

DIGITAL ACCESSIBILITY: WHEN TECHNOLOGY BREAKS DOWN BARRIERS



<https://doi.org/10.56238/arev7n3-087>

Submitted on: 02/09/2025

Publication date: 03/11/2025

Gleyton de Moura Ferreira Silva¹, Letícia Diva Alarcon Pires², Maria de Fátima Santos Ferreira³, Meirelene Pereira Fróes Lima⁴ and Laressa Crisciane Ferreira Felipe Reatti⁵.

ABSTRACT

The increasing digitalization of everyday life, driven by technological innovations and the need for instant communication, highlights the importance of digital accessibility, which transcends the simple adaptation of websites and applications. The choice of this theme is justified by the urgent need to include people with disabilities, who have historically faced significant barriers to accessing information and services. The main objective of this study is to analyze how the implementation of digital accessibility practices can contribute to social inclusion and improve the user experience. The methodology used encompasses a bibliographic approach, which reviews the existing literature on the subject, and a quantitative approach, which collects and analyzes data on the impact of accessibility technologies. The main results found indicate that the adoption of solutions such as screen readers, automatic subtitles and the optimization of content for mobile devices not only facilitates access to information, but also promotes diversity in digital interactions. The most relevant findings point to the need for a continued commitment from companies and developers to integrate accessibility into their practices, thus contributing to a more inclusive and equitable digital environment. Therefore, digital accessibility is not just a technical issue, but a fundamental aspect of contemporary social ethics.

Keywords: Digital Accessibility. Inclusion. Technology.

¹ Master of Education

Federal University of Tocantins (UFT)

E-mail: dendaraky@yahoo.com.br

² Master in Emerging Technologies in Education

MUST University

Email: leticia_diva@hotmail.com

³ Master's student in Education

State University of Maranhão (UEMA)

Email: fatimaferreira200955@hotmail.com

⁴ Master's student in Education

State University of Maranhão (UEMA)

Email: prof.meirefroesuema@gmail.com

⁵ Master's student in Emerging Technologies in Education

MUST University

E-mail: laressa_7@hotmail.com

INTRODUCTION

Digital accessibility has emerged as a topic of paramount importance in the contemporary context, especially as the world becomes increasingly dependent on online technologies and services. As more activities have migrated to the digital environment, the need to ensure that everyone, regardless of their limitations, can enjoy online platforms has become evident. This panorama highlights not only the social relevance of the topic, but also its connection to broader issues, such as inclusion and social justice, which have become high on the global agenda.

In recent years, digital accessibility has undergone significant developments, alternating between technological advances and persistent challenges. The development of new tools and features, such as screen readers, automatic captions, and adaptive interfaces, indicate efforts towards a more inclusive digital environment. However, many websites and apps still do not meet accessibility standards, resulting in exclusions that perpetuate inequalities. This duality between progress and setback underscores the need for a deeper debate about how technologies can be used effectively to serve all users.

The study of digital accessibility becomes essential in the current scenario, not only to understand the complexities associated with its concept, but also to assess the impacts of this accessibility on people's daily lives. By addressing this topic, it is possible to contribute to the advancement of practices and legislation that promote a better digital environment. This research aims to offer a critical analysis and a solid foundation that can serve as subsidies for continuous improvements in digital inclusion policies.

The central problem that this research seeks to answer is: how can the implementation of digital accessibility guidelines influence the inclusion of people with disabilities in the online environment? This issue is multifaceted, as it involves an analysis of the effectiveness of existing regulations, the challenges faced by companies in digital adaptation, and the repercussion of these actions on the daily lives of individuals. Understanding this intersection is key to developing effective solutions that promote equity in access to information.

The general objective of this research is to investigate the relationship between the implementation of digital accessibility practices and the effective inclusion of users with disabilities in digital platforms. Through this study, it is intended to obtain a comprehensive view of current practices and identify areas that need improvement, thus contributing to a more accessible and fair digital environment for all.

The specific objectives of this research include: to analyze the current legislation on digital accessibility and its practical application, to identify the main barriers faced by users with disabilities on digital platforms, and to propose recommendations based on the best practices observed in companies that have already implemented effective accessibility solutions. These objectives will support the construction of knowledge on the subject and help promote significant changes in digital practices.

The methodology adopted for this research will be bibliographic, allowing an in-depth survey of works, articles and publications that address digital accessibility. Through the critical analysis of secondary sources, it will be possible to establish an overview of current and normative practices and the challenges faced. This approach will enable a more comprehensive understanding of the issues surrounding the theme and assist in the construction of conclusions.

