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Exploring Inclusive Design and Digital Humanities: Enabling Bilingual Digital Narratives for Deaf Children

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Abstract

The collaboration between designers and digital humanists has indeed gained increasing significance in crafting effective projects, with design serving as a centralizing force in the realm of digital humanities by establishing interfaces for individuals to engage with technological resources. Therefore, design's methodological practices, encompassing various research and experiential facets, play a pivotal role in enhancing the usability and accessibility of digital resources within the social sphere. This study aims to expand the discourse on the characteristics and potential of the interplay between inclusive design and digital humanities practices, with a specific focus on the development of bilingual digital narratives (utilizing Brazilian Sign Language and Portuguese). The research adopts a collaborative, qualitative approach, encompassing processes of evaluation, validation, and enhancement. Digital visual narratives are presented as a facilitating tool for integrating LIBRAS and Portuguese, thereby aiding in language acquisition for deaf children. The article contributes to the discussion of the humanistic approach to design, emphasizing the values of empathy, ethics, and social responsibility in the creation of inclusive and accessible projects.

Keywords

Design, technology, education, digital narrative, hearing impairment

Introduction

This paper offers a brief reflection on the correlation between design and digital humanities, a theme that has been driving our discussions and research planning in the field of inclusive design over recent years. The results presented here stem from an interdisciplinary research project that bridges the realms of design and digital humanities. This project's primary goal is to create bilingual digital narratives, encompassing Brazilian Sign Language (LIBRAS) and Portuguese, and catering to both deaf and hearing children.

The work carried out by Portugal (2017 to 2022) during the Productivity Research Scholarship - PQ/CNPq period provides a theoretical foundation for the research presented here. Furthermore, the research conducted during the postdoctoral fellowship at the School of Communication at the Royal College of Art (RCA) in London contributes to this article. This work resulted in the development of a series of books that meticulously present fundamental concepts, studies, and reference material related to design and its complex interaction with technology and other related domains, all in a pedagogical format. These concepts provide a solid foundation for digital humanities projects, as they involve designers deeply engaged in the symbolic representation of language and their crucial role in meaning construction.

The synergy between designers and digital humanists has assumed increasing significance in the creation of effective projects. Design functions as a central element for digital humanities by sculpting interfaces that enable individuals to interact seamlessly with technological resources. Consequently, design's contribution is substantial, given that its methodological practices encompass a spectrum of research and experiential facets that streamline the utilization of digital resources within the social sphere, rendering them more instinctive and accessible.

Aligned with this rationale, this article presents a contemplation of the intrinsic relationship shared by design and digital humanities. It delves into the language development in deaf children and introduces a project centered around visual digital narratives. These narratives serve as a facilitative medium that harmoniously blends two languages, LIBRAS and Portuguese, to aid in language acquisition among deaf children, thus fostering their inclusive integration into society.

Interdisciplinarity between design and digital humanities

The relationship between the fields of design and humanities is of utmost importance for developing projects that address social, cultural, and technological needs. Collaborations between design and humanities can yield innovative and impactful solutions that reflect the complexity of society and human experiences. Moreover, the humanistic approach to design, emphasizing empathy, ethics, and social responsibility, can foster inclusion and diversity in the solutions designed. Through this interaction, projects can be tailored to meet the unique needs and expectations of users, while considering cultural values and meanings.

Authors such as Anne Burdick et al. (2012/2020), Johanna Drucker (2014), Jentery Sayers (2018), Cristina Portugal (2022), among others, advocate for collaboration between design and humanities as an opportunity to design solutions that address contemporary challenges and improve people's quality of life.

The significance of interdisciplinary approaches in design and digital humanities is underscored by the authors mentioned above. They argue that design should draw knowledge and skills from various fields, including computer science, cognitive psychology, media studies, literary theory, art history, and more. Therefore, the relationship between design and digital humanities is fundamental for developing technological solutions that consider the cultural and human dimensions inherent in technology interactions.

Burdick (2012) defines digital humanities as an interdisciplinary field that examines the intersection of technology and culture. It seeks to understand how digital technologies transform the forms of expression, production, and dissemination of knowledge and culture. This approach emphasizes the importance of a critical and reflective outlook that takes into account the social, cultural, political, and ethical dimensions involved in the production and utilization of digital technologies.

