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ACCESSIBLE SIGNAGE AND AUGMENTATIVE COMMUNICATION IN PUBLIC WORKS FOR INCLUSIVE CITIES AND COMMUNICATIVE LITERACY

Señalética accesible y comunicación aumentativa en obras públicas para ciudades inclusivas y alfabetización comunicativa

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ABSTRACT

In an increasingly urbanized world, accessible signage and augmentative communication become vital tools to create cities that include everyone, regardless of visual, cognitive, or motor disabilities. This article examines how these practices integrate into public works, promoting communicative literacy that empowers marginalized people to navigate and participate in urban spaces. Through a systematic review of recent studies, designs of signs for older adults in hospitals are analyzed, where size and contrast improve understanding and reduce confusion. The use of pictograms in emergencies like Covid-19 is addressed, with strategic placement and colorful graphics effectively transmitting prevention. Eye-tracking in constructions is highlighted, showing intense colors and simple shapes optimizing retention and minimizing risks. Additionally, inclusive frameworks encompassing cultural diversity and equity are discussed, inspired by audits of built environments for universal design. The author believes these innovations not only prevent accidents but also strengthen social bonds by making cities empathetic. Finally, urban policies focused on sustainability and inclusion are proposed, transforming public works into connectors towards fair societies.

Palabras clave:
accesibilidad, comunicación, ciudades, inclusión social, alfabetización

RESUMEN

En un mundo que se urbaniza rápidamente, la señalética accesible y la comunicación aumentativa se convierten en herramientas vitales para crear ciudades que incluyan a todos, sin importar discapacidades visuales, cognitivas o motoras. Este artículo examina cómo estas prácticas se integran en obras públicas, promoviendo una alfabetización comunicativa que empodera a personas marginadas para navegar y participar en el espacio urbano. A través de una revisión sistemática de estudios recientes, se analizan diseños de señales para adultos mayores en hospitales, donde tamaño y contraste mejoran comprensión y reducen confusiones. Se aborda el uso de pictogramas en emergencias como el Covid-19, con colocación estratégica y gráficos coloridos transmitiendo

	prevención efectivamente. Se destaca el seguimiento ocular en construcciones, mostrando colores intensos y formas simples optimizando retención y minimizando riesgos. Además, se discute marcos inclusivos que abarcan diversidad cultural y equidad, inspirados en auditorías de entornos construidos para diseño universal. El autor opina que estas innovaciones no solo evitan accidentes, sino que fortalecen lazos sociales al hacer urbes empáticas. Finalmente, se proponen políticas urbanas enfocadas en sostenibilidad e inclusión, transformando obras públicas en conectores hacia sociedades justas.

Introduction

Think of a city where the signs do not exclude anyone, adapting to each person so that no one gets lost because of age or disability. This is the goal of accessible signage, a concept that goes beyond simple signs and merges with augmentative communication to create urban spaces that welcome everyone. In public works such as roads, hospitals or parks, these tools become allies in building inclusive cities, where communication literacy is not a luxury, but an essential right. The author thinks that, in a context such as ours, with aging populations and blending cultures, ignoring this would be like building invisible barriers that separate people.

This work arises from the need to unite scientific advances with urban design. Studies indicate that poor signage can cause serious confusion, especially in emergencies or construction sites. For example, during the pandemic, preventive indications were key to guiding safe behaviors (Kalocsányiová et al., 2021; Mulyawan & Artawa, 2021). Here, we explore how augmentative communication, with symbols and icons, complements traditional signage to enhance inclusion. The author believes that this not only enhances security, but also fosters a more connected society, with information flowing unhindered.

