

BARRIERS TO DIGITAL INCLUSION 2

RESEARCH REPORT | APRIL 2024



Documenting digital accessibility challenges for people who are blind or have low vision.

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BARRIERS TO DIGITAL INCLUSION 2

EXECUTIVE SUMMARY | APRIL 2024

Documenting digital accessibility challenges for people who are blind or have low vision.

EXECUTIVE SUMMARY

Making Digital Information Available to All: Continuing the Story With American Foundation for the Blind's Diary Study

People use websites, mobile apps, kiosks, and digital documents to accomplish many tasks. However, many of these digital tools are not accessible for people with disabilities. People who are blind or have low vision can have trouble buying things or getting services when companies use inaccessible digital tools.

About AFB's research on this. In April of 2023, the American Foundation for the Blind (AFB) published a report from its Barriers to Digital Inclusion Survey. It showed that many people who are blind or have low vision face frequent problems using websites and mobile apps. In November 2023, AFB researchers built on these findings by having 20 people, all blind or low-vision, fill out daily diaries for 10 days. The participants told us how many times they used digital tools each day, and how many times they had an accessibility problem. Digital tools included websites, mobile apps, kiosks (like digital point-of-sale or check-in systems), and digital documents. The participants told us what they did to resolve accessibility problems, how long it took to fix or try to fix each problem, and whether or not they ended up doing the digital task they were hoping to get done.

What did the researchers learn? The infographic shows what participants reported during a typical week. As in the first study, the participants had accessibility problems almost every day that made it harder to get things done. Kiosks were especially hard to use, since they usually had touch screens without any screen reader or braille.

As in the first study, the participants had accessibility problems almost every day that made it harder to get things done.

A week in the digital life of a blind or low vision person

12

The average participant had 12 digital barriers during the week.

2.4

They spent 2.4 hours in total dealing with those 12 barriers

24.3

On average, they used 24.3 minutes of help from a sighted person to do digital tasks when barriers arose.

2X

Digital activities took more than twice as long when they included accessibility barriers.

74%

When using kiosks like digital point-of-sale or check-in screens, participants spent 74% of the task time dealing with accessibility barriers.

68

People who used government websites lost 68 minutes for each accessibility barrier.



The participants also told us detailed stories about how digital accessibility problems affected their lives. One participant had trouble taking his daughter to a trampoline park because he couldn't sign the digital waiver form without help. Another spent three hours booking a flight because she could not use the website and had to call the airline for help. Several participants also told us they just decided not to buy things online because the websites were too hard to use.

What changes does AFB recommend based on the research?

As in the first study, businesses, technology companies, schools, government agencies, and the federal government all have a responsibility to make digital systems accessible for people with disabilities.

- The federal government must enact and enforce laws and regulations that require digital accessibility for customers and employees with disabilities. This includes issuing regulations under the Americans with Disabilities Act and the Rehabilitation Act. The government should also provide free technical assistance to help organizations follow the law. It should set standards for making kiosks accessible. Finally, federal lawmakers should pass the Websites and Software Applications Accessibility Act to help businesses make their digital systems accessible.
- Businesses and organizations that use or make websites and applications should follow up-to-date accessibility standards. They should also hire website and software creators and managers who know how to build, maintain, and buy accessible digital technologies.
- Computer science teachers at universities must include accessibility lessons in all areas of their classes.

GLOSSARY OF TERMS:

Accessible: When used to describe a website or app, it means that it can be used by people with disabilities the same way it is by people without disabilities. Accessible websites and apps let people with disabilities access the same information, engage in the same interactions, communicate as effectively, and enjoy the same services. They also provide the same privacy, independence, and ease of use.

Alt text: A written description of an image.

Digital inclusion: Making websites, mobile apps, and video programming accessible to people with disabilities.

Screen readers: Software that reads text out loud or uses a braille display so people who are blind, low vision, or deafblind can read a computer screen.

INTRODUCTION

One day in November 2023, a father took his young daughter to the local trampoline park for an afternoon of fun. Like all other guests, he was required to sign a digital waiver form before his daughter could use the equipment. Unlike most of the guests, though, this father was blind. He was unable to access the digital waiver form using the screen reader on his smartphone, and when he asked the park employees for help, he was told they were too busy to assist him.

