Why Should We Care About Web Accessibility?

Worldwide, more than one billion people have a disability. Disability affects one in three families in North America, and if it doesn't affect yours, it is almost a certainty that it affects someone close to you. What is important to note when looking at these statistics is that, while these numbers already make up a significant percentage of the national and global population, the proportion of people living with a disability is growing.

This is happening for several reasons. Medical and technological advancements have increased the survival rate for premature babies, which is a wonderful thing. However, this means that more babies are being born with disabilities. People are also living longer, and as they age, they develop disabilities such as hearing loss and Alzheimer's – in fact, the 2010 US Census found that 50% of adults 65 and older had a disability (as opposed to 19% across all age groups). The US is also coming out of a decade of war. With modern medicine and armor, soldiers are ten times more likely to survive an injury than in previous wars, which means that many soldiers are sustaining injuries that constitute a disability.

With miraculous medical and technological advancement comes a critical need to improve accessibility measures to accommodate the growing population of individuals with disabilities. This white paper is intended for administrators and developers of website content, media producers, accessibility coordinators, as well as instructional designers and technologists. This paper will provide you with a deeper understanding of web accessibility and will cover the following topics:

- The benefits of making your web content accessible
- Types of disabilities and online challenges
- Assistive technologies for different types of disabilities
- What is necessary in creating an accessible digital experience
- The legal landscape of accessibility
- Tips for improving your web accessibility
- Conforming with WCAG 2.0, ADA, and AODA
- Resources for accessibility compliance
The Benefits of Web Accessibility

While the primary purpose of web accessibility is to provide access to individuals living with substantial disabilities, there are many other benefits to making your web content accessible. When done well, web accessibility results in a better experience for all your visitors without tradeoffs for the general user experience. It can even reduce costs while improving market reach.

You're Missing 20% of Your Audience

With nearly 20% of Americans identifying as individuals with disabilities, if you are not making your web content accessible, you are potentially missing out on a fifth of your audience. Worldwide, you’re missing one billion people who, depending on their abilities, may not be able to buy your product, enjoy your video, navigate your website, or read your documents. By making your website accessible and opening up your content to this huge percentage of the population, you can improve your company’s reach dramatically.

Legal Compliance

There are many web accessibility standards and legal requirements that may impact your organization. In the US, Sections 508 and 504 of the Rehabilitation Act, the ADA, and the CVAA all dictate accessibility requirements for web content. The Accessibility for Ontarians with Disabilities Act (AODA) is the most progressive accessibility law in the world. Even if you are not currently implicated by web accessibility laws, it is better to be proactive in your approach to web accessibility. Recent legal decisions have expanded the scope of these laws to impact institutions that are not directly written into the law. For instance, the case of the National Association of the Deaf vs. Netflix extended the rules of Title III of the ADA – which had previously only applied to physical structures – to the Internet. The court ruled that Netflix was still a place of public accommodation, and therefore was required to add closed captions to all of its video content. This sets a profound precedent for the ADA’s application to other online places of public accommodation, including colleges and universities.

While it is not a law, WCAG 2.0 is the international standard on web accessibility, and is a standard to shoot for. Many laws, including the AODA, reference WCAG 2.0 in their requirements for web accessibility. WCAG 2.0 will be covered in depth later on in this paper.

Better Experience

Making your website accessible means providing equivalent access to all of your non-trivial content. In many cases, the accessibility measures you take can provide better engagement and comprehension for all viewers. As one example, a study by the Office of
Communications in the UK found that 80% of people using closed captions were not deaf or hard of hearing. Closed captions provide increased comprehension and retention for videos where the speaker has an accent or where the content is difficult to understand. Viewers who know English as a second language benefit from captions or transcripts because they can follow the written text more easily than the spoken words. Captions also allow viewers to fully comprehend a video in a sound sensitive environment such as a library or office.

