth equates AI with gaming, they project the concept onto their lived experience; when an adult says "it's like a computer," they translate novelty into known references. Such associations are attempts to make sense of something not yet internalized, while simultaneously exposing the limits of digital literacy within the Deaf community.

Skyer (2021) emphasizes that, without linguistically adequate access to complex information, individuals construct understandings from media fragments and partial perceptions. This explains why AI is linked to familiar tools rather than seen as a broader socio-technical transformation. Mainieri et al. (2022) observed a similar oscillation—between superficial enthusiasm and misinformation—regarding innovation during the pandemic.

This "surface knowing" is not harmless. It reinforces inequality by impeding effective appropriation of technology. As Cicharska et al. (2024) argue, Deaf inclusion in the age of AI hinges not only on tool availability but on cultural and educational mediation that clarifies uses and limits. Without critical formation in Libras, AI risks becoming a distant resource accessible only to a well-informed minority.

The pattern dovetails with structural exclusion (Hall, Brick & Millios, 2024). Absent qualified information in their language, Deaf individuals remain trapped in misguided interpretations that keep them away from high-prestige roles. Rather than envisioning AI as a professional opportunity, they reduce it to an app or leisure device—narrowing the social imagination of their place in a technological future.

Combating mistaken associations thus requires more than correcting individual errors; it demands conditions for continuous, contextualized content in Libras. Projects such as TALIA (Campos et al., 2023) and other sign–speech translation efforts (Fonseca, 2024; Aquerreta Montoro, 2024) can help, provided dissemination occurs in Libras and training surpasses superficial exposure. In short, these associations are symptoms of broader informational exclusion. Without bilingual, mediated debate, AI appears merely as an extension of known technologies rather than a domain capable of transforming social and professional life.

3. Practical Uses

Although most interviewees exhibited unfamiliarity or superficial interpretations of AI, three participants (2, 3, and 12) reported concrete, day-to-day uses. Examples clustered around academic contexts: teachers using AI to grade assignments and draft materials, and a higher-education student employing AI for text revision. When appropriately mediated, AI already plays a practical role for some Deaf users, facilitating writing and knowledge production.

This appropriation connects directly to AI's potential as an educational mediator. Campos et al. (2023) showed how TALIA—a Libras translator powered by AI—can be embedded pedagogically. Fonseca (2024) and Aquerreta Montoro (2024) likewise discuss sign-language translation experiences that bridge technology and education, while Albino (2023) demonstrates gesture-recognition algorithms that assist communication in Libras.

Internationally, community involvement has proved pivotal. Desai et al. (2023) highlight how community-sourced datasets improve recognition and utility, whereas Tagliabue et al. (2025) report promising real-world performance for a bidirectional Italian Sign Language translator (DEEP). When AI is built around real community needs, it moves from experimental artifact to instrument of inclusion.

A notable thread in participants' reports is autonomy. Deaf teachers leveraging automated feedback not only optimize their work but also bolster parity with hearing colleagues in academic settings—an immediate, concrete gain. By analogy with Ocuto's (2024) findings on rich linguistic environments for Deaf children, accessible digital environments mediated by AI can strengthen adults' autonomy in educational and professional tasks.

Nevertheless, these practical uses were confined to more schooled participants. Teachers and university students reported clearer benefits than low-income workers, reaffirming that formal education remains the chief gatekeeper to AI's advantages. Without language and educational equity (Hall, Brick & Millios, 2024), Deaf individuals tend to remain in low-complexity roles while only a subset accesses technology-rich spaces.

In short, practical uses confirm AI's capacity to facilitate academic and professional life—enhancing autonomy, efficiency, and participation. Yet concentration among the more educated reveals persistent inequality. Scaling benefits requires broader critical training in Libras, investments in translation systems, and accessible digital ecosystems—so AI becomes a collective inclusion resource rather than a privilege of the few.

4. Interest in Learning

One of the most significant findings was participants' strong interest in learning about AI—even among those who did not clearly understand the concept. Statements such as "it seems cool," "I want to know it," or "I would take a course" reveal curiosity and

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readiness to expand knowledge, provided content is accessible in Libras.

This desire represents an opportunity for public policy and educational initiatives. Ibrahim, Ali, and Baballe (2025) indicate AI's potential as assistive technology for Deaf and Deafblind individuals. Realizing that potential, however, requires a minimal understanding of how AI works; otherwise, it remains a distant "black box," risking further exclusion. The expressed willingness to learn signals demand for critical, accessible training that fosters genuine appropriation.

The point aligns with Hall, Brick, and Millios (2024): language equity is a precondition for Deaf professionals to occupy higher-prestige roles. Courses on AI in Libras could expand digital literacy and open pathways to technology development, teaching, and research. In this sense, interest is not mere curiosity but a vector for social and professional insertion.