“I sat down with my daughter and explain[ed] to her that we’re not gonna be able to play at the trampoline park because I can’t fill out the waiver form,” the father wrote in a diary entry for the second phase of the Barriers to Digital Inclusion Study.

This was not an isolated incident. As detailed in this report, diary study participants who are blind and who have low vision reported numerous accessibility barriers with websites, mobile applications, kiosks, and digital documents that presented meaningful challenges to their participation in daily activities. The participants explained in detail how these barriers not only impacted them personally but also impacted those around them and their interactions with providers of goods and services.

This study builds on the findings of our earlier Phase 1 survey of 398 blind, deafblind, and low vision participants. In that 2022 survey, 80% or more of the participants reported facing at least occasional barriers when using websites or mobile applications for important activities like shopping, online education, job-seeking, and travel booking. Phase 2 used a daily diary methodology to capture experiences with digital information and services in real time. This method produces more accurate estimates of how often barriers are encountered, how much time is lost when facing barriers, and the ways barriers are resolved. The diary participants also provided richly detailed accounts of how both digital barriers and accessible digital experiences impact their daily lives.

The participants explained how barriers not only impacted them personally but also impacted those around them and their interactions with providers of goods and services.

STUDY PARTICIPANTS

For this phase of the study, 20 participants were invited to complete daily diaries on 10 consecutive days between Monday, November 20, and Thursday, November 30, 2023 (14 participants) or between Friday, November 24, and Monday, December 4, 2023 (6 participants). The 20 participants were selected from a larger sample of 168 respondents to a pre-screening survey, in order to achieve a demographically balanced sample with a range of experiences using digital tools.

All participants were adults living in the United States who identified as being blind or having low vision and using both websites and mobile apps daily. Table 1 shows key demographic features of the sample.



Study participants who are blind and who have low vision reported numerous accessibility barriers with websites, mobile applications, kiosks, and digital documents.

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TABLE 1:

Participant Demographics

PARTICIPANTS' CHARACTERISTICS	n (percent)
Age	
18–34 years	5 (25%)
35–50 years	9 (45%)
51–65 years	3 (15%)
Over 66 years	3 (15%)
Gender Identification	
Women	10 (50%)
Men	10 (50%)
Race/Ethnicity	
White	7 (35%)
Black/African American	5 (25%)
Hispanic/Latino	3 (15%)
Asian/Asian American	3 (15%)
Native American/Pacific Islander	3 (15%)
Middle Eastern/North African	1 (5%)
Multiracial	4 (20%)
Additional Disabilities	
d/Deaf/Hard of hearing	2 (10%)
Learning/Cognitive Disability	2 (10%)
Neurological Disorder	1 (5%)
Technology Use	
Screen Reader Only	11 (55%)
Screen Reader + Magnification	5 (25%)
Screen Reader + Braille	2 (10%)
Magnification Alone	2 (10%)

DAILY PROCEDURES

Participants were invited to complete a diary each evening. In each diary, the participant was asked to consider their digital experiences in the preceding 24 hours. They recorded the number of digital activities they had done during the preceding 24 hours and the number of times those activities presented barriers in 8 categories: shopping, travel and transit, government services, healthcare, kiosks (such as digital point-of-sale systems or check-in systems), communications, and “other” activities. Then, participants were asked to share details about up to 3 specific digital barriers encountered. In an open-ended text box, participants were invited to share the task they were trying to perform, what specific barriers arose, and how they attempted to resolve the barrier. Participants reported how much time they spent on the task and how much of that time was spent specifically on resolving or trying to resolve the barrier. They also reported whether they resolved the barrier independently, with sighted assistance, or if they were unable to resolve the barrier. Finally, if the participant reported no digital barriers during the preceding 24 hours, they were invited to share details about a positive digital experience they had during the day.

Diary completion rates were excellent: most of the participants (17 participants, 85%) completed all 10 daily diaries, while one participant completed 9, one participant completed 8, and the final participant completed two diaries. This resulted in a total of 189 diary entries (94.5% of the possible 200 total).