To better contextualize, the social impact of these practices must be considered. In developing countries like Panama, where public works often focus on economic efficiency, integrating accessibility from the initial design could dramatically change the daily experience of thousands. Imagine a hospital where an elderly person doesn't get lost in labyrinthine corridors thanks to intuitive signs, or a construction site where workers with cognitive limitations immediately grasp risks through clear icons. This is not utopia; recent studies support it and show viable paths. Moreover, in a post-pandemic world, where equity has taken on new relevance, ignoring these tools would be a step backwards. The author, from his experience in civil engineering, has seen how projects that prioritize inclusion not only comply with regulations, but also generate a positive impact on social cohesion, making cities more livable for all.

The text is organized logically: first, the methodology used for the review is detailed; then, the central theme is developed with subsections that group specific advances; this is followed by an in-depth discussion of practical and theoretical implications; and it closes with conclusions that include proposals for the future. By varying the angles of analysis, from health to road and urban areas, the aim is to provide a holistic view that will motivate engineers, urban planners and policy makers to act with urgency. This structure allows not only to inform, but to inspire real changes in how public works are conceived, ensuring that communication literacy is a pillar in the construction of equitable societies.

Method

For this comprehensive analysis, a systematic literature review was chosen, a method that acts as a detailed map to classify and synthesize pivotal studies on accessible signage and augmentative communication. Consolidated approaches were used as a basis, such as the systematic mapping proposed by Prandi et al. (2023), which catalogs innovative solutions for inclusive navigation in digital and physical environments. This approach allows not only to collect data, but also to identify emerging patterns and gaps in current research.

The process began with searches of reputable academic databases, covering publications from 2021 to 2025, a key period for post-pandemic developments. Terms such as "accessible signage", "augmentative communication", "inclusive designs in public works" and "urban communicative literacy" were focused on, combined with filters for specific environments such as hospitals, construction and emergencies. This generated an initial universe of hundreds of articles, which was filtered by strict criteria: thematic relevance, presence of empirical data and practical application to inclusive cities. Purely speculative texts

or those without experimental validation were excluded, prioritizing research with robust quantitative and qualitative methods.

From this filtering emerged a selection of 25 key references, each broken down to extract essential elements: executive summaries, main findings, methodologies employed and practical recommendations. These were grouped into thematic categories, such as designs targeted to older adults, applications in crisis contexts, and use of technologies such as eye tracking to measure visual attention (Fang et al., 2022). Qualitative techniques, such as thematic content analysis, were applied to detect recurring trends, for example, the preponderance of color and shape in signal optimization. In addition, interdisciplinary perspectives were incorporated, merging civil engineering with cognitive psychology and universal design to enrich the landscape.

The author, from his experience in urban projects, appreciates how this methodology unites dispersed fragments of knowledge, revealing notorious gaps, such as the scarce representation of studies in Latin American regions. For example, while Europe and Asia lead in hospital innovations, Latin America could benefit from local adaptations that take into account cultural diversity. To ensure rigor, data were cross-checked between sources, validating consistencies and resolving discrepancies through narrative synthesis. The result is not a mere summary; it is an actionable compendium that proposes concrete applications for public works in contexts such as Panama's, where inclusion is often left to the end. This review, therefore, serves as a bridge between theory and practice, fostering a communicative literacy that transforms cities into equitable and sustainable spaces.

Development

This section delves into the key developments in accessible signage and augmentative communication, structured in subsections to facilitate understanding and maintain a logical flow that leaves no loose ends. Each subsection groups related studies, connecting theoretical designs with actual implementations in public works, allowing us to see how these tools intertwine to promote more equitable and empathetic cities.

The author believes that this division not only clarifies complex ideas, but also highlights the transformative potential of these practices, where a simple pictogram or tactile sign can change the daily experience of someone with a disability. From a personal perspective, in urban projects such as those in Panama, where cultural diversity clashes with obsolete infrastructures, integrating these elements from the outset avoids unnecessary exclusions and fosters a communicative literacy that flows naturally. By expanding each part with empirical details and variations in the analysis, the discussion is enriched, ensuring that the reader grasps the multidimensionality of the topic: it is not just about posters, but about bridges that bring people together in inclusive environments. This invites reflection on how, in a fast-paced world, these innovations could make cities not divide, but unite.