Similarly, just as the term "writing" encompasses a broad spectrum of activities, "design" encompasses a range of practices, from everyday tasks to highly specialized domains. Design, in the broader sense, encompasses various facets, from business strategies and "design thinking" methodologies to the "design sciences," including engineering and human-computer interaction, along with cultural criticism and provocative "critical design." Digital humanities

projects closely align with communication, graphic, and visual designers who are concerned with the symbolic representation of language, the graphic expression of concepts, style, and identity.

Burdick (2012) asserts that design can collaborate with the field of digital humanities by bringing a practical and concrete approach to creating interfaces and interactions with digital technologies. Design should not be a mere superficial aesthetic layer on digital products but an integral part of the development process, capable of reflecting on the ethical, cultural, and social issues entwined in their creation. Furthermore, design can enhance the accessibility and comprehensibility of data and information for diverse audiences, crafting innovative solutions that consider user needs and perspectives.

Drucker (2014) adds to these ideas by highlighting how design can create more transparent and accessible interfaces for information, enhance the user experience when interacting with digital data, and communicate complex and abstract information in a clearer, more engaging way. Additionally, design plays a pivotal role in shaping the way information is created, organized, and presented, contributing to a more innovative and user-centric field of digital humanities.

According to Drucker (2014), most information visualizations are acts of interpretation presented visually, not mere representations of the world. Recognizing this, our task is threefold: to study information visualizations to understand their functioning, to question the familiar interfaces that have become habitual, and to consider how to visualize interpretation, serving a humanistic agenda.

The intersection between design and digital humanities is advocated by Portugal (2022), who posits that design should focus on creating tools and experiences that expand human capabilities in thinking, communication, collaboration, and creativity.

Furthermore, the author contends that design is inherently a cultural practice, and culture itself is profoundly influenced by technology. She posits that research in digital humanities offers a robust theoretical and methodological framework for comprehending how technology moulds culture and, reciprocally, how culture shapes technology. This comprehension holds paramount significance for interactive design, a field committed to crafting meaningful and transformative user experiences.

Within the realm of design, a pivotal discourse centers on the imperative of collaboration between designers and digital humanists. Equally critical is the infusion of critical and theoretical perspectives into design practices, enriching user experiences and advancing principles of inclusivity and accessibility in the digital era. Furthermore, the exploration of the application of emerging technologies, such as artificial intelligence and virtual reality, within the domain of digital humanities design, is a subject of paramount importance.

The methodologies embraced by design for the creation of accessible interfaces encompass several key approaches:

- User-centered design, characterized by the active engagement of users throughout the design process, ensuring their needs and experiences are integral considerations from inception.

- Inclusive design, which aspires to devise solutions that cater to the requirements of all users, irrespective of their abilities or limitations.
- Universal design, entailing the creation of solutions universally accessible to everyone, regardless of their abilities or limitations, without necessitating supplementary adaptations.

This article, in particular, will delve into the realm of inclusive design as an overarching approach. Inclusive design seeks to produce products, services, environments, and technologies universally usable by individuals, regardless of their physical, cognitive, or sensory capabilities. Its fundamental aspiration is the removal of barriers, championing accessibility and inclusion for individuals with disabilities and special needs. It vigilantly acknowledges individual disparities and endeavours to ensure parity in addressing the demands of all users. Inclusive design may additionally involve the active participation of individuals with disabilities in the design process, thus ensuring that their perspectives and requirements are conscientiously integrated from the outset.

To initiate the discussion on the interplay between design and digital humanities in crafting visual narratives to aid language acquisition for deaf children, we commence with a succinct examination of language development in children is presented below.

A Brief Reflection on Language Development in Deaf Children

Understanding the social development of the human mind necessitates an exploration of the intricate relationship between thought and language during a child's intellectual development. Vygotsky (1987) proposed the analysis of this relationship in discrete units, culminating in the assertion that the word's meaning constitutes the fundamental unit of both thought and language. The significance of a word is pivotal in constructing a line of reasoning, and language provides the means to articulate it. This relationship between thought and word is reciprocal, with words serving thoughts and thoughts informing words. The developmental journey of thought and language occurs at distinct paces, permitting the gradual evolution of word meanings in response to experiences and varying situations throughout the learning process. As a child progresses, they begin by associating two or three words with the tangible attributes of an object, progressively distinguishing the object from its properties.