**In digital environments,
just as in physical ones,
the same individual with
a disability can struggle
in the presence of barriers
but thrive when barriers
are removed.**

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REPORTED BARRIER PREVALENCE

Participants had digital barriers on most days: On average, during the ten-day period, each participant had 7.25 days where they reported at least one digital barrier. Six of the participants reported at least one digital barrier every day during the ten-day data collection period. Overall, participants reported an average of 1.77 digital barriers per day (range: 0-7). Table 2 shows the number of activities reported in each category across all 189 diaries, the number of barriers reported, and the percentage of activities that included barriers.

TABLE 2:

Activities and Barriers by Category

Category	Total activities	Total barriers	Barrier rate
Online Shopping	291	79	27%
Transit	106	16	15%
Education	128	35	27%
Gov. Services	82	18	22%
Healthcare	79	26	33%
Kiosks	55	24	44%
Communications	724	84	12%
Other	143	53	37%

BARRIER TYPES

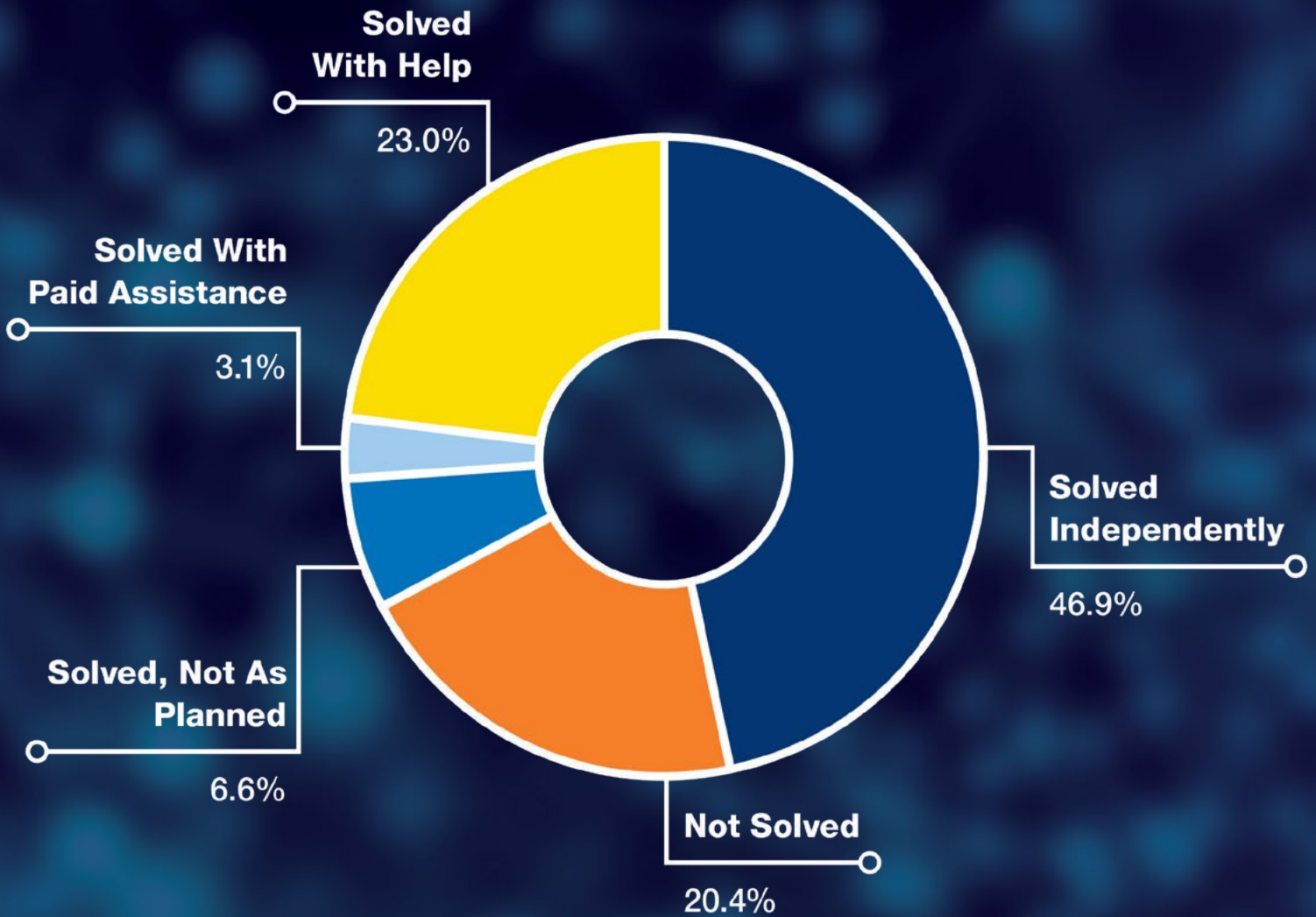
On the second page of the diaries, the participants provided detailed descriptions of a total of 227 barriers encountered. A significant number of barrier descriptions (155 counts) specifically detailed that digital interfaces were either completely inaccessible, such as kiosks in doctors' offices or grocery stores, or very challenging to use with assistive technologies like screen readers. For instance, a participant who works for a college, tasked with filling out an employee background check form, described the experience as "not only time consuming, but frankly demoralizing." The additional time and effort led them to comment, "I couldn't believe something as simple as checking a checkbox or entering my date of birth was inaccessible on a form used by hundreds of employees at my college."

