



2021 Accessibility Testing Guide

- ▶ **A Comprehensive Guide about the Universe of Quality Assurance Accessibility Testing**

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