Building an Accessible Digital World

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# Abstract

Who is responsible for making sure the digital world is accessible to people with disabilities? Examined through the lens of the physical built world, those of us who design and construct the digital environment have a significant role to play. But are we prepared?

# Introduction

In his September 2020 column, A Brief History of Software Professionalism and the Way Forward, Phil Laplante poses the question:

Society expects a standard of competence, professionalism, and accountability from its doctors, nurses, and other professionals who hold lives in trust. Yet anyone can write software that can appear in or interact with critical systems, so what does “software professional” mean, and what are society’s expectations for those individuals?[[1]](#footnote-1)

As an accidental technology professional, this question resonated for me. After stumbling into a tech career with a music theory degree and some natural aptitude, I have been building my competence, professionalism, and accountability as I go. Discovering accessibility helped me realize the impact of my design decisions and coding approaches, and the need to prioritize user needs. Technology done right can open doors to opportunity and participation for people with disabilities. Technology designed and built without attention to accessibility produces barriers.

In my previous position as a digital accessibility consultant at The Paciello Group, I had the privilege of working alongside and learning from the most competent and professional accessibility specialists out there. More recently, I had the opportunity to learn about accessibility and disability inclusion by completing the ADA Coordinator Training Certification Program. The more I learn about accessibility and disability inclusion, the more I appreciate the seriousness of our work. We are no longer digital pioneers exploring and building a brave new World Wide Web. We are building the world we live in. *We hold lives in trust.*

In this article, I explore accessibility in the digital world using an analogous example of accessibility in the built environment. With the support of this scaffolding, we can examine the gaps in our profession that lead to inaccessible technology and disability discrimination and propose ways to build competency and capacity for an accessible and inclusive digital world.

# Defining the Role of Accessible Technology

During the COVID-19 pandemic, the idea of “critical systems” moved from the margins to the mainstream, as so many systems have become critical to society and well-being. Those who live on the near side of the digital divide have enjoyed a level of continuity in access to employment, healthcare, education, goods and services, thanks to internet-enabled devices, like computers and smartphones.

However, access to technology does not guarantee access to internet-based programs and services. Researchers at Carnegie Mellon University reviewing Twitter data to identify accessibility issues surfaced by the rapid transition to the digital world found people with disabilities reporting issues accessing products, education, and public health information.[[2]](#footnote-2) Blind and low vision participants in a 2020 American Foundation for the Blind study reported issues accessing COVID-19 information as well as more general challenges using technology for health information, transportation, shopping, employment, socializing, education, and voting.[[3]](#footnote-3)

## Technology Can Help Overcome Impairments

Humans use technology to overcome impairments. People who have vision impairments use eyeglasses and contact lenses to correct their vision and use magnification and other settings to adjust displays. People who have mobility impairments use mobility aids, like wheelchairs and scooters, and operate technology using different inputs, including speech and eye-tracking. People who are blind use text-to-speech software to operate graphical interfaces and consume digital information. People who have learning difficulties also use text-to-speech tools to help with reading and writing. Technology is an essential tool in making opportunities and enabling participation.

Assistive technology and accessibility strategies enable access to the digital world. Screen reader software converts text to speech for people who are blind and people who need reading assistance. Speech recognition enables speech control and input for people who can’t operate a mouse, touchscreen, or keyboard. Magnification and other modifications allow people with vision impairments to make necessary adjustments to the display of content and controls. Like an accessible building entrance, accessible technology opens doors to opportunities and participation.

But assistive technology and accessibility strategies only work when the features that comprise the digital world are built to accessibility standards. The systems and software, the websites, applications, and apps that we use to get information, access programs and services, communicate and connect must include accessibility features, and the content they provide must be accessible. Otherwise, people who have accessibility needs may be locked out.

## Technology Barriers Can Cause Exclusion

We are all responsible for preventing exclusion, in our lives and in our work. Under the social model, disability is “the socially created disadvantage and marginalization experienced by people who have (or are perceived to have) ‘impairments.’”[[4]](#footnote-4) This view is supported by disability and equality laws, policies, and legislation around the world, including the Americans with Disabilities Act (ADA), civil rights law that prohibits discrimination on the basis of disability. With this view, everyone in society has a role to play in eliminating existing barriers and preventing new ones.

Disability discrimination occurs when a person with an impairment is treated differently and less favorably due to their disability. Architectural and communication barriers cause disability discrimination, for example, when a customer with a mobility impairment is unable to enter a shop or restaurant due to steps, or a citizen with hearing loss cannot access public health video updates due to absence of captions, or a student who uses a screen reader can’t complete assignments due to inaccessible course materials.