There were 35 specific mentions of issues caused by unlabeled buttons and links, which made completing tasks difficult or impossible. Another participant, while attempting to purchase bus tickets online, mentioned that "the buttons that relate to selecting one way/round trip and adding to the cart" were unlabeled. This required them to "randomly select the buttons to see what happens and adjust accordingly," a process they found "deeply frustrating and time-consuming" as they had to "try one button at a time and go back a page and try a different button."

Participants with low vision reported 27 instances where they could not complete digital tasks due to poor contrast and layout, or inappropriate color themes and font sizes in web pages or applications. Other barriers included a lack of necessary image descriptions (16 counts) and website or mobile updates that degraded accessibility and usability (7 counts).

"I couldn't believe something as simple as checking a checkbox or entering my date of birth was inaccessible on a form used by hundreds of employees at my college."—Study Participant

BARRIER IMPACTS



BARRIER IMPACTS

LOST TIME AND FRUSTRATION

One study participant needed to book a flight but encountered barriers on the airline's website, reporting that the fields for choosing cities and departure dates could not be accessed on either her computer or her smartphone. After trying on both devices, she called the airline, waited on hold for two hours, and then spent an additional hour with an airline representative booking the flight and securing special assistance related to flying with her service animal. "The whole ordeal was extremely time consuming and frustrating, and if I hadn't been off from work today, there was no way I could have booked the flight," she wrote.

This participant was not alone in her experience of time lost to digital access barriers. On average, study participants reported that digital barriers cause tasks to take about twice as long as they would without barriers. Specifically, participants spent 55% of total task time dealing with digital barriers, and only 45% of that time on the task itself. That means that a task with a digital barrier that takes a sighted person 45 minutes to complete would take 100 minutes, on average, for a blind or low vision person.

This extra time often arose from participants working to resolve digital barriers independently, which was the most common strategy used. Participants reported resolving or working around digital barriers by themselves 47% of the time. Although they often succeeded in circumventing the digital barriers, this extra work had substantial negative impacts on the participants. Nearly half (N=105) of the barrier descriptions included comprehensive accounts highlighting the additional labor — extra cognitive load, extra effort, and extra steps — that participants had to navigate while conducting everyday online activities like buying jeans or accessing a child's grades. Within this context of extra labor and extra wasted time, 66 participants specifically reported feelings of frustration and anger, as well as anxiety about potentially missing opportunities if a solution could not be found. One participant, after spending three hours struggling with an inaccessible PDF for an affordable housing application, wrote that "this process is so completely anxiety ridden."

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USE OF SIGHTED ASSISTANCE

Another participant went to the doctor for a physical and bloodwork. To check in for her physical exam, she needed to interact with an iPad. The screen reader on the iPad was not activated, and the receptionist did not know how to enable accessibility. Consequently, this participant sought assistance from the receptionist with checking in. This involved giving the receptionist private information, including her date of birth and answers to questions about her mental health and mood, in earshot of other patients, while other patients entered the information privately. Then, when going to the lab for bloodwork, the participant encountered a touchscreen kiosk with no braille or text-to-speech output. At the lab, no staff were positioned to assist with the kiosk, so the participant sought help from another patient who was waiting, having to give her name and date of birth to a second stranger. “I was able to get checked in, and was called back for my bloodwork quickly. Had no one been around however, this process might have taken a very long time,” she wrote.