Signage designs for older adults in hospital settings

We started with hospital designs focused on older adults, a vulnerable group where signs must be not only visible, but instinctively understandable to prevent disorientation that could lead to stress or even accidents. Wu et al. (2022) develop a framework based on situated cognition and cognitive frequency, arguing that effective cues should be anchored in everyday scenarios that resonate with the user. For example, incorporating graphics that depict common physical and social situations, such as a hallway with people interacting, boosts comprehension rates by an impressive 60% for optimized designs, according to tests with real participants. This implies that, instead of abstract texts, signs should evoke familiar experiences, reducing the mental load in already overwhelming environments.

Deng et al. (2024) delve into the perceptions of elderly users in tertiary hospitals in Guangzhou, revealing through qualitative surveys that legibility and light contrast are decisive

factors in fostering confidence and autonomy. Their findings indicate that signs with regional cultural touches, such as icons inspired by local traditions, not only improve orientation, but also generate a sense of belonging, mitigating the alienation common in impersonal medical spaces. In a complementary manner, Deng et al. (2023) apply the Kano model to break down usability requirements: they identify four mandatory attributes, such as clear departmental guidelines, and twelve appealing ones, including digital interactive elements that, although not essential, raise overall satisfaction. The author assumes that this underlines a valuable lesson for public works: integrating cultural elements is not a luxury, but a necessity to make signs feel close and not distant, avoiding the appearance of mere functional ornaments.

Zhang et al. (2024) bring an experimental angle to the topic, focusing on universal design for low vision among the elderly. Their tests in simulated laboratories show that a minimum size equivalent to 7% of the reading distance, combined with high contrast, significantly shortens response times, particularly in environments with variable illumination. This is crucial in hospitals, where poorly lit corridors can exacerbate visual problems, and suggests direct applications in public works such as subway stations or parks, where visual accessibility bridges distances. The author, reflecting on local projects, notes that in Panama, where the population is aging rapidly, adopting these principles could transform obsolete infrastructures into models of inclusion, preventing inadvertent exclusion.

Before introducing the first table, it is worth explaining its purpose: this comparative summarizes theoretical frameworks and empirical findings from key studies on hospital signage for older adults, highlighting developments and convergences that guide practical recommendations. Grouping data in this way facilitates the visualization of patterns, such as the recurring emphasis on contextual legibility, which helps urban planners prioritize interventions.

TABLE 1

Comparison of hospital signage designs for seniors

Study	Main frame	Key findings	Recommendations
Wu et al. (2022)	Situated cognition	Improved comprehension with concrete graphics by 60%	Include social and physical situations in designs to anchor in real-life experiences
Deng et al. (2024)	User perceptions via surveys	Legibility and light contrast enhance confidence; key regional cultural elements	Adapting signs to local contexts to foster a sense of belonging
Deng et al. (2023)	Kano model for requirements classification	4 mandatory attributes (e.g. departmental guides), 12 attractions (e.g. digital)	Prioritizing the basics before adding innovations to maximize impact
Zhang et al. (2024)	Experimental universal design for low vision	Minimum size 7% distance, high contrast reduces response times	Combining text with images in variable environments for broad accessibility

This table clearly illustrates that, despite methodological variations, there is a consensus in emphasizing adapted readability and cultural context, which minimizes confusion in complex settings such as hospitals. The author notes that these data could be extended to urban public works, where similar signs would reduce exclusions and promote smooth navigation, strengthening communicative literacy in everyday life.

Accessible signage for people with low vision

Turning to people with low vision, Zhang et al. (2024) experiment with sizes and contrasts, recommending at least 7% of the reading distance for legibility. In virtual simulations, high contrast reduces response times, especially at small sizes. This is vital in road works, where temporary signs must be visible to all.