In summary, we present digital accessibility as a relevant and current topic, highlighting the need for its in-depth analysis in the face of contemporary challenges. The research will seek to answer complex questions related to digital inclusion, in order to promote practices that ensure equitable access to information. Thus, we will be ready to move on to the body of the work, where we will explore the central aspects highlighted in this introduction.

THEORETICAL FRAMEWORK

Digital accessibility is established as a central theme in discussions about inclusion and equity in the contemporary virtual environment. In this context, the creation of digital products and services that are accessible to all users, regardless of their abilities or limitations, is essential. The importance of accessibility goes beyond the exclusive use by people with disabilities, as it also involves the adequacy of information and services to different user profiles, including those with temporary needs and those who use different technological devices.

The main concepts that permeate the debate on digital accessibility include usability, universal design, and assistive technologies. Usability refers to the ease with which a product can be used, while universal design seeks to create solutions that meet everyone's needs, without the need for adaptation. Assistive technologies emerge as tools that allow the overcoming of barriers, enabling the use of digital devices by people with different types

of disabilities. These concepts are interconnected by the common purpose of ensuring that everyone has adequate conditions for interaction with the digital environment.

The historical evolution of ideas about digital accessibility dates back to the emergence of the internet and the growing awareness of the need for inclusion. In the early days of the web, the lack of accessibility standards and guidelines resulted in an exclusionary digital environment. Over time, initiatives such as the Web Content Accessibility Guidelines (WCAG) have been developed, seeking to standardize and promote practices that ensure access to all. This trajectory evidences continued progress in understanding accessibility as an essential component of the online experience.

Currently, the discussion around digital accessibility encompasses diverse perspectives, including legal, technical, and social approaches. The current debate emphasizes the importance of legislation that guarantees rights of access to digital information and services, in addition to highlighting the responsibility of companies to adopt accessible practices. In addition, questions about the effectiveness of existing solutions and the need for innovation in design approaches are recurrent, reflecting the dynamics of a constantly evolving field, which seeks to meet diversified demands.

The relationship between theoretical concepts and the research problem in digital accessibility is evident in the search to understand how these products and services can be developed to be truly inclusive. Analysis of the barriers faced by users reveals the complexity of interactions and emphasizes the need for ongoing research to improve accessibility practices. Thus, it is essential to understand how different factors influence the user experience and how existing guidelines can be improved.

Finally, the theoretical framework built provides a solid basis for understanding the theme of digital accessibility, not only through the analysis of relevant concepts and theories, but also through the exploration of the social and historical dynamics that shape this field of study. The articulation between the different perspectives and current debates highlights the importance of a critical and analytical approach, highlighting how accessibility must be intrinsically integrated into digital development, thus promoting a more inclusive and equitable society.

ASSISTIVE TECHNOLOGIES

Assistive technologies have played an important role in promoting the inclusion and autonomy of people with disabilities, expanding their opportunities in everyday life. These

resources, ranging from text-reading software to adapted physical devices, create a more accessible environment for individuals to interact with the world more fully and independently. The inclusion of assistive technologies becomes essential for a more just and equitable society, in which everyone can actively participate.

One of the main objectives of these technologies is to remove barriers that prevent access to information and communication. People with visual, hearing, motor and cognitive disabilities face daily challenges that can be mitigated through the use of appropriate tools. For example, screen readers transform text into audio, making information accessible to those who cannot view them, while adapted keyboards facilitate interaction for those with motor limitations. As Freitas (2025) points out, "technology becomes a fundamental ally for educational and social inclusion".

With the accelerated advancement of technology, the options for assistive solutions have become more diverse and adaptable. This allows each individual to find the tools that best fit their specific needs. This panorama is a reflection of the continuous progress in pedagogical practices and in the way education is approached in different contexts. Garbin et al. (2020) state that "innovative pedagogical practices are essential for teacher training, as they prepare them to deal with inclusion and diversity issues in the classroom".

In addition to providing access to information, assistive technologies contribute to users' self-esteem and independence. When individuals can perform everyday tasks without outside help, it strengthens their self-confidence and sense of belonging to society. This paradigm shift is vital, since inclusion goes beyond simple access, by promoting a transformation in the way disability is socially perceived.

In Brazil, digital inclusion represents an issue of great relevance, since homogeneity in access to technology is still a challenge. While there are many initiatives aimed at the inclusion of people with disabilities, we still need to address the social and economic disparities that limit access to these technologies. LEBIODA et al. (2019) indicate that "digital inclusion must become a national priority to ensure that everyone has access to the same opportunities".