The pre-linguistic phase corresponds to a stage in cognitive development, analogous to the pre-intellectual phase in language development. In the pre-linguistic phase, children lack the linguistic means to convey their thoughts but communicate their needs through affective expressions, such as crying or pointing. Upon acquiring language, their thinking matures, enabling them to consciously differentiate meanings and attribute them precisely to express their thoughts.

Language serves as a tool for individuals to imbue meaning into objects, orient themselves in time and space, and establish their role as agents in society. Language offers diverse modes of expression, encompassing thought, oral and gestural speech, and writing. While oral speech adheres to its unique rules and norms, it is in writing that language achieves its most intricate and comprehensive structure. Thought serves as the precursor to both spoken and written language, yet it can remain confined to the inner realm, inaccessible to the external world.

In Vygotsky's research involving groups of children, he observed that the gestures children employ when expressing themselves constitute the initial indicators of future writing abilities. Children establish associations between their gestures and the ideas they wish to convey, a phenomenon also evident in children's drawings. Language acquisition signifies gaining access to the world and the capacity to cultivate intellectual and symbolic proficiencies, thereby empowering individuals to master their intentions and articulate their thoughts.

Concerning the education of deaf individuals, two primary educational approaches emerge: restricted oralism, emphasizing the teaching of oral language through lip-reading akin to hearing individuals, and gesturalism, advocating the early teaching of sign language to facilitate the development of deaf children. According to Lacerda (1998), deaf education traces its roots back to the sixteenth century in Spain. However, before 1750, deaf individuals exhibited limited literacy and minimal opportunities within the job market. The first school for the deaf was founded in France in 1756. In 1880, during the World Congress of the Deaf in Milan, the oralist approach was adopted, effectively banning sign language in deaf schools. Sacks (1998) concluded in "Seeing Voices" that deaf individuals exhibit a natural inclination toward sign language rather than speech, with sign language proficiency requiring dedicated teaching and years of practice.

The crucial aspect to emphasize is that profoundly deaf individuals demonstrate no innate predisposition towards spoken language acquisition. Speaking is a skill that necessitates explicit instruction and years of effort. In contrast, they exhibit an immediate and pronounced inclination toward sign language. Sign language, being a visual language, is inherently accessible to this population (Sacks, 1998).

This text outlines the historical evolution of deaf education, highlighting the period during which oralism predominated, suppressing the use of sign language. It wasn't until 1971 that sign language regained recognition, with 1975 marking the acknowledgment that oralism did not adequately address the educational and societal inclusion needs of deaf individuals. In 1981, research led to the adoption of bilingual pedagogy, advocating the teaching of sign language as a foundational step, followed by instruction in the local written language. In Brazil, the National Institute of Deaf Education (INES, 1988) espouses bilingualism as its educational philosophy. It's worth underscoring that sign language possesses its own linguistic structure, necessitating early instruction for deaf children to facilitate cognitive development.

For a deaf child, the acquisition of two languages is pivotal for integration into society. Despite Brazilian Sign Language (LIBRAS) being recognized as Brazil's second official language, its instruction remains largely confined to specialized schools. This persists despite legal provisions for the inclusion of deaf individuals in mainstream educational institutions. The dearth of educational materials designed to teach both languages poses a challenge to educators, who frequently resort to inventive techniques, such as comics amalgamating LIBRAS and written Portuguese. Moreover, the absence of educational resources tailored to the specific needs of deaf children, particularly those demanding intense visual stimulation, presents another obstacle. It is imperative that deaf children encounter their native language and the associated socio- cultural values, with mothers playing a pivotal role in nurturing a child's initial discoveries of the world and linguistic development. In households where parents are hearing and the child is deaf, the absence of visual stimulation can impede the child's development, relegating them

to rudimentary gestural communication. Ideally, hearing parents should acquire proficiency in Brazilian Sign Language (LIBRAS) and actively engage in visually stimulating activities during the child's critical phase of visuospatial language acquisition.

The following steps will be presented for the development of the bilingual story project, which aimed to assist in the language acquisition process for deaf children.

Steps for the creation of bilingual digital stories

Our research followed a structured process for the creation of bilingual digital stories:

1st Stage: Bibliographic and Documentary Research We began with an extensive review of sources to establish the theoretical foundations of our project. Our goal was to explore the relationship between contemporary digital technologies in education and the user experience. We aimed to contribute to the advancement of knowledge in this field by addressing questions related to designing interactive systems for meaningful experiences. We also sought to understand the real experiences of the agents involved and the dynamic between these agents.