**Search Engine Optimization (SEO)**

If you have any video or audio content, adding captions, transcripts, and descriptive text – the accessible alternatives for people who have trouble hearing or seeing – will also improve your SEO. Closed captions provide a text alternative for spoken content. Because search engines like Google can’t watch a video, this text is the best way for them to correctly index your videos. Discovery Digital Networks did a study to see the impact of captions on their SEO, and they found that adding captions to their YouTube videos increased their views by 7.32%.

Other accessibility measures that improve SEO include proper page titles, heading structures, and well-composed link text.

**Types of Disabilities and Online Challenges**

Before diving into different web accessibility techniques and assistive technologies, it is important to understand the different types of disabilities and online challenges that you must accommodate. Disability is essentially the permanent or temporary absence of a given sense. When you think of disabilities, you probably tend to think about permanent, severe disabilities (e.g., a person who has been blind since birth). In fact, many disabilities are considered to be temporary or episodic. For instance, if you broke your arm and had to wear a cast for a month, you would experience a temporary disability. There are also progressive disabilities, which are often aging-related (hearing loss, memory loss, vision loss, arthritis, etc.). The following are the most common types of disabilities that people live with.

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<thead>
<tr>
<th>Type of Disability</th>
<th>Examples</th>
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<td><strong>Visual</strong></td>
<td>Complete or partial blindness</td>
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<td>Farsightedness</td>
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<td>Nearsightedness</td>
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<td><strong>Dexterity/Mobility</strong></td>
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<td>Arthritis</td>
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All of these disabilities impact a user’s ability to interact with web content. Even people who may not think they have a disability may find that certain accessibility measures, such as the ability to magnify text, can be of benefit.

### The Impact of Inaccessible Web Content

There are numerous ways that individuals with disabilities are impacted by inaccessible web content. If you have any audio or video on your website, individuals with auditory challenges won’t be able to access that content unless you add closed captions. If your headers, tables, lists, and image alt tags are absent or inaccurate, screen readers won’t work correctly.

Users with color deficits may not be able to navigate important elements on your website that are differentiated solely by color. Does your form highlight incomplete fields in red? Do you rely on color symbols to delineate product offerings or graph elements? Someone who is colorblind...
won't be able to access any of these elements. In the Adobe Acrobat Comparison (Figure 1), different capabilities of the four Adobe Acrobat product are indicated solely by colored circles. An individual who is colorblind would not be able to differentiate the basic, standard, or advanced features of these products.

In Figure 2, the Google Apps for Business form specifies errors by highlighting the items needed to continue. However, the items highlighted are only differentiated by the color of the text. An individual who is colorblind would not see any difference between the fields highlighted by red text and the fields that are not highlighted.

**Assistive Technologies**

In a world that assumes that all faculties are available, swapping and extending senses is the creative response to making web content and technologies accessible. We are fortunate to live in an innovative era where assistive technologies are rapidly emerging to improve accessibility for the disability community. Again, designing for the extremes means that everyone can benefit. The following are some of the assistive technologies available to enhance the accessibility of web content.

**Instead of Reading Small, Magnify!**

Many people struggle with small text. For those who do, all the major operating systems now have magnification software built in. The ability to swipe, pinch, and zoom on mobile devices allows users to quickly tailor content to their specific needs. Other technologies, such as ZoomText, combine magnification with anticipatory logic and screen.
reader software. Large monitors and text size controls can further improve the web experience for people struggling to read small text on the screen.

**Instead of Seeing Unclearly, Enhance!**

Vision is a spectrum, and there are many individuals who see differently than others. Technology is being developed to help enhance the visual world for people who otherwise have difficulty. The image shown here depicts a girl wearing a product developed in Ottawa by eSight Corporation that allows someone who sees partially to reassemble what they are not seeing. As she walks through the building, an onboard computer instantly reorganizes the world around her in a way that makes better sense for her eyes and brain.