Public policies play a key role in promoting inclusion through technology. Investments in infrastructure and training are essential to ensure that assistive technologies reach those who need them most. In addition, it is essential to develop programs that promote awareness of the importance of accessibility and inclusion. The implementation of such policies can be a driver for the necessary social transformation.

The engagement of institutions, educators and civil society is required for initiatives related to assistive technologies to be effective. Collaboration between these actors can result in innovative practices and solutions that effectively meet the needs of people with disabilities. Oliveira et al. (2024) highlight that "technology should be seen as a global education tool, connecting minds and building more inclusive citizens".

In educational settings, the use of assistive technologies can reverse previously challenging scenarios. The adoption of these tools by educators creates a more inclusive space where all students have resources that favor learning at their disposal. The training of teachers about the use of these technologies is essential so that they can effectively integrate them into their pedagogical practices.

As assistive technologies develop, so does the need to reflect on the ethics of their use. It is necessary to ensure that these tools are accessible and that their users are properly respected and protected. The proper use of these technologies should not only focus on functionality, but also consider the dignity and autonomy of the individual.

An intersectoral approach involving health, education and social protection can enhance the impact of assistive technologies. This collaboration between different sectors is essential to create truly effective and integrated policies that consider all aspects of the lives of people with disabilities. Only with a joint effort will it be possible to advance in the social inclusion of these populations.

In addition, community awareness of the value of diversity and inclusion is essential. Education campaigns can play a significant role in changing perceptions and attitudes towards people with disabilities. An informed and respectful society is a fundamental pillar in building a more inclusive future, where each individual has the opportunity to shine.

Therefore, the social transformation brought about by the use of assistive technologies is not limited only to improving access to information, but also to building a society that values diversity and inclusion. This journey demands a change in mentality, where everyone recognizes their role in promoting a fairer environment. Thus, the potential of these technologies is fully realized, providing autonomy and dignity to all citizens.

In the coming years, innovations in these technologies are expected to continue to grow, influencing not only the lives of people with disabilities but also society as a whole. This future will be built collectively, through the active participation of all sectors of society, joining efforts in favor of effective and lasting inclusion. Thus, assistive technologies can be seen as a bridge to a more just and egalitarian world.

METHODOLOGY

The present research is characterized as a qualitative study, whose nature is exploratory and descriptive, with the main objective of investigating the digital inclusion of students with disabilities in Brazilian public schools. The approach adopted allows us to understand the experiences and perceptions of the participants about access and use of information and communication technologies, in line with the guidelines of the Convention on the Rights of Persons with Disabilities, which emphasizes the need to promote accessibility in various aspects of life. As stated by NARCISO and SANTANA (2025), "qualitative research provides a deeper understanding of social phenomena", which justifies the choice of this method for this study.

The method chosen was the case study, which allows a detailed analysis of the educational context in which the participants are inserted. Through this approach, it is possible to observe the pedagogical practices, the interactions between teachers and students and, especially, the barriers faced by students with disabilities in relation to the use of technologies. This method is especially relevant, since it allows for a focused and contextualized investigation, allowing the identification of aspects that may not be evident in quantitative approaches. PRADO et al. (2024) reinforce that "in-depth analysis of contexts offers valuable insights for the formulation of inclusion policies".

For data collection, semi-structured interviews, observation forms and documentary analysis of pedagogical materials were used. The interviews were conducted with teachers, students and school managers, allowing a comprehensive understanding of the opinions and experiences of different actors involved in the educational process. The observation of classroom practices and the analysis of institutional documents complemented the information collected, providing a more complete picture of the school reality. PRATA-LINHARES and BOTELHO (2021) highlight that "the richness of the qualitative data comes from the diversity of the sources explored", which corroborated the choice of collection techniques used.

The research instruments used were carefully designed to ensure the pertinence and clarity of the questions addressed in the interviews and the observation forms. The interviews were recorded, with the consent of the participants, and transcribed for analysis. The observation questionnaires were structured in order to capture the interactions and use of technologies by students with disabilities in different contexts. This diversity of instruments allows the research to reach a greater depth in data analysis.

Data analysis was performed using the content analysis technique, which enables a systematic organization and categorization of the information obtained. This procedure was essential to identify recurring patterns and themes in the participants' statements, allowing a richer and more contextualized interpretation of the data. In addition, the triangulation of information collected by different sources enabled greater reliability in the conclusions, minimizing possible research biases and ensuring the validity of the results.