Arias-Flores et al. (2024) evaluate accessibility in Ecuador, finding only 44% compliance, suggesting technologies for improvement. The author believes this data highlights the gap between theory and practice, urging public works to incorporate universal designs from the outset.

Applications in emergency and pandemic contexts

In emergencies such as Covid-19, Kalocsányiová et al. (2021) analyze linguistic landscapes in London, noting inequalities: deprived areas have fewer signs, exacerbating exclusions. Mulyawan & Artawa (2021) study signs in Balinese hotels, where strategic placement and colorful graphics reinforce hygiene. Wibirama et al. (2021) propose gaze-controlled signs for health education. The author believes that in pandemic public works, multilingual and pictorial signs save lives by communicating without words.

Construction site safety

Construction safety relies heavily on signals that instantly capture attention, reducing risks in chaotic environments. Gungor (2023) assesses comprehension among industrial employees, finding that clear pictograms improve retention by 40%, using cognitive tests. Fang et al. (2022) employ eye tracking to show that red colors and rectangular shapes minimize cognitive load, with quantitative data on visual fixations. Hu et al. (2022) measure impacts on error control, proving that high-danger signals intensify vigilance. Akcay (2022) and Cheng et al. (2022) review similar studies, confirming that this technology pinpoints vulnerabilities, while Dong et al. (2024) show that text-pictogram combinations accelerate comprehension by 30%.

Before the table, this comparison highlights visual influences on construction signs, grouping technologies and impacts to guide practical designs in public works.

TABLE 2

Influence of features on visual attention in construction signs

Study	Technology	Key features	Impact on care
Fang et al. (2022)	Eye tracking	Red color, rectangular shape	Reduces cognitive load by 25%, accelerates fixation
Akcay (2022)	Mobile eye tracking	Identification of sources of hazards on site	Improved safety training effectiveness in 35%
Cheng et al. (2022)	Systematic review of studies	Fixation and duration indicators	Influences personal experience, optimizes for novices
Dong et al. (2024)	Stationary eye tracking	Text combined with pictograms	Accelerates overall comprehension by 30%

This table clarifies how visual features optimize attention, lowering risks. The author considers that, in public works, this would turn dangerous areas into safe ones, nurturing communicative labor literacy.

Pictograms on urban maps and tourism

Pictograms on urban maps represent an evolution in signage, especially for tourists seeking to orient themselves in unfamiliar environments without relying excessively on text. Kovačević et al. (2024) conducted extensive tests with pictograms designed for specific visitor needs, demonstrating that simple, culturally adapted symbols achieve 85% comprehension accuracy in diverse groups. For example, on maps of European cities, icons representing attractions such as monuments or pedestrian routes not only facilitate navigation, but also reduce search times by 40%, according to experiments with real users. This highlights how, in public works such as urban parks or tourist circuits, pictograms act as linguistic bridges, overcoming language barriers and making the experience more intuitive.

The author believes that in contexts like Panama, where tourism is growing but often ignores diversity, incorporating local pictograms inspired by folklore or geography could revitalize economic sectors without excluding anyone. Imagine a map of the capital city with icons evoking the Canal or indigenous markets, not only guiding, but educating culturally. In addition, these designs encourage inclusion by considering cognitive variations, as in tourists with dyslexia, where simple geometric shapes overcome complex texts. From a personal point of view, the author has noticed in road projects how poorly adapted pictograms generate confusion, and believes that expanding their use in urban maps would transform cities into

accessible destinations, enhancing tourist communication literacy. This not only attracts more visitors, but also strengthens local identity, making public works more than infrastructure: true inclusive narratives.

Mistakes and optimization in road signage

In the road field, errors in signage can lead to serious accidents, but its optimization offers practical solutions for dynamic environments. Pashkevich & Bartusiak (2025) evaluate failures in large construction sites through naturalistic driving studies, finding that 36% of signs are redundant or confusing, distracting drivers and increasing risks by 25%. Its recommendations include reducing the density of indications, prioritizing clear and sequential messages, which, in simulated tests, reduced interpretation errors by 50%. This is crucial in public road works, where temporary signs often overwhelm, and suggests iterative review protocols to eliminate redundancies.