**Instead of Using a Mouse, Point Your Nose or Eyes and Blink!**

There are also many technologies that help people with dexterity or mobility challenges better interact with a computer or mobile device. People who don't have full use of their hands or arms need some way to navigate, and several products now allow people to move a mouse or cursor via gestures, head and eye movements, or blinks. The Eye Tribe is an eye tracking device that enables eye control on computers, monitors, and mobile devices. It is the world’s smallest eye tracking device, and tracks eye motions to allow users to access websites, documents, and applications that follow accessibility standards. The National Research Council’s Nouse, pictured here, is another device that tracks motion by following nose position.

**Instead of Typing, Talk!**

Speech recognition is another popular technology that allows people to speak commands rather than typing. We all are increasingly enjoying the use of Siri, Google Now, and Windows 10’s Cortana to command devices, whether due to episodic disability (driving, arms full of groceries, etc.) or a lack of touch-typing skill. Speech recognition software (like Siri, Google Now, and Windows 10’s Cortana) helps people who don’t have mobility in their fingers, but it also helps people who are in situations where they can’t type (like driving). This is a perfect example of how designing for the extremes (speech recognition software was designed in the ’90s as an accessibility measure) can prove beneficial to everyone.
Instead of Typing: Click, Sip, Puff, or Tap!

Another way around using a mouse, keyboard, or touch screen is to use a sip-puff device (such as the one pictured here on a young girl). With no use of her limbs, she can still sip or puff on the tube to emulate left and right mouse clicks. By moving her head, she can move the mouse. With this device, she can navigate any website that has content organized according to WCAG standards.

Instead of Reading, Feel!

Braille is a proven way for people who are blind to access written content without seeing it. Dynamic braille displays raise or lower dot patterns on command to help present onscreen text. Pictured here is a dynamic braille display that attaches to a desktop, laptop, phone, or tablet. There are even smartphones designed for the blind that don’t have screens at all: instead, they have a dynamic Braille display and keyboard.

Instead of Reading, Listen!

Another way to access screen content is to use a screen reader. Some screen readers are baked into the operating system (VoiceOver, which is baked into iOS and Mac OS devices, is pictured here), while more advanced versions, such as JAWS or NVDA, install as third party applications on desktop or laptop computers. As long as the web page or document is structured using accessible programming and styling, the screen reader will be able to effectively navigate all the content.

Instead of Listening, Read!

For people who are deaf or hard of hearing, audio and video content is inaccessible if it is not captioned. Transcripts are sufficient for audio only content. With video, it’s important that you use captions instead of a transcript, as captions are time synchronized with the spoken word and allow users to follow along with the context of the visuals on the screen.

Cost

Not long ago, accessible technologies were very expensive and often used proprietary hardware. However, with new innovations and evolving technology, assistive technologies are increasingly becoming affordable for everyone. For example, dedicated color detectors for people who are colorblind used to cost about $150; now, a $5 iPhone app provides the same service without the need for a secondary
device. JAWS, still the Cadillac of Windows screen readers at $1400, has lost half its market share to NVDA, a donationware open source screen reader whose functionality is improving monthly. Meanwhile, dedicated IRC chat applications are increasingly being replaced by programs like Skype, which are not primarily seen as assistive technologies. Like eyeglasses, many assistive technologies are so ubiquitous that we don’t even think of them as tools we use to overcome temporary deficits.

**Necessities of an Accessible Digital Experience**

With advances in the availability, usability, and affordability of assistive technologies, a completely accessible digital experience has never been more possible. More than ever before, web and content teams are striving to create the perfect accessible experience:

- Usable by everyone...
- ...through any user agent
- ...on any kind of device
- ...with any speed of connection
- ...in any environment

Such perfection is difficult to achieve; fortunately, perfection is not necessary. Rather, developers simply need to meet or exceed a set of minimum standards whose guidelines have been carefully developed. By planning for accessibility early in a project, it is realistic to exceed the minimums.

However, waiting until the end of the process to make a product accessible will likely cause frustration. Being retroactive in your accessibility measures is the most expensive, painful, and ineffective approach to meeting accessibility standards. If you instead plan for accessibility in the earliest stages of a project, you can achieve accessibility with a minimum of effort while reaping the greatest benefits.