Participants reported using unpaid sighted assistance either from someone whom they knew or who was on hand 23% of the time when they had digital barriers. On average, the sighted helper invested 12 minutes of their time assisting with each barrier.

While sighted assistance usually led to barrier resolution, the need for sighted help limited participants’ autonomy and put a strain on relationships. In about a quarter (n=58) of the barrier descriptions, participants discussed feeling overly reliant on individuals in their circles to assist with circumventing accessibility barriers. Additionally, 11 barrier descriptions specifically cited privacy concerns associated with sharing financial or medical details with another person while getting assistance. For example, in order to get necessary assistance, participants discussed needing to verbalize private identifiable information (such as date of birth), medical details, or financial details like their banking PIN. This meant not only sharing private information with a sighted helper but also sometimes verbalizing the information in the earshot of bystanders.

Participants occasionally used a paid visual interpreter service to resolve digital barriers, but this strategy was only used in 6 barrier descriptions (3% of barriers described). When participants did use a visual interpreter service, they used an average of 10 minutes, priced at \$10. In some cases, the paid visual interpreters misunderstood requests or made errors that cost participants even more time. One participant could not access the website to buy a bus ticket. This participant sought visual interpretation support, but the visual interpreter worked inefficiently, taking so long that the fare expired and the participant was forced to pay a higher bus fare.

NON-RESOLUTION OF DIGITAL BARRIERS

In 20% of the digital barriers described, participants reported that they were unable to resolve the barrier and did not complete the task they were attempting. For example, when shopping online, some participants ended up buying nothing because they could not access the information they needed to make informed product choices. Seventeen of the barrier descriptions involved situations in which participants began the process of buying an item online, ran into digital barriers, and aborted the purchase. This negatively impacts businesses as well as potential customers. One participant simply wrote, “In general if I can’t get quality information on a product, I just won’t buy it.”

Finally, in 7% of the barrier descriptions, participants could not complete digital tasks as planned but found an alternate way to do what they needed to do. For example, some participants booked travel or obtained financial or health information via phone. One participant had trouble navigating a popular food delivery app, so they decided to just pick the first restaurant in the list instead of browsing and choosing their preferred restaurant. Such workarounds took extra time, reduced participants’ access to information, and compromised participants’ flexibility and choice.



In 20% of the digital barriers described, participants reported that they were unable to resolve the barrier and did not complete the task they were attempting.

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POSITIVE DIGITAL EXPERIENCES

The participants shared a total of 44 positive digital experiences. Encountering accessible and usable interfaces within the digital content ecosystem resulted in participants expressing a profound sense of “feeling included and not forgotten.” These expressions encompassed feelings of great satisfaction derived from the ability to independently perform daily tasks, often taken for granted by sighted individuals. Examples of these tasks included online grocery shopping, monitoring their children’s education through school apps and websites, and managing medical records and bill payments. One participant, enthused by the high level of accessibility of their children’s school website, conveyed, “It is incredibly important for me as a parent to have access to information about my kids’ schools. This app provides the kind of access I wish I had everywhere!” In another instance, a participant expressed an increased sense of confidence and a stress-free experience. Describing checking their medical lab results, they shared, “It felt great to complete this task without the need to share personal information with someone providing sighted support or expending extra energy and time to figure out how to accomplish the task.” The barrier-free nature of these digital encounters evoked highly positive emotions among participants, including feelings of satisfaction, pride, and independence.

**Businesses,
technology vendors,
government agencies,
schools, and service
providers must make
their websites,
software applications,
and kiosks fully accessible
to people with disabilities.**

**BREAKING BARRIERS TO
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FINAL THOUGHTS

The four overarching goals of the Americans with Disabilities Act (ADA) are equal opportunity, full participation, independent living, and economic self-sufficiency. Data from this diary study reveal that digital access barriers compromise the ability of blind and low vision individuals to achieve these goals. Participants explained how inaccessible websites, mobile apps, and kiosks limited their access to commerce, healthcare, government services, and education, among other areas. Although the participants often found ways to overcome or work around digital barriers, they did so at the cost of their time, their independence, and their privacy. Consistent with the findings from the first phase of the Barriers to Digital Inclusion Study, digital barriers were pervasive — experienced on a near daily or daily basis .

