



Digitization and accessibility:

how technology removes learning barriers for all students

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Foreword

In the early 2000s, the internet emerged as the dominant learning avenue in education. This format for learning was intended to make information easily available to everybody regardless of their capabilities, age, economic status, and other attributes. Unfortunately, online education has not leveled the playing field for all individuals. Most digital content and websites were not built to be accessible, which means they were not designed and developed so that people with disabilities could use them. As the transition to digital learning continues to grow and become the primary delivery for educational content, it is imperative that the platforms and content be made accessible to all users.

The lack of digital accessibility and inclusivity extends beyond education. Today, approximately 96.8% of the world's top million websites are not accessible, based on a review in accordance with the universal Web Content Accessibility Guidelines (WCAG). These guidelines are used to help developers create digitally accessible products for people with disabilities. The lack of digital accessibility in education means that students with disabilities who do not have equal access to content often graduate much later than students without disabilities, and sometimes, never graduate at all. The goal of the accessibility guidelines is to provide guidelines on how to build digital environments wherein all people can interact with, learn from, and contribute to their education without barriers.

What are the different types of disabilities?

The World Wide Web Consortium (W3C) classifies disabilities into five broad categories:

- ✓ Auditory disabilities
- ✓ Cognitive, learning, and neurological
- ✓ Physical
- ✓ Speech-related
- 🗸 Visual

Individuals with auditory disabilities may be hard of hearing (which involves mild or moderate hearing conditions in one or both ears), deaf (with a substantial and uncorrectable hearing condition in both ears), or may be deaf-blind, which involves a combination of uncorrectable hearing and optical conditions.

Individuals with cognitive, learning, and neurological disabilities may have seizures, multiple sclerosis (which involves damage to brain and spine cells, negatively affecting a person's sensory, cognitive and physical abilities), mental health disabilities (which include anxiety, delirium, depression, paranoia, schizophrenia, learning, perceptual, and intellectual disabilities, memory-related conditions), Attention Deficit Hyperactivity Disorder (ADHD), and Autism Spectrum Disorder, commonly abbreviated as ASD (which involves conditions that affect the communicative and social interaction capabilities of individuals, making them more reclusive).





Individuals with physical disabilities may have paralysis, repetitive stress injuries, amputated limbs, or arthritis. Speech-related disabilities include stuttering, muteness, or dysarthria (which involves weakness or paralysis in an individual's speech-enabling muscles, such as their lips, tongue, throat, and lungs).

Visual disabilities include color blindness, low vision (which includes poor sharpness in vision), tunnel vision (the lack of peripheral vision), central field loss, and other forms of clouded eyesight, blindness, and deaf-blindness.

The examples here are not comprehensive for all disabilities. Additionally, the impact of a disability will vary among individuals. Some individuals may have more than one disability. Institutions should have the necessary provisions in place to support students with disabilities. To ensure that, educational institutions and publishers can focus on optimizing specific aspects of their websites or products for achieving digital accessibility.

What are the main focus areas for achieving digital accessibility?

WCAG is separated by four main principles for achieving digital accessibility, sometimes known as digital a11y, on online platforms. These focus areas are perceivability, operability, understandability, and robustness. This is often referred to as POUR. There are 13 guidelines divided across these four principles. These guidelines cover all the non-negotiable parameters for ensuring digital accessibility.



01 Perceivable

This refers to the ease with which users can find and identify content, design, notes, or instructions on an online platform. Perception normally involves the first points of contact when a user visits a website or accesses a piece of content. To maximize perceivability, these websites and products need to be designed with features that enable users to see or hear the content easily.

Perceivability can involve multiple sensory aspects. For example, a learning video needs to have synchronized captions so that individuals who have auditory disabilities can perceive its content. Similarly, a website needs to be structured so that screen reader software (such as JAWS or VoiceOver) can support those with low vision or blindness to navigate through them and understand the information without difficulty.

02 Operable

Where perceivability is all about how easily a user can receive the information found on a digital platform, operability deals with how easily they can use buttons, controls, navigation icons, and other interactive tools on such platforms. An operable site enables individuals to navigate and use its interface without difficulty. For example, an accessible site will display the options and submenus inside a menu when the mouse or keyboard cursor hovers over it, instead of requiring additional clicks.

03 Understandable

The guidelines in this section involve presenting content, metadata, instructions, or design elements in a comprehensible format. Individuals on accessible websites can comprehend any information there, as it has a consistent format and presentation, predictable design, concise, multimodal, and appropriate tone of educational content. Additionally, the process of using such a website must be easy to learn and memorize for users.

04 Robust

These guidelines are meant to support that the accessibility features in any website or product can be used across different types of software and hardware systems by adhering to evolving web standards.

Within these guidelines, there are details on how digital products can achieve different levels of conformance. WCAG has three levels: A, AA, and AAA. Level A is the minimum required elements that should be included to support all users. Level AA is where most websites and digital products conform. Any site that achieves Level AA automatically conforms to the Level A standards. Likewise, digital products that align to Level AAA have shown conformance to all of the WCAG standards. Most websites and digital products are working towards or aligning with WCAG 2.1AA standards.





Why is digital accessibility essential in education?

Companies who develop educational products need to keep accessibility at the forefront of product, platform, and program design. By doing so, they can deliver accessible materials that enable all users, including those with disabilities, to benefit from their offerings. As a result, the companies are not only able to not only improve their business outcomes but also support equity and inclusion.