The author assumes that in regions such as Latin America, where traffic chaos exacerbates problems, optimizing signage not only saves lives, but also speeds up traffic flows. For example, in Panama, roads with excessive signage generate traffic jams; simplifying them, inspired by these studies, could improve efficiency. In addition, integrating feedback from real users detects cultural errors, such as ambiguous symbols. From his own perspective, the author has seen in inspections how simple optimizations transform dangerous roads into safe ones, fostering road communication literacy that educates drivers without overloading them. This implies policies that vary approaches, combining technology such as sensors for dynamic signals, reducing errors and promoting inclusion in daily mobility.

Inclusion, diversity and equity frameworks in the built environment

Inclusion, diversity, equity and accessibility (IDEA) frameworks emerge as essential guidelines for shaping built environments that leave no one out, ensuring that public works avoid exclusion from their very conception. Zallio & Clarkson (2022) present an IDEA audit that assesses universal accessibility comprehensively, demonstrating in case studies how such interventions can raise user satisfaction by 45%, measuring not only physical aspects such as ramps or contrasts, but also cultural and gender dimensions that often go unnoticed.

This tool proposes a structured framework that integrates step-by-step audits, from gap identification to solution implementation, which is key in urban projects where human diversity is as varied as the streets themselves. Zallio et al. (2024) extend this approach with specific case studies, where building audits reveal gaps in minority representation, suggesting checklists that incorporate marginalized voices from the initial planning phase, fostering not only legal compliance, but a true sense of belonging. This is particularly relevant in public works, where cultural diversity is often overlooked, and proposes flexible frameworks that adapt to local contexts, preventing generic designs from perpetuating inequalities.

The author believes that, in Panama, applying these IDEA frameworks could revolutionize projects that today seem exclusive, considering phenomena such as massive migrations or indigenous ethnicities that enrich the social fabric. For example, an audit could incorporate native symbols into park or station signage, fostering an equity that goes beyond the physical and touches on the cultural, making common spaces feel welcoming to all. From a personal viewpoint, the author has observed in field inspections how the lack of diversity in designs generates subtle alienation, such as when a public building ignores the needs of communities of African descent, and believes that these frameworks humanize cities, strengthening social cohesion by varying approaches ranging from gender equity to age inclusion.

Expanding its use implies an interdisciplinary collaboration between engineers, sociologists and communities, varying the vocabulary to cover not only technical accessibility, but emotional equity, ensuring that the works are not only functional, but sustainable over time. Imagine a future where IDEA audits become standard, transforming cities into places where

diversity is not a challenge, but a strength that nurtures daily coexistence. In the end, these frameworks are not mere checklists; they are a commitment to fairer societies, where no one feels like an outsider in his or her own city.

Augmentative communication for specific disabilities

Augmentative and alternative communication (AAC) ingeniously adapts to specific disabilities, providing ways for people with speech or vision limitations to express ideas in public settings without feeling isolated. Wilkinson et al. (2023) develop evidence-based approaches for individuals with cortical visual impairments, incorporating tactile and auditory symbols that elevate interaction by 60%, according to detailed clinical tests that measure not only comprehension, but also emotional confidence. This is key in public works such as hospitals or schools, where a simple tactile pictogram board can transform a frustrating experience into an empowering one, preventing someone from being marginalized for not being able to "speak" in a conventional way.

Brock et al. (2022) examine the impact of symbolic formats and psycholinguistic features on receptive syntax, finding that these elements positively influence children without disabilities, but with potential extensibility to autistic spectrums, where personalization makes a difference. Pope & Light (2025) delve into comparisons between textual and pictorial representations for children on the autism spectrum, demonstrating that pictorial symbols accelerate learning by 35%, emphasizing the need for tailored designs that consider individual preferences to maximize effectiveness. Johnson et al. (2024) explore children's preferences for graphic symbols representing pain-related words, revealing that simple, relatable graphics are preferred over abstract ones, suggesting that, in pediatric contexts, such as playgrounds or educational centers, these icons may soothe anxieties and facilitate communication.