2nd Stage: Definition of Visual Identity Understanding our target audience was paramount. We conducted an analysis that considered their visual preferences, age group, and specific characteristics. Based on this analysis, we developed an attractive and cohesive visual identity for our platform. This included decisions regarding color schemes, typography, icons, and the selection of appropriate images.

3rd Stage: Visual Story Creation This phase involved the development of the story's visual elements. We crafted the storyboard, characters, illustrations, scenes, animations, and the layout of story screens. All of these elements were created using defined media.

4th Stage: Development of Interactive Features Our next step was identifying and planning the interactive features that would be integrated into the platform. These features encompassed animations, videos, text, sound design, and narration. Our design approach ensured that these features promoted active participation by both deaf and hearing children, with a strong focus on accessibility and user-friendliness.

5th Stage: Prototype Development We tackled issues related to presenting information in a non-linear manner, such as utilizing hypertext in a structure of semantically linked nodes. This approach offered multiple alternatives for navigation and interaction. During this phase, we established high-level requirements for the platform and created wireframes and accessibility interaction elements.

6th Stage: Usability Testing and Optimization To ensure a user-centric design and a seamless user experience, we conducted rigorous usability tests with our target audience. These tests identified potential issues and provided valuable feedback. Based on this feedback, we made improvements and optimizations to the platform. Continuous monitoring and analysis of performance were essential to ensure its proper functioning.

Adopting the steps mentioned above and based on the Social Design Principles by Margolin (2004) we created a digital book for deaf and hearing children. The authors emphasize the

primary objective of social design as "the satisfaction of human needs, especially those of individuals with low income or specific needs related to age, health, or disability" (2004, p. 44).

This proposal for a social action model in the design field underscores the importance of qualities such as empathy, active listening, and collaboration. It advocates for the involvement of clients, users, and communities in co-creating solutions that truly cater to their unique needs, rather than imposing designs that might not align with their aspirations.

Margolin (2004) suggests that designers must comprehend the dynamics and interactions among all stakeholders involved in a project, as well as the environment in which these interactions occur. This comprehensive understanding defines a system, and the entire design process should be collaborative. These principles have been fundamental in our efforts to create digital stories for deaf and hearing children, which constitute the focus of this study.

Inclusive visual narratives for deaf and hearing children

The convergence of design, digital humanities, and visual storytelling is pivotal to the development of inclusive educational materials for deaf children. Through the creation of interactive stories that utilize both Brazilian Sign Language (LIBRAS) and written Portuguese, we can provide a more enriching and meaningful learning experience for these young learners. According to Lupton (2020), design elements such as typography, color, layout, and imagery serve as potent tools for conveying messages and narratives in a clear and impactful manner. She also contends that design is, in essence, a form of "storytelling" with a structure akin to traditional narratives—beginning with a problem, navigating through conflict, and culminating in a solution. This perspective underscores that design goes beyond aesthetics; it's about how messages are communicated and how they resonate with the audience.

Hence, Lupton's (2020) notion of design as a form of visual communication that narrates stories and delivers messages clearly and effectively becomes particularly relevant. Design is a powerful instrument for breaking down communication barriers, rendering information more accessible and inclusive. It should aspire to be inclusive and accessible to all, including those who are deaf. Design can transcend language barriers and enhance the understanding of information for individuals who communicate differently.

The amalgamation of design, digital humanities, and the creation of visual narratives stands as a cornerstone in crafting accessible educational materials for deaf children. The development of interactive stories, complete with illustrations and animations that incorporate LIBRAS and written Portuguese, holds the potential to offer a more engaging and impactful learning journey for these children.

Digital technology has paved the way for innovative forms of visual narratives that transcend traditional media like cinema and television. These digital narratives empower viewers to actively engage with the storyline. For instance, in video games, players take on an active role in shaping the narrative, making decisions that influence its course. Digital visual narratives exhibit distinctive features, such as the capacity to manipulate timelines, enabling users to navigate backward and forward within the story. Furthermore, these narratives seamlessly integrate various media elements, including text, images, sound, and video.

Digital visual narratives introduce the concept of immersive virtual worlds, inviting viewers to explore and enhance their narrative experiences. These virtual realms can serve both entertainment and educational purposes, particularly in bilingual education by facilitating the simultaneous presentation of LIBRAS and written Portuguese.