Laws prohibit disability discrimination in the physical and digital world. Title III of the ADA requires public accommodations—places that offer goods and services to the general public—to “afford goods, services, facilities, privileges, advantages, and accommodations to an individual with a disability in the most integrated setting appropriate to the needs of the individual,” and discrimination is “a failure to design and construct facilities … that are readily accessible to and usable by individuals with disabilities.”[[5]](#footnote-5)

On the question of whether a website is considered a place of public accommodations, the U.S. Department of Justice issued a letter stating, “The Department first articulated its interpretation that the ADA applies to public accommodations’ websites over 20 years ago.”[[6]](#footnote-6)

Another place to look for evidence of disability discrimination through inaccessible technology is the rising number of ADA Title III lawsuits related to web accessibility.[[7]](#footnote-7)

The ADA requires standards compliance for new construction and alterations and removal of architectural and communication barriers in existing facilities. If we apply that guidance to the digital world, this means that new technology must comply with accessibility guidelines and existing technology must be remediated to remove barriers.

## Example: Access Routes and Entrances

For built facilities, accessibility standards have extensive requirements and guidance for accessible access routes and entrances—and rightly so! What good are accessible programs and services if people can’t get in the door? With technology, we can think of signups and logins as a digital form of access routes and entrances. Signing up for a service is the access route, a path to participation; logging in is getting through the front door. A designed-in barrier could be a submit button that only works with a pointing device and not a keyboard. Another barrier could be a mandatory data field without a visible or accessible label. Verification tests, like CAPTCHA, that require users to transcribe characters, images, or audio can be impossible to complete. These barriers mean some people will be unable to complete and submit the form with the required data, effectively barring access to the services on the basis of disability.

The relatively plastic digital world can be more amenable to accessibility than the hard edges of the physical world. Rather than requiring a range of accessibility features to ensure the access route and entrance works for everyone, digital resources built on accessibility standards can adapt to meet individual accessibility needs. For example, some people with visual impairments see better with inverted colors—light colors on a dark background. A business owner does not need to provide an inverted color option on their website to meet their non-discrimination obligations. People who need inverted colors can change the display settings on their device, and well-built websites and apps will adapt to their settings.

# Defining the Accessibility Role of Designers and Builders

In the built environment, responsibility for ADA compliance includes entities offering programs and services as well as everyone involved in the design and construction of places of public accommodation, including architects, civil engineers, interior designers, consultants, construction managers, general contractors and subcontractors.[[8]](#footnote-8)

When we apply this principle to design and construction roles in the digital environment, that means software engineers, product owners, designers, developers, and others are responsible for accessibility compliance. Are the designers and builders of the digital world adequately prepared to meet that responsibility?

## Professionalism Can Help Meet Accessibility Responsibilities

The built environment has a defined regulatory framework that reflects its impact on critical factors like life safety and accessibility. With accessibility, there are laws and policies that establish requirements and standards and guidelines that define accessibility features. Education programs cover accessibility topics and accessibility is a requirement in program accreditation. Architects must have a license to practice and must meet licensing requirements, including education from an accredited program. Programs are synchronized to support uniform preparation through education, experience, and examination. With this framework in place, society can have some assurance that built features of the physical world will provide a level of accessibility.

A prerequisite for professionalism is education programs that are defined by accreditation requirements. For an architectural program to be accredited by the National Architectural Accrediting Board, for example, graduates must demonstrate the “Ability to design sites, facilities, and systems that are responsive to relevant codes and regulations, and include the principles of life-safety and accessibility standards.” Acknowledging the challenges of balancing multiple and sometimes conflicting priorities, they must also demonstrate the “Ability to make design decisions within a complex architectural project while demonstrating broad integration and consideration of environmental stewardship, technical documentation, accessibility, site conditions, life safety, environmental systems, structural systems, and building envelope systems and assemblies.”[[9]](#footnote-9) Requirements and regulations don’t guarantee thoughtful consideration of accessibility and inclusive design. But including accessibility among accreditation requirements for architecture programs helps ensure tomorrow’s architects are aware of accessibility, recognize their professional obligations, and have the tools they need to include accessibility in their designs.