The author believes that, in public works such as schools or plazas, CSA empowers children with disabilities, extending communicative literacy to levels beyond the verbal. In Panama, where resources for these tools are scarce in rural areas, adapting these systems could revolutionize educational spaces, making an autistic child feel part of the group without extra effort. From his experience, the author notes how the lack of CSA unnecessarily marginalizes, generating barriers that collapse with simple innovations, and believes that expanding its use not only fosters inclusion, but also strengthens more empathetic societies, varying designs to meet specific needs such as visual or cognitive. Imagine scenarios where tablets with personalized symbols are integrated into bus stations, allowing users with aphasia to call for help without words. This implies a greater commitment to diversity, where communication ceases to be an obstacle and becomes a bridge, nurturing cities where everyone can "speak" in their own way.

Public transportation accessibility

Accessibility in public transportation represents a fundamental pillar for inclusive mobility, where adapted signals eliminate everyday barriers that often marginalize people with disabilities. Warchoł-Jakubowska et al. (2024) conducted a detailed study in Warsaw, highlighting how tactile guides and Braille signs increase use by the disabled by 50%, based on comprehensive city audits that measure not only regulatory compliance, but actual impact on independence. They found that multimodal integration - combining visual, auditory and tactile elements - significantly reduces exclusions by proposing unified standards for stations and vehicles that include universal pictograms and synchronized audio announcements. This is especially relevant in public works such as subway systems or buses, where well-thought-out accessibility transforms daily routines from frustrating to seamless, allowing everyone from the blind to people with reduced mobility to navigate without excessive dependence.

The author believes that, in Panama, where public transport is often chaotic and ill-adapted, adopting these approaches would greatly enhance social equity. For instance, implementing tactile signs at bus stops or automatic ramps on buses would not only help blind

people, but would also foster an empowering independence, preventing the city from appearing hostile. From his own perspective, the author has seen in field inspections how the lack of accessibility marginalizes entire groups, generating not only inefficiencies, but profound inequalities that could be mitigated with modest investments. He believes that expanding this humanizes cities, varying approaches to embrace cultural diversity - such as multilingual signs in indigenous areas - and promoting a communicative mobility literacy that makes transportation a right, not a privilege. Imagine a system where integrated apps complement physical signals, guiding in real time with voice or vibration, reducing confusion and strengthening community cohesion. In essence, this not only complies with laws, but builds more empathetic societies, where no one is left behind because of physical limitations.

Emerging technologies for evacuation and space signals

Emerging technologies are revolutionizing the way evacuations are handled in urban environments, with spatial cues that optimize responses during crises, making information flow more intuitively and quickly. Fan et al. (2022) delve into the efficiency of transmitting spatial information in safe evacuation signals, proposing three-dimensional designs that adjust angles and perspectives to maximize comprehension. In their experimental simulations, these 3D models manage to reduce response times by 40% by taking into account factors such as visual distance and user orientation, which is especially useful in tall or complex buildings where traditional flat signals often fail due to obstructions or limited perspectives. This not only speeds up the exit process, but also minimizes collective panic by guiding the flow of people in a more natural way, integrating elements such as dynamic lighting or holographic projections that adapt to the movement.

The author believes that integrating these advances into public works would better prepare cities for unpredictable disasters, such as frequent earthquakes in Panama, where confusing escape routes have cost lives in the past. From his experience in civil engineering, the author notes how these technologies not only save lives, but also enhance communication literacy in emergencies by making information accessible without relying on textual reading, varying designs to include people with disabilities or low levels of education. Imagine scenarios where 3D signs are automatically activated via sensors, guiding evacuees with projected arrows that change according to real-time congestion. This implies a shift towards intelligent systems that promote inclusion and sustainability, preventing works from becoming obsolete in the face of growing threats such as climate change. Ultimately, expanding its use would transform evacuations from chaotic to coordinated, strengthening urban resilience with a human touch that prioritizes everyone.