Ensuring regulatory compliance -

In the United States, educational materials are legally required to be accessible. For school systems that receive funding from the federal government, buyers want to ensure that the product they are buying complies with the Rehabilitation Act, the Americans with Disabilities Act, and the Individuals with Disabilities Education Act. These laws prohibit discrimination against students with disabilities and require technologies to be accessible without "undue burden." It is essential for developers to consider these laws and create accessible materials.

Differentiation within the market-

Education is an ever-expanding sector with new businesses frequently joining in. In such a saturated market, prioritizing digital accessibility can be a differentiator in terms of the quality of online products.

Breaking down barriers-

An accessible online platform and program promotes equity and inclusion by making digital content readily available to all individuals for use.

Opening the knowledge gateway to new users-

An accessible online platform and program will attract a wide array of individuals. Users, especially those with disabilities, the elderly, and people living in areas with lower bandwidth can greatly benefit from digital accessibility in educational programs.

Keeping users connected across geographical boundaries —

One of the advantages of online learning is that it erases geographical boundaries. Accessible educational materials make learning inclusive for all individuals, enabling them to learn education from wherever they are.



How are institutions using digital accessibility for improved outcomes?

The positive impact of digital accessibility can be seen through several success stories around the world. The Rochester Institute of Technology (RIT), New York, serves as a prime example of the role of digital accessibility in education. For this project, researchers helped with the creation of accessible solutions to aid learning for students who were deaf and hard of hearing. Researchers from RIT, many of whom are deaf or hard of hearing themselves, use Artificial Intelligence (AI) and natural language generation to make various avenues of learning easier to use or maneuver for students with auditory conditions.

The accessibility program of RIT uses trained personnel and assistance from autonomous language translation, automatic speech recognition, and language generation tools to enable students with auditory conditions to learn seamlessly. The institute aims to use this initiative to attract more students of color who are deaf.

Similarly, one of the top 3 educational publishers in the world increased registrations for their digital learning products by 45% as a result of upgrading their digital math authoring tool to WCAG 2.0 AA level.

These examples reaffirm the positive impact of digital accessibility on education. However, achieving digital accessibility in educational programs and products requires expertise in multiple fields such as accessibility studies, user experience design, and digital technology, among others. Moreover, it requires a structured approach to the implementation that effectively combines cross-functional expertise to achieve desired results.





How can companies implement an accessibility program?

Although there are multiple approaches to creating an accessibility program, creators of educational materials can employ the following steps to streamline the task efficiently:

01 Initiation phase

In the United States, educational materials are legally required to be accessible. For school systems that receive funding from the federal government, buyers want to ensure that the product they are buying complies with the Rehabilitation Act, the Americans with Disabilities Act, and the Individuals with Disabilities Education Act. These laws prohibit discrimination against students with disabilities and require technologies to be accessible without "undue burden." It is essential for developers to consider these laws and create accessible materials.

02 Planning phase

The planning stage involves setting aside a budget for the creation of a target-specific accessibility program. Additionally, institutions looking to implement such a program also need to establish the software and hardware requirements and define constraints, like the availability of resources.

Apart from that, the planning stage includes selecting the accessibility conformance standards for digital content as well as creating quality metrics to meet those standards. Finally, the project head will need to evaluate and correlate the viability of the standards chosen with the resources in hand for the task. Essentially, a blueprint is created for the accessibility project.

03 Design and development phase

The design and development phase is typically executed iteratively. This means that rigorous testing is performed at every stage of product design and development. Typically, these tests are conducted with the help of potential users.

04 Post-project phase

Accessibility is a journey, not a destination. Organizations implementing accessibility programs will need to continuously monitor the health of their website and products to ensure they remain accessible and inclusive for their users.

Meeting all the objectives and conformance standards without any expertise or support is an uphill task for most organizations. This task becomes all the more daunting while considering the rapid pace at which technology is evolving, constantly challenging the robustness of digital accessibility features of websites and digital learning tools. Additionally, the constantly evolving web standards demand relentless diligence from such organizations to stay updated, which can be resource-intensive and risky at the same time.

Magic EdTech helps tackle these challenges through a holistic approach that combines expertise in strategy, design, accessibility, and technology. Doing so, not only helps organizations stay competitive and compliant but also helps them to lower the barriers to learning for all individuals across the world. To know more about how we're enabling Digital Learning for Everyone, visit www.magicedtech.com.

SOURCES

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- ✓ U.S. Census Bureau: Living With Disabilities Infographic and Childhood Disability in the United States, 2019
- ✓ Cornell University Institute on Employment and Disability: Disability Statistics, and Find U.S. disability statistics covering specific areas of interest.
- ✓ National Center for Education Statistics: Students with Disabilities
- U.S. Bureau of Labor Statistics: Persons With a Disability: Labor Force Characteristics Summary

Websites/Organizations

- ✓ W3C
- ✓ WebAIM
- ✓ International Association of Accessibility Professionals (IAAP)
- ✓ National Center on Accessible Education Materials (AEM)
- ✓ Americans with Disabilities Act and Title III
- ✓ Individuals with Disabilities Education Act
- ✓ The Rehabilitation Act and Section 504, Section 508
- ✓ Color Blindness
- ✓ Disability Etiquette: Tips on Interacting With People With Disabilities
- Importance of Captioning
- Vision Simulations