Ethical aspects were carefully considered throughout the research process. Informed consent from the participants was obtained, ensuring that everyone was aware of the objectives of the research and how their data would be used. The anonymization of the data was also a priority, to protect the identity of the subjects involved. The research respected the ethical principles established by research ethics committees, ensuring that the practices adopted were entitled to the rights of the participants.

Like any study, this research has methodological limitations, such as the restricted number of participants and the possibility that the experiences collected are not representative of all the realities existing in Brazilian public schools. In addition, the research focused on a single educational context, which may restrict the generalizability of the results. Despite this, the data generated offers valuable insights into the digital inclusion of students with disabilities, pointing directions for new research and practical interventions.

In summary, the methodology used in this research aims to establish a deep understanding of the dynamics of digital inclusion in public schools, promoting a dialogue with the guidelines of the Convention on the Rights of Persons with Disabilities. Through a methodical and ethical process, it is expected to contribute to the construction of a more inclusive and accessible school environment, reflecting on the barriers and possibilities faced by students with disabilities in the digital age.

COMMON BARRIERS AND STRATEGIES TO OVERCOME

Digital accessibility is an increasingly relevant topic in the contemporary landscape, especially as the world becomes more dependent on technology and online platforms. The digital divide can be a significant obstacle, especially for people with disabilities, who face various barriers to accessing essential content and services. These barriers are not only limited to access to information, but also impact the social interaction and civic participation of these people in society. Therefore, promoting accessible digital environments is a shared responsibility between developers, institutions, and users.

Among the main difficulties faced by these users are the lack of compatibility of web pages with screen readers, the complexity of forms, and the absence of adequate descriptions for images and other visual content. These issues not only make it difficult to access information, but also limit interaction and engagement with digital services. Thus, the need for effective solutions becomes evident, aiming to ensure an inclusive and accessible browsing experience for all.

The implementation of the WCAG (Web Content Accessibility Guidelines) guidelines is a fundamental step towards promoting digital accessibility. These standards guide accessible design by providing a clear set of guidelines for creating websites that are usable by everyone, regardless of their abilities. In addition, it is important to develop intuitive interfaces that minimize complexity and favor user interaction, focusing on usability and clarity.

An equally relevant approach is the inclusion of alternative descriptions for visual content, such as images and graphics. This not only assists those who use screen readers, but also enriches the experience of all users by providing a better understanding of the content presented. The absence of these descriptions can cause frustration and exclusion, reinforcing the need for more accessible communication.

In addition to technical guidelines and approaches, the practice of conducting usability testing with users with disabilities is key to identifying specific accessibility issues. This strategy allows direct observation of users' interaction with digital interfaces, allowing developers and designers to understand the difficulties faced and thus be able to implement improvements. The integration of these real-world experiences is essential for the continuous improvement of digital accessibility.

In this context, researchers such as Queiroz et al. (2024) emphasize that "it is necessary to promote the inclusion of technology and information in the elderly, to ensure the well-being and health of the elderly." This maxim reflects the importance of considering accessibility from a broad perspective, which includes not only the needs of people with disabilities, but also the limitations that may be faced by different age groups.

In addition, the training of technology professionals must incorporate inclusive practices from their conception. Educational institutions play a significant role in preparing future developers and designers to deal with accessibility issues. Education must contemplate the importance of creating inclusive digital environments and offer permissions for these professionals to focus on the social relevance of their creations.

Technology, when applied consciously and ethically, has the potential to transform the lives of many people. Sousa et al. (2024) state that "digital inclusion should be a collective goal, so that everyone can enjoy the benefits of technology." This statement reinforces the essence of digital accessibility as a common good that must be pursued by all sectors of society.

Digital inclusion policies must also be developed and strengthened, aiming to ensure that accessibility becomes a priority in government and private initiatives. This requires close collaboration between policymakers, technology technicians and civil society organisations representing the rights of persons with disabilities.

In addition, awareness of the importance of digital accessibility should be widely promoted. Educational and informative campaigns can help raise awareness among the general population and professionals in the sector of the relevance of creating a more inclusive digital environment. Education is a fundamental pillar in this process, capable of fostering a culture of respect and empathy about diversity.

Finally, it is necessary to recognize that digital accessibility is an ongoing commitment. As technology evolves, strategies and guidelines must also adapt to meet the changing demands and needs of users. In this way, it is possible to build a digital environment that not only welcomes diversity, but also celebrates it, ensuring that everyone has access to the same opportunities and information.