Language acquisition is paramount, as it serves as the foundation for organizing thoughts and active participation in society. In Brazil, a significant challenge in bilingual literacy education for deaf individuals is the simultaneous teaching of LIBRAS and written Portuguese. By leveraging visual and interactive resources, we can capture children's attention, enhance comprehension, and facilitate the assimilation of content. Additionally, digital technologies offer the potential to broaden access and distribution of these materials, reaching a wider audience and expanding their societal impact.

Through the application of inclusive and user-centered design methodologies, as well as interdisciplinary collaboration, we can develop educational materials tailored to the unique needs of deaf children. These materials play a crucial role in fostering their integration and inclusion in society.

The journey to support language acquisition for deaf children commenced with the project titled "Design and Contemporary Digital Technologies Applied to the Development of Interactive Digital Books for Deaf and Hearing Children," which received recognition from the National Council for Scientific and Technological Development. This initiative aims to create digital books for deaf children, presented in illustrated and animated formats, with a special emphasis on LIBRAS, considering its predominantly visual-spatial nature. As we evaluate the results of this project, it becomes evident that there is a pressing need to develop, systematize, and implement a digital platform for managing, collecting, and distributing these stories. The creation of stories designed for this project will soon be accessible through an inclusive digital platform.

Figure1: Prototype of the first story called Ana e José. Source: authors archive.

https://www.youtube.com/watch?v=1fTZtjmtt9g,

Testing Bilingual Digital Books: Enhancing the Project for Deaf and Hearing Children]

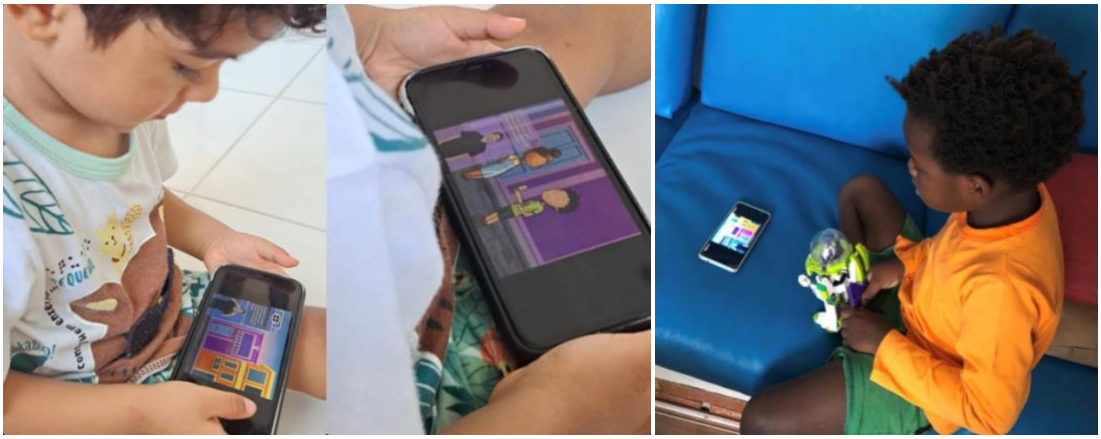

Figure 2: Deaf and hearing children reading the book Ana e José a story of friendship. Source: authors archive.

To enhance our project's efficacy, we conducted tests involving two groups of children: one comprising five deaf children and another of five hearing children, all aged between 5 and 7 years old. Observing how these children interacted with the bilingual digital book was a crucial step in gaining insights to inform future improvements.

During the tests, we provided the children with access to the digital book and closely observed their reactions and behaviours. Here are some valuable insights we extracted:

- Engagement and Interest: We assessed the level of engagement and interest shown by the children in the book's content. This involved measuring the time they spent reading, identifying enthusiasm while exploring the pages, and noting if they asked questions about the story.
- Ease of Use: We evaluated how easily the children could navigate the digital book. This encompassed their ability to flip through pages, interact with elements, and utilize features like audio and animations.
- Comprehension of Content: We verified the children's comprehension of the story and its key concepts. This included asking questions to ensure they grasped the narrative's core points.
- Design Feedback: We collected feedback from the children regarding the overall design of the digital book. This encompassed visual aesthetics, the quality of illustrations and animations, and any confusing or challenging aspects encountered.
- Interaction with Bilingual Resources: We observed how both deaf and hearing children interacted with the bilingual resources, including the transition between LIBRAS and Portuguese. Our aim was to understand how these resources contributed to their understanding of the story.