Importantly, lower-schooled participants—despite saying they did not know AI—still expressed a desire to learn, indicating expectations of concrete benefits. As Pinto (2022) reminds us, informational exclusion does not reflect a lack of interest but a lack of responsive policies. Meeting this demand with accessible opportunities can convert curiosity into structured learning.

Interest also extends beyond academic contexts: some participants envisioned applications at work or in daily communication, echoing calls (Gadkari, Bhable & Jadhav, 2023) for sign-language datasets that enable real-world functionality. Training that integrates theory and practice could, therefore, connect Deaf learners to meaningful, everyday AI uses.

International projects such as ASL Citizen (Desai et al., 2023) and DEEP (Tagliabue et al., 2025) show that community participation improves acceptance and engagement. Providing AI courses in Libras could empower Deaf individuals not only as users but as contributors to research and innovation—expanding their protagonism in the technological field.

In sum, the widespread interest in learning about AI is a strategic lever for digital inclusion. When channeled through critical, bilingual training, curiosity becomes empowerment, reduces inequalities, and broadens professional horizons. Ignoring this demand would squander a chance to transform "not knowing" into leadership.

5. Resistance and Fear

Among the responses, one striking account portrayed AI as "a robot that could kill in the future." Although isolated, this perspective expresses resistance and fear that must not be dismissed. Unlike unfamiliarity or mistaken associations, this is an explicitly negative representation anchored in dystopian imaginaries of human threat.

Skyer (2021) reminds us that perceptions within historically marginalized communities are shaped by prior experiences and dominant social discourses. In the absence of critical information in Libras, distorted representations can gain traction. Popular media depictions of AI as a menace—without linguistic and cultural mediation—are readily absorbed, making fear a product of communicational inequality rather than individual overreaction.

Mainieri et al. (2022) documented similar ambivalence during the pandemic: technology oscillated between solution and threat. Cicharska et al. (2024) further argue that inclusion depends not only on technological availability but on cultural mediation that builds trust. Without it, informational gaps are filled by anxieties that hinder adoption.

Resistance can also be read as an outcome of structural exclusion. Lacking language equity, Deaf individuals are more vulnerable to negative interpretations of emergent technologies (Hall, Brick & Millios, 2024). Fear thus becomes a predictable consequence of limited access to reliable information—restricting engagement with AI and potentially reinforcing cycles of exclusion.

Transforming fear into engagement requires accessible, demystifying information and critical digital literacy in Libras. International experience suggests that community participation in development (e.g., ASL Citizen; Desai et al., 2023) increases acceptance and reduces apprehension. In Brazil, involving Deaf communities as co-designers and protagonists in AI projects can shift dystopian frames toward critical, constructive engagement.

In short, resistance and fear should not be pathologized as individual exaggerations but understood as products of informational inequality that creates space for negative narratives. The remedy lies in cultural mediation, language equity, and active participation—so that Deaf communities move from consumer status to co-authors of AI's future.

V. Conclusion

This study examined the perceptions of Deaf users of Brazilian Sign Language (Libras) regarding artificial intelligence, revealing a landscape marked by lack of knowledge, mistaken associations, restricted practical uses, strong interest in learning, and, to a lesser extent, resistance or fear. Taken together, these findings indicate that the relationship between the Deaf community and AI remains at an initial and fragmented stage, strongly conditioned by educational, economic, and informational inequalities.

Lack of knowledge, identified across generations, shows that digital exclusion is not merely a matter of age but of structural access to information mediated in Libras. Mistaken associations further

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suggest that, in the absence of critical digital literacy, AI tends to be interpreted as a mere extension of familiar technologies—computers, games, or messaging apps—thereby constraining an understanding of its broader social, professional, and educational impact.

In contrast, the reports of practical use—especially in academic settings—confirm AI's potential to expand autonomy and facilitate Deaf people's work within inclusive digital environments. Yet this potential is currently accessed primarily by those with higher levels of schooling, underscoring the need to democratize opportunities for both use and learning. Here, the widespread willingness to learn about AI is pivotal: it signals clear demand for bilingual training pathways capable of transforming curiosity into empowerment.

Resistance and fear, although less frequent, should not be overlooked. They demonstrate how the absence of critical, accessible information creates fertile ground for distorted narratives—often amplified by the media—that frame AI as an uncontrollable risk. Converting apprehension into trust requires cultural mediation, consistent public policies, and active participation of Deaf communities in technological development.

We conclude that Deaf inclusion in the age of AI cannot be reduced to the mere availability of tools. It demands structural conditions that guarantee linguistic equity, critical access, and sustained training opportunities in Libras. This entails investment in sign-language datasets, accessible capacity-building programs, and pedagogical strategies that bring Deaf communities closer to AI in practical and critical ways. Doing so can break the cycle of "not knowing" produced by exclusion and open pathways for Deaf individuals not only to use AI, but to become protagonists in its design and application. In this perspective, AI ceases to be a distant promise or a feared threat and becomes an instrument of inclusion, autonomy, and social transformation for the Deaf community.

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