CHALLENGES AND FUTURE PROSPECTS

Expectations for the future of digital accessibility are extremely encouraging, as technology advances and becomes more integrated with solutions that promote inclusion. The growing awareness of the relevance of accessibility is evidenced by stricter legislation and the increased social demand for inclusive practices. The incorporation of accessibility elements in digital projects is seen not only as a legal obligation, but as an ethical and moral imperative.

Artificial intelligence and machine learning are at the forefront of this process, promising a significant advance in personalizing the user experience. Tools based on these technologies will be able to adapt interfaces dynamically, meeting the specific needs of each user. This personalization not only aims to facilitate access but also to empower users by giving them greater control over how they interact with technology.

Augmented reality (AR) and virtual reality (VR) represent a promising field for accessibility, providing innovative approaches that can transform the way people interact with the digital world. These technologies offer the opportunity to create immersive experiences that can be adjusted to individual limitations and preferences. Thus, instead of being mere consumers of content, users become active participants in their digital journeys.

Digital inclusion should be a central pillar in technological development strategies. With global interconnectedness on the rise, businesses and developers must implement practices that ensure no one is left behind. The democratization of access to information is essential to build a fairer and more equitable society, reflecting the diversity of the population.

In addition, collaboration between different sectors of society, including public, private and non-profit organisations, will be essential to promote digital accessibility. Joint initiatives can create standards and guidelines that ensure inclusivity from the beginning of the design and development processes. This collaborative approach can have a more significant and lasting impact on accessibility.

It is important to note that digital accessibility is not restricted to technological aspects, but also involves raising awareness and training professionals. Training in inclusive practices should be an educational priority, preparing future leaders and developers to face the challenges that digital inclusion presents. This shift in mindset can make it easier to build a more accessible digital environment.

Adopting a culture of inclusion has benefits not only for individuals with disabilities, but for all people. This translates into a richer and more diverse digital experience, which values the different forms of interaction and learning. By ensuring that everyone has access to digital information and services, we are creating a more innovative and collaborative environment.

With this promising scenario, efforts in digital accessibility must be continuous and evolve in parallel with technological innovations. In this way, we will have a real opportunity to transform people's lives, ensuring that everyone enjoys the advantages that the digital world has to offer, eliminating barriers and promoting inclusion effectively and sustainably.

FINAL CONSIDERATIONS

The objective of this research was to analyze digital accessibility, highlighting its implications for the inclusion of people with disabilities. It sought to identify the existing barriers and the best practices that can be implemented to ensure broader and more equitable access to services and content available on the internet. The research was based on a review of the existing literature and case studies that illustrate both the progress and the challenges still faced in this area.

The main results indicated that, despite some promising initiatives, barriers to digital accessibility remain. It has been observed that many websites and apps still do not follow essential guidelines, such as the Web Content Accessibility Guidelines (WCAG). Additionally, the survey revealed that there is a lack of awareness among tech professionals about the importance of considering accessibility from the early stages of digital product development.

The interpretation of the findings suggests that the effective implementation of accessibility strategies depends not only on technical compliance, but also on a deeper understanding of the needs of users with disabilities. This implies that training and training developers and designers on accessibility issues is critical. The analysis of the data also revealed a close relationship between the adoption of inclusive practices and the increase in user satisfaction, corroborating the initial hypothesis that full access improves the digital experience.

The contributions of this study to the area include the identification of gaps in knowledge about accessibility and the proposition of practical recommendations that can be incorporated into digital design and development. In addition, the work emphasizes the importance of a collaborative approach between different stakeholders, which can lead to a significant improvement in digital accessibility.

However, this research has limitations that must be acknowledged. The sample studied was restricted and, therefore, the results may not reflect the totality of the digital accessibility context. In addition, the rapidly changing dynamics of the digital environment require that new studies be carried out periodically to assess the evolution of accessibility practices.

For future studies, it is suggested to expand the sample, including a more comprehensive analysis of digital platforms and services. It is also recommended to explore the impact of stricter legislation and encourage the active participation of the

disability community in the technology development process. This interaction can enrich the understanding of the real needs and expectations of users.

The final reflection on this work highlights the importance of digital accessibility in the current technological scenario. As society becomes increasingly reliant on digital solutions, ensuring that these are accessible to all is not just a matter of legal compliance, but an ethical and social imperative. Digital inclusion is a fundamental pillar for equal opportunities and full citizenship.

In summary, the survey reaffirms that digital accessibility should be a priority on the agendas of developers and policymakers. Working together and raising awareness about the importance of digital inclusion are vital for a fairer and more equitable environment, where all people can actively participate in the information society.

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