Discussion and conclusions

The findings reveal that accessible signage does not remain static; it adapts to technological advances and changing societal needs. In hospitals, frameworks such as Kano's (Deng et al., 2023) emphasize the fundamentals, but there is a gap in digital integrations that could streamline the experience, especially for seniors with familiar technology. In buildings, eye-tracking (Fang et al., 2022) indicates that red tones are more visually appealing, but what happens in cultures where that color evokes different meanings, such as mourning rather than alertness? The author notes that, in Panama, adapting pictograms to local contexts would not only strengthen inclusion, but also avoid cultural misunderstandings that aggravate risks. This suggests that, beyond global standards, solutions should be molded to regional realities, preventing imported designs from generating unnecessary confusion.

Augmentative communication, with symbols for autism (Pope & Light, 2025), is expanding to urban settings, but inequities in equity persist, such as in poor neighborhoods where signs are scarce (Kalocsányiová et al., 2021). This argues that public works should implement IDEA audits (Zallio et al., 2024) to ensure fairness, demanding policies that diversify

the communicative lexicon: not only fixed signs, but interactive systems that respond to real users. The author assumes that this entails a paradigm shift, where inclusion is not an add-on, but the central axis, varying approaches to embrace ethnic and gender diversity.

Reflecting on gaps, such as the lack of studies in Latin America, there is an urgent need for more regional research that considers socioeconomic contexts, ensuring that innovations do not remain theoretical. In addition, in roadways, optimizations (Pashkevich & Bartusiak, 2025) reduce errors, but integrating emerging technology such as 3D (Fan et al., 2022) could revolutionize evacuations, minimizing panics. From a personal perspective, the author has seen in projects how ignoring equity perpetuates cycles of exclusion, and believes that these frameworks strengthen social cohesion, transforming cities into empathetic and resilient spaces. He thinks that, in a scenario where emergencies such as pandemics or natural disasters become frequent, ignoring these intersections would be a blunder, as signage not only informs, but saves lives by connecting diversities. In sum, the discussion interconnects issues, proposing holistic approaches that enhance universal communicative literacy, closing gaps and fostering sustainability, while varying the vocabulary to range from the technical to the human, ensuring that public works serve all without distinction.

Finally, accessible signage and augmentative communication redefine public works as the foundation of inclusive cities, raising communication literacy to a level where no one is left behind. It is recommended to integrate technologies such as 3D designs (Fan et al., 2022) for efficient evacuations and IDEA audits for equity, ensuring that projects consider diversity from the outset. In the future, more local studies are urgently needed in underrepresented regions, such as Latin America, to adapt innovations to cultural and socioeconomic realities, promoting long-term sustainability.

The author is confident that by prioritizing these elements, metropolises will be built where inclusion is not optional, but inherent, strengthening community ties and empowering all. This not only reduces risks, but cultivates just societies, where public works act as catalysts for positive change, inspiring future generations to build with empathy and holistic vision. Think about how, in an increasingly complex urban landscape, these practices could mitigate persistent inequalities, such as those seen in past pandemics, preparing communities for challenges to come.

From his own perspective, the author has witnessed in the field how small adjustments in signage transform everyday experiences, and believes that expanding this globally would forge a more connected world, where communication transcends barriers and unites diversities. In essence, this approach is not just technical; it is an ethical commitment to humanity, urging policymakers to invest in literacy that lasts, making every public work a step toward true equity. Imagine a future where cities do not divide, but unite, thanks to signals that speak to everyone, fostering a harmonious coexistence that benefits society as a whole.

Conflict of interest

The author declares that he has no conflicts of interest.

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