**International Accessibility Standard WCAG 2.0 and the Legal Landscape of Accessibility**

While there are specific legal requirements for individual jurisdictions, there is one international standard that most legislation points to called WCAG. Note that some document standards will also point to PDF/UA, the ISO standard for accessible PDF that follows similar principles. If you are following WCAG version 2.0 Level AA, you will comply with (or exceed) most legal requirements you face for digital content. Therefore, familiarizing yourself with WCAG 2.0 guidelines is critical for making your digital content accessible. Keep in mind that accessibility laws cover more than digital content, so you will still need to take other measures to comply with all aspects of accessibility.
What Is WCAG 2.0?

The Web Content Accessibility Guidelines (WCAG) were created by the non-profit World Wide Web Consortium (W3C). WCAG consists of a series of guidelines for making web content accessible. WCAG 1.0 was introduced in 1999, and has since been superseded by WCAG 2.0, published in 2008. WCAG 2.0 is organized into four universal design principles and consists of three levels of compliance. The four principles are:

- **Perceivable**: Information and user components must be presentable to users in ways they can perceive. This means that information must be able to be perceived by everyone.
- **Operable**: User interface components and navigation must be operable. This means that the interface cannot require interaction that a user with a disability cannot perform.
- **Understandable**: Information, as well as the operation of the user interface, must be understandable. This means that all users must be able to understand the information and the operation of the user interface.
- **Robust**: Content must be robust enough that it can be interpreted reliably by a wide variety of user agents (such as browsers), including assistive technologies. This ensures that your content remains accessible as technologies evolve.

WCAG 2.0 success criteria are organized into three levels of compliance:

- The 25 Level A criteria are the highest priority and are typically the easiest to fulfill. If your product satisfies at least all of the Level A criteria, the entire product is considered to be Level A compliant. Your product will be accessible to many, though often with considerable extra effort on the part of those living with substantial disabilities.
- The additional 13 Level AA criteria yield a truly equivalent experience for most users. By fulfilling all of the Level A and Level AA criteria, your product is considered to be Level AA compliant. Level AA will generally result in content being accessible to most users, though perhaps not with equivalent access for all. With skill, you can achieve all Level AA criteria without tradeoffs for the mainstream experience.
- Level AAA provides advanced accessibility criteria. Products that comply with all Level AAA criteria are rare, and will almost certainly involve compromises for some users. More typically, companies will pick and choose Level AAA criteria depending on the content and audiences of a given product.
For example, according to WCAG 2.0 guidelines for multimedia, the following is required for captioning a video:

- Level A Compliance: Captions, Prerecorded (1.2.2). Captions are provided for all prerecorded audio content in synchronized media, except when the media is used as an alternative for text and is clearly labeled as such.
- Level AA Compliance: Captions, Live (1.2.4). Captions are provided for all live audio content in synchronized media.
- Level AAA Compliance: Sign Language, Prerecorded (1.2.6). Sign language interpretation is provided for all prerecorded audio content in synchronized media.

As you can see, the requirements become more difficult to implement as the level of compliance increases from A to AA to AAA.

Realistically, writers, designers, developers, producers, marketers, and publishers should aim to make all their digital content AA compliant – and, indeed, most accessibility laws that reference WCAG 2.0 point specifically to either level A or Level AA, depending upon the size and sector of the organization.