## Technology Professionals are Not Prepared for Accessibility

Technology program accreditation requirements do not include accessibility. In the ABET Criteria for Accrediting Engineering Programs, the Software Engineering curriculum requirements reference life-safety topics, including security, verification, and validation, but not accessibility. “The curriculum must include computing fundamentals, software design and construction, requirements analysis, security, verification, and validation; software engineering processes and tools appropriate for the development of complex software systems; and discrete mathematics, probability, and statistics, with applications appropriate to software engineering.” The only place accessibility is mentioned is a list of example constraints, including “accessibility, aesthetics, codes, constructability, cost, ergonomics, extensibility, functionality, interoperability, legal considerations, maintainability, manufacturability, marketability, policy, regulations, schedule, standards, sustainability, or usability.”[[10]](#footnote-10)

Without accreditation requirements for digital accessibility, efforts to incorporate the topic into education programs are limited and ad hoc. In their 2018 survey of computing and information science faculty at 318 institutions in the United States, Shinohara, et al found that most of the faculty who teach accessibility (375 out of 1857 responses, or 20%) teach it once a year in a class or two. Most respondents reported a main challenge to teaching accessibility was that it was “not a core part of the curriculum.”[[11]](#footnote-11)

Consequently, competence in web accessibility is not originating in formal education programs. In the WebAIM Survey of Web Accessibility Practitioners, formal schooling (12.5%) came in last for ways practitioners learned about web accessibility. Most reported informal and unstructured learning experiences, including online resources (91.3%), on-the-job training or experiences (83.4%), and collaboration with peers or colleagues (81.1%).[[12]](#footnote-12) In their 2020 survey of technology professionals, Patel, et al found that that 44% were either not very or not at all familiar with accessibility guidelines, and 63% were either not very or not at all familiar with accessibility laws. “Some participants were aware of ADA requirements for construction but did not know how those rules applied to software development.”[[13]](#footnote-13)

Given the lack of formal structure and preparation, it’s not surprising that accessibility defects are commonplace in the digital world. The 2021 WebAIM analysis of 1 million home pages found an average of 51.4 automatically detectable accessibility errors per page, including low contrast text, missing alternative text for images, and missing form input labels.[[14]](#footnote-14) Using sufficient color contrast, providing alternative text for images, and programmatically labeling form inputs are basic accessibility features that are readily achievable and, like other marks of quality, should be core practice for any competent professional.

# Building a Framework for Accessibility Professionalism

How can we ensure accessibility competency, such that design and engineering professionals are prepared to build accessible digital resources? While the digital world lacks a formal regulatory framework, there are solid building blocks to support accessibility professionalism.

* **Digital accessibility standards.** The Web Content Accessibility Guidelines (WCAG, w3.org/TR/WCAG21/) is an international standard developed by the Worldwide Web Consortium. First published in 1999 and published as an ISO standard (ISO/IEC 40500) in 2012, the standards provide the specifications and requirements for supporting accessibility in digital resources. WCAG is the measure used to assess compliance with non-discrimination laws and policies. Unfortunately, the standards are not widely known among technology professionals.
* **Specialist certification programs.** The International Association of Accessibility Professionals (IAAP, accessibilityassociation.org) offers professional certification programs on accessibility topics in digital and built environments. In the U.S., the Department of Homeland Security (DHS) Trusted Tester program (dhs.gov/508-training) and the ADA Coordinator Training Certification Program (ACTCP, adacoordinator.org) provide training and certification. While these types of certification programs help build specialist expertise, they do not address the urgent need for core competency in accessibility across technology design and engineering professions.
* **Accessibility teaching.** To address shortcomings in accessibility education efforts, Teach Access (teachaccess.org) is working to advance accessibility in higher education through curriculum development, mentoring, advocacy and outreach, and industry demand for accessibility skills. Teaching Accessibility in the Digital Skillset (teachingaccessibility.ac.uk) is researching accessibility pedagogy, defining and resourcing the field of accessibility education. The Web Accessibility Initiative (WAI, w3.org/wai) provides resources for teaching accessibility. This work toward building solid accessibility teaching pedagogy and effective teaching resources is foundational to any effort to incorporate accessibility into core curricula in different technology disciplines.

Building blocks are just that — blocks to build on. On their own, they provide some support. Together, they become more substantial. Should we continue to disregard accessibility standards, delegate responsibility to specialists, and provide cursory coverage (at best) in the curriculum? Or can we combine the accessibility professionalism building blocks with those for other critical factors, such as cybersecurity, and build professionalism that recognizes the impact of our work on the digital world? Owning professional responsibility for digital accessibility and disability inclusion could be an impetus for establishing a regulatory framework that supports competence, professionalism, and accountability from technology professionals so that we *are* prepared to hold lives in trust. So that we do no harm.

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# Bio

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