Based on the observations and feedback gathered during the tests, we are better equipped to make improvements to the project. This may involve adjustments to the user interface,

narrative structure, the presentation of bilingual resources, or any other areas that can enhance the children's experience with the bilingual digital book.

These tests with children aged 5 to 7 years play a pivotal role in the development process, ensuring that the project aligns with the needs and expectations of the target audience. This approach facilitates an engaging and effective learning experience, underscoring the importance of a user-centred approach in designing educational resources for both deaf and hearing children.

Through our research, we identified that bilingual stories in LIBRAS and Portuguese have yielded significant benefits, including language development, visual stimuli, contextualized learning, and enhanced accessibility.

Building upon this work, we have developed an instrument that allows deaf children to engage in interactive stories via a tablet or smartphone application. These narratives are presented using diverse media: sounds, images, texts, and videos. This enables deaf children to associate LIBRAS with images and text while sharing the experience with their hearing peers, who can enjoy the auditory aspects, such as music and narration.

Bilingual digital stories play a pivotal role in supporting language development for deaf children in both LIBRAS and Portuguese. They provide a visual and gestural representation of words and phrases, simplifying language comprehension and acquisition. Visual elements, including images and animations, captivate the attention of deaf children and aid in content understanding—highlighting the role of visual communication in Deaf culture.

Moreover, these stories depict everyday scenarios where language is used, helping deaf children grasp word and phrase applications in various contexts. This adaptability ensures personalized and accessible learning, making these stories an excellent complement to formal LIBRAS and Portuguese education.

In conclusion, bilingual digital stories can significantly contribute to the acquisition of LIBRAS and Portuguese by deaf children. Their visual and contextualized approach to language learning offers numerous benefits, as evidenced by our research. Our studies have highlighted key guidelines for integrating LIBRAS and Portuguese:

- Narrative Bilingualism: Include both Brazilian Sign Language (LIBRAS) and Portuguese to foster proficiency in both languages.
- Visual and Textual Integration: Combine visual and textual elements, such as illustrations, animations, and subtitles in Portuguese and LIBRAS, to enhance understanding and reinforce learning.
- Accessibility Focus: Develop narratives with accessibility in mind, ensuring they cater to the needs of deaf children who use hearing aids or support technologies.
- Culturally Relevant Content: Include themes and stories that resonate with the cultural experiences of deaf children, promoting identity and self-esteem.
- Interactivity: Incorporate interactive elements to sustain the interest and engagement of deaf children, such as educational games and interactive activities tailored to the target audience's preferences.

Inclusive design plays a pivotal role in ensuring that educational materials cater to the needs of all users, including those with disabilities. For children, especially those with hearing impairments, inclusive design can significantly enhance the accessibility and usability of educational materials, making the learning process more effective and enjoyable. As such, it is crucial to critically reflect on the role of design in crafting accessible and inclusive visual narratives for deaf children, with the goal of promoting equal opportunities and fostering the full development of their language.

Sacks (1998) emphasizes the vital importance of integrating deaf children into society by providing them access to sign language, a natural, visual, and spatial language. This inclusion empowers them to participate in deaf communities, communicate freely, and cultivate a positive cultural identity, rather than being compelled to conform to dominant cultural standards or facing isolation and exclusion. For Sacks, sign language isn't just a means of communication; it's a rich form of expression and thought that allows deaf children to convey their ideas and emotions comprehensively.

Visual narratives play a pivotal role in the language development of deaf children as they facilitate the construction of a visual repertoire and the comprehension of abstract concepts in a more concrete manner. As Quadros (1997) notes, images, just like writing, are a language and therefore can be used as a tool to enhance communication between the deaf and society in general. Additionally, the use of images fosters the attribution of meanings and enriches the understanding of the world, enabling deaf children to enjoy a more diverse and enriched experience.