Section 508 Refresh (USA)

WCAG 2.0 will soon be broadly referenced in the United States. Section 508 of the Rehabilitation Act, which dictates accessibility requirements for federal programs and services in regards to electronic and information technology, is in the process of being updated to reflect modern technology. This update is known as the “Section 508 Refresh.” The United States Access Board submitted a proposed rule in February of 2014 that directly referenced WCAG 2.0 level A and AA success criteria. When this refresh is confirmed, anyone who is implicated by Section 508 will have to update their web accessibility measures to conform to the referenced Level AA WCAG 2.0 standards.
AODA (Ontario)

Ontario has the most progressive, widespread accessibility law in the world, and is the first to pass specific regulations that apply to both private and public sector organizations as well as government entities. The Accessibility for Ontarians with Disabilities Act (AODA) was instated in 2005 with the objective of creating a barrier-free Ontario by 2025, calling for a giant overhaul of the Ontarian infrastructure. In 2011, specific regulations (known as the IASR) precisely identified deadlines and compliance levels for government as well as private sector and non-government organizations.

The AODA Standards for Information and Communications sets regulations for electronic communications, stating that organizations must make public-facing websites and web content accessible according to WCAG 2.0. As of 2015, all sectors except for small private organizations must be WCAG 2.0 level A compliant. Beginning on January 1, 2016 and phasing in through 2021, organizations in Ontario must become level AA compliant. While the AODA requirements are being phased in gradually, it remains the most progressive accessibility law in the world and provides a clear, actionable roadmap for organizations to follow.

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**Deadlines for the Information and Communications Standard of the AODA**

**WCAG 2.0 Around the World**

Meanwhile, governments all over the world are following North America’s lead. Having studied legislation from over fifty countries, many countries are pointing to some level of WCAG compliance.
Compliance Testing

Auditing is a critical step in making sure your web content is WCAG 2.0 compliant. With 38 rules dictating WCAG 2.0 Level AA conformance, it is critical to audit your products to find out what works and what still needs attention. Auditing, testing, and reporting can also be valuable in proving to regulators and users that your product or site is meeting accessibility requirements. In 2014, W3C published WCAG-EM, a methodology that provides a framework for minimum standards for reporting on WCAG compliance.

Next Steps

While it is helpful to meet as many WCAG 2.0 guidelines as you can, some of the standards are more actionable than others. There are many excellent resources online to help you implement WCAG standards. W3C provides a checklist for WCAG criteria along with tips for meeting standards. They are simple to understand and follow, and can help you move towards full compliance without having to delve into the often-daunting details of the full WCAG 2.0 documentation. Always keep in mind that it is better to do what you can than to do nothing at all – and that you don't have to do it alone. There is an enthusiastic and dedicated community of accessibility advocates on the web who are eager to share their knowledge and techniques. There are also great resources available to help you implement accessibility, some of which we have included at the end of this paper.

With the worldwide population of individuals with disabilities at around one billion, accessibility is a critical component of any web content strategy. By building accessibility into your publishing process, you will make your web content more robust, broaden your reach, drive down costs, and comply with legislation.

**WCAG 2.0 Level AA Requirements**

Please review the [W3C’s full list of requirements](#) for more details on each standard, below.

- **Principle 1: Perceivable – Information and user interface components must be presentable to users in ways they can perceive.**

![WCAG 2.0 as a legal standard trending globally](image-url)
Guideline 1.1 Text Alternatives: Provide text alternatives for any non-text content so that it can be changed into other forms people need, such as large print, braille, speech, symbols, or simpler language.

1.1.1 Non-text Content: text alternatives are provided for all non-text content. (Level A)

Guideline 1.2 Time-based Media: Provide alternatives for time-based media.

1.2.1 Audio-only and Video-only (Prerecorded): An alternative for time-based media is provided for prerecorded audio-only or video-only content. (Level A)

1.2.2 Captions (Prerecorded): Captions are provided for all prerecorded audio content. (Level A)

1.2.3 Audio Description or Media Alternative (Prerecorded): An alternative for time-based media or audio description of the prerecorded video content is provided. (Level A)

1.2.4 Captions (Live): Captions are provided for all live video content. (Level AA)

1.2.5 Audio Description (Prerecorded): Audio description is provided for all prerecorded video content. (Level AA)

Guideline 1.3 Adaptable: Create content that can be presented in different ways (for example simpler layout) without losing information or structure.