As for the father in our study who could not access the digital waiver form to take his daughter to the trampoline park, a kind stranger at the park intervened and aided him in signing the form, so his daughter could ultimately enjoy the benefits of the park. However, access to sighted assistance is not guaranteed. Digital access barriers do not only impact the individual user who is blind or has low vision; they can impact the user’s family members, including those who offer assistance as well as dependent family members who rely on a blind or low vision caregiver. These barriers also impact businesses when individuals are unable to purchase goods or services due to access barriers. Indeed, this study documented 17 instances when participants were ready to shop online but never made purchases because they could not fully access commercial websites.

In digital environments, just as in physical ones, the same individual with a disability can struggle in the presence of barriers but thrive when barriers are removed. Business leaders, policymakers, and website and app developers have the power to transform the everyday experiences of people with disabilities by making digital environments fully accessible. The same father who struggled with digital inaccessibility at the trampoline park explained how different his experience was on a day when he enjoyed full digital inclusion. “Today, all of my Christmas shopping and digital encounters have been very positive,” he wrote. “I was left feeling satisfied, proud, independent, and like I’m on top of the world. Going through a day without needing any sighted help is a win for a blind person like me.”

REFERENCES

- Silverman, A. M., Baguhn, S. J., Amorosino, B. B., & Carranza, R. R. (2023). *Barriers to Digital Inclusion Survey: Digital access barriers for Americans who are blind, have low vision, or are deafblind*. American Foundation for the Blind.

RECOMMENDATIONS

As described in the first Phase of the Barriers to Digital Inclusion Study, there is ample opportunity to make digital environments accessible to and inclusive of all. AFB offers the following recommendations as a starting point.

Businesses, technology vendors, government agencies, schools, and service providers must make their websites, software applications, and kiosks fully accessible to people with disabilities.

- Test for and adhere to the most recent standards for web and software accessibility. The Web Accessibility Initiative creates international standards that explain how to make content more accessible to people with disabilities, including the Web Content Accessibility Guidelines, the Authoring Tool Accessibility Guidelines (ATAG), and the User Agent Accessibility Guidelines (UAAG).
- Hire website and software engineers, designers, and project managers who are knowledgeable about how people with disabilities use digital technologies and accessible and inclusive design practices. Hire people with disabilities for key testing and design roles that impact the accessibility of the product.
- Institute internal accessibility policies (including procurement policies) to ensure that any web or app-based products that the organization buys, deploys, or sells are accessible to people with disabilities.
- Assign responsibility for delivering accessibility to specific individuals throughout the organization (e.g., human resources, product development, procurement, etc.) and where appropriate, designate a Chief Accessibility Officer to coordinate accessibility implementation.
- Designate resources and budget for accessibility activities, including training, evaluations, product updates, and customer support.
- Provide clear channels for clients with disabilities to offer feedback about accessibility and seek support when they are experiencing barriers.
- Conduct regular standardized product reviews to monitor the accessibility of websites and software applications on an ongoing basis.

Computer educators must incorporate accessibility knowledge and practices in technology design, engineering, and content creation training courses, including boot camps, corporate trainings, and academic computer science curricula.

The federal government must issue clear laws and regulations that make businesses, government agencies, and funding recipients accountable for the accessibility of the virtual environment through which they deliver all goods, services, programs, and activities.

- Issue regulations under the Americans with Disabilities Act that require employers, state and local governments, and businesses to make all of their websites and software applications accessible to customers and employees with disabilities.
- Issue regulations under Section 504 of the Rehabilitation Act to ensure that recipients of federal funding do not discriminate on the basis of disability in delivering services, programs, and activities through their websites and software applications.
- Establish and adopt standards for the accessibility of kiosks and other self-service transaction machines.
- Provide covered entities with clear, free, and easily understood technical assistance that enables compliance with digital accessibility regulations and laws.
- Pass the Websites and Software Applications Accessibility Act and other legislation to modernize requirements for accessible technology and assist businesses in implementing digital accessibility.
- Improve compliance with and enforcement of Section 508 of the Rehabilitation Act across the federal government to ensure that all federal agencies are accessible to constituents and employees with disabilities.

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