Based on the studies conducted during this research on the creation of bilingual stories to develop effective visual narratives, Portugal (2022) emphasizes the following considerations:

- Integration: Visual narratives should seamlessly incorporate various visual elements like images, graphics, animations, and text to create a cohesive and harmonious visual experience.
- Sequencing: Visual narratives should follow a logical sequence of events, ensuring that the story is comprehensible to viewers. The narrative rhythm should also be considered to maintain viewer interest and attention.
- Hypertextuality: Visual narratives should offer viewers access to additional information about the story through hyperlinks or other connections, enhancing the overall narrative experience.
- Multimodality: Visual narratives should incorporate a variety of multimodal elements, including sound, music, and sound effects, to create a more immersive sensory experience.
- Participation: Visual narratives should empower viewers to actively engage with the story, allowing them to interact with the narrative in various ways, such as making choices, voting, or contributing to the story's development.

In light of these considerations, it becomes essential to explore novel approaches to design, as highlighted by Manzini (2004) in the context of a "fluid world." In such a world, where products, services, and information converge to generate unprecedented design possibilities, designers

must adapt their professional profile to become facilitators within a network. Their role shifts to that of providers of the innovation process rather than direct executors.

Manzini (2004) underscores that designers, with their creativity and communication skills, can play a crucial role in promoting high levels of social participation. These ideas align seamlessly with the concept of designing for digital humanities projects, where designers act as enablers and collaborators within complex networks, driving innovation and social impact.

Conclusion

The intersection of design and humanities is crucial for creating projects that respond to social, cultural, and technological needs. A collaboration between the two fields can result in innovative solutions that reflect the complexities of society and human experiences. A humanistic approach in design values empathy, ethics, and social responsibility, promoting inclusion and diversity in the projects created. This interaction can lead to projects that cater to the unique needs and expectations of users while considering their cultural values and meanings. Collaboration between designers and digital humanists has become increasingly important to create effective projects that enable people to interact with technology through design interfaces. Design practices encompass a set of research and experiences that make digital resources more intuitive and accessible in the social sphere.
The relevance of the interrelation between design and digital humanities in the creation of visual narratives becomes relevant because digital humanities seek not only to explore technological potential, but also to question and problematize its uses and effects on society.

Technologies have been blamed for various social, economic, and ecological problems. However, new technologies create forms of social action and organization when accepted by the culture in which they are inserted. Design, classified as material and immaterial culture of societies, interferes in our environment and, therefore, it is necessary to reflect, study, and understand this field of action and research.

Currently, there has been a growing interest in the area of deafness, especially among linguist researchers, educators, psychologists, among others, since this theme constitutes a fertile field for discussions. Research brings the designer to this universe of investigation, and their participation is given through instruments specific to their field of expertise. The stories do not aim exclusively to provide narratives to assist in language acquisition by deaf children. The project has a broader purpose. In it, images and illustrations are used to awaken curiosity and the senses, attributing meaning and stimulating the understanding of the world, of the universe of each story. The texts, presented with illustrations and images, are capable of enchanting children with colours and shapes, stimulating imagination and creativity, and arousing interest in juvenile literature.

Based on the research conducted, it was possible to identify those bilingual stories in Libras and Portuguese for deaf children generated some benefits, such as language development, visual stimuli, contextualized learning, accessibility in support of learning.

Bilingual digital stories can help deaf children develop their language skills, both in Libras and in Portuguese, because these stories provide a visual and gestural representation of words and phrases, which facilitates language comprehension and acquisition.

By often including visual elements such as images and animations, these materials can capture the attention of deaf children and improve their understanding of the content. This is especially important because visual communication plays a key role in Deaf culture.

Bilingual digital stories can also present everyday situations in which language is used, helping deaf children understand how words and phrases are applied in different contexts, as well as allowing adaptations to meet the individual needs of deaf children, such as speed presentation of content or repetition of information. This makes learning more accessible and personalized.

Digital stories can be used as a complementary tool to formal teaching of Libras and Portuguese, providing deaf children with the opportunity to practice their language skills in a fun and engaging way. We believe these benefits underscore that bilingual digital stories can play an important role in promoting the acquisition of Libras and Portuguese by deaf children, providing a visual and contextualized approach to language learning.

In conclusion, design can contribute to the construction of a clearer and more accessible narrative, allowing data to be understood more efficiently and intuitively by users. In addition, design can help in the organization and structuring of data, making them more readable and facilitating the identification of patterns and trends. It is important to emphasize the importance of collaboration between designers and digital humanities experts to create effective and meaningful solutions. The humanistic approach in design values empathy, ethics, and social responsibility and can promote the inclusion of deaf children in society.

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