1.3.1 Info and Relationships: Information, structure, and relationships can be programmatically determined or are available in text. (Level A)

1.3.2 Meaningful Sequence: When sequence affects meaning, a correct reading sequence can be programmatically determined. (Level A)

1.3.3 Sensory Characteristics: Instructions do not rely solely on sensory characteristics (shape, size, visuals, orientation, sound). (Level A)

Guideline 1.4 Distinguishable: Make it easier for users to see and hear content, including separating foreground from background.

1.4.1 Use of Color: Color is not used as the only visual means of conveying information. (Level A)

1.4.2 Audio Control: A mechanism is available to pause or control the volume of audio that plays automatically. (Level A)

1.4.3 Contrast (Minimum): Visual presentation of text/images of text has a contrast ratio of at least 4.5:1. (Level AA)

1.4.4 Resize Text: Text can be resized without assistive technology and without loss of content/functionality. (Level AA)

Principle 2: Operable – User interface components and navigation must be operable.

Guideline 2.1 Keyboard Accessible: Make all functionality available from a keyboard.

2.1.1 Keyboard: All functionality of the content is operable through a keyboard interface. (Level A)

2.1.2 No Keyboard Trap: Focus can be moved to or from a component of the page using only a keyboard interface. (Level A)

Guideline 2.2 Enough Time: Provide users enough time to read and use content.

2.2.1 Timing Adjustable: User can turn off, adjust, or extend time limits set by the content. (Level A)

2.2.2 Pause, Stop, Hide: There is a mechanism for the user to pause, stop, or hide any moving, blinking, scrolling, or auto-updating information. (Level A)
Guideline 2.3 Seizures: Do not design content in a way that is known to cause seizures.

- 2.3.1 Three Flashes or Below Threshold: Web pages do not contain anything that flashes more than three times in any one second period. (Level A)

Guideline 2.4 Navigable: Provide ways to help users navigate, find content, and determine where they are.

- 2.4.1 Bypass Blocks: A mechanism is available to bypass blocks of content that are repeated. (Level A)
- 2.4.2 Page Titled: Web pages have titles that describe the topic or purpose. (Level A)
- 2.4.4 Link Purpose (In Context): The purpose of each link can be determined from the link text alone. (Level A)
- 2.4.5 Multiple Ways: More than one way is available to locate a web page within a set of web pages. (Level AA)
- 2.4.6 Headings and Labels: Headings and labels describe topic or purpose. (Level AA)
- 2.4.7 Focus Visible: Any keyboard operable user interface has a mode of operation where the keyboard focus indicator is visible. (Level AA)

Principle 3: Understandable – Information and the operation of user interface must be understandable.

Guideline 3.1 Readable: Make text content readable and understandable.

- 3.1.1 Language of Page: The default human language of each web page can be programmatically determined. (Level A)
- 3.1.2 Language of Parts: The human language of each passage or phrase in the content can be programmatically determined. (Level AA)

Guideline 3.2 Predictable: Make web pages appear and operate in predictable ways.

- 3.2.1 On Focus: When any component receives focus, it does not initiate a change of context. (Level A)
- 3.2.2 On Input: Changing the setting of any user interface component does not automatically cause a change of context. (Level A)
- 3.2.3 Consistent Navigation: Repeated navigational mechanisms occur in the same relative order each time they are repeated. (Level AA)
- 3.2.4 Consistent Identification: Components that have the same functionality within a set of web pages are identified consistently. (Level AA)

Guideline 3.3 Input Assistance: Help users avoid and correct mistakes.

- 3.3.1 Error Identification: If an input error is automatically detected, the item is identified and the error is described to the user in text. (Level A)
- 3.3.2 Labels or Instructions: Labels or instructions are provided when content requires user input. (Level A)
- 3.3.3 Error Suggestion: If suggestions for correcting an input error are known, then the suggestions are provided to the user. (Level AA)
- 3.3.4 Error Prevention (Legal, Financial, Data): For web pages with legal commitments or financial transactions, submissions should be reversible, data should be checked for errors, and a mechanism should be available for reviewing, confirming, and correcting before finalizing submission. (Level AA)

Principle 4: Robust – Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies.
Guideline 4.1 Compatible: Maximize compatibility with current and future user agents, including assistive technologies.

- **4.1.1 Parsing:** In content implemented using markup languages, elements have complete start and end tags, are nested according to specifications, do not contain duplicate attributes, and IDs are unique. *(Level A)*
- **4.1.2 Name, Role, Value:** For all user interface components, the name and role can be programmatically determined and set. *(Level A)*

**Resources**

**WCAG 2.0 and Accessibility Laws:**

- [W3C's WCAG 2.0](https://www.w3.org/WAI/standards-guidelines/wcag) requirements
- [W3C](https://www.w3.org)
- [WebAIM's WCAG 2.0 checklist](https://www.webaim.org/technologies/wcag)
- [AODA](https://www.ada.gov)
- How the [AODA Impacts Web/Video](https://www.ada.gov)
- [Section 508](https://www.section508.gov)
- How [Section 508 Impacts Online Video](https://www.section508.gov)
- [Section 508 refresh](https://www.section508.gov)
- [The ADA and Online Video](https://www.ada.gov)
- [UK Accessibility Laws](https://www.gov.uk)
- [Australia and New Zealand](https://www.gov.au) Accessibility Laws

**Tools, Resources, and Testing:**

- [Zimmerman Low Vision Simulation Kit](https://www.zimmermanlowvision.com) by Pittsburgh’s Dr. George J. Zimmerman
- [Regulations on the universal design](https://www.itso.ca) of Information and Communications Technologies (ICT)
- [Cambridge Simulation Glasses](https://www.cambridgesimulation.com)
- [Cambridge Simulation Gloves](https://www.cambridgesimulation.com)
- [Impairment Simulator Software](https://www.impairmentsoftware.com)
- Best source in Canada for [JAWS software](https://www.jawssoftware.com) and a great source for many other assistive technologies
- [Filter Keys](https://www.filterkeys.com) for Windows
- [Slow Keys](https://www.slowkeys.com) for MacOS
- [Tobii EyeMobile](https://www.tobii.com) for Windows tablet
- [The Eye Tribe](https://www.eye-tribe.com)
- [Braille displays](https://www.brailledisplays.com) for MacOS
- [Braille displays](https://www.brailledisplays.com) for iOS
- [Braille commands for VoiceOver navigation](https://www.braille.nu) from a braille display
- [English to Braille](https://www.braille.nu) online translator
- [JAWS for Windows](https://www.jawssoftware.com)
- [NonVisual Desktop Access (NVDA)](https://www.nvaccess.org)
- [Browsealoud](https://www.browsealoud.com)
- [Characters as Read by JAWS and Window-Eyes](https://www.jawssoftware.com)
- Free [PDF Accessibility Checker](https://www.pdfaccessibilitychecker.com) (PAC 2)
About David Berman

David Berman has over 30 years of experience in inclusive design: he strongly believes we can include everyone, without tradeoffs. As author (*Do Good Design* [Pearson, 2013]), expert speaker, and strategist, his work has brought him to over 50 countries. David is an Invited Expert to W3C and a high-level advisor to the United Nations on accessible Web design thinking. He’s also an International Advisor at G3ICT, advising governments on inclusive design policy, and chair of the Carleton Access Network at Carleton University. He serves on the ISO committee for accessible PDF. Clients include BMO, IBM, the International Space Station, and the Canadian Human Rights Commission.

Website [www.davidberman.com](http://www.davidberman.com)

About 3Play Media

3Play Media provides cost-effective, premium quality captioning, transcription, and subtitling solutions to more than 1,600 customers in higher education, enterprise, entertainment, media, and government. Our mission is to simplify the process by providing a user-friendly account system, flexible APIs, and integrations with a multitude of video players, platforms, and lecture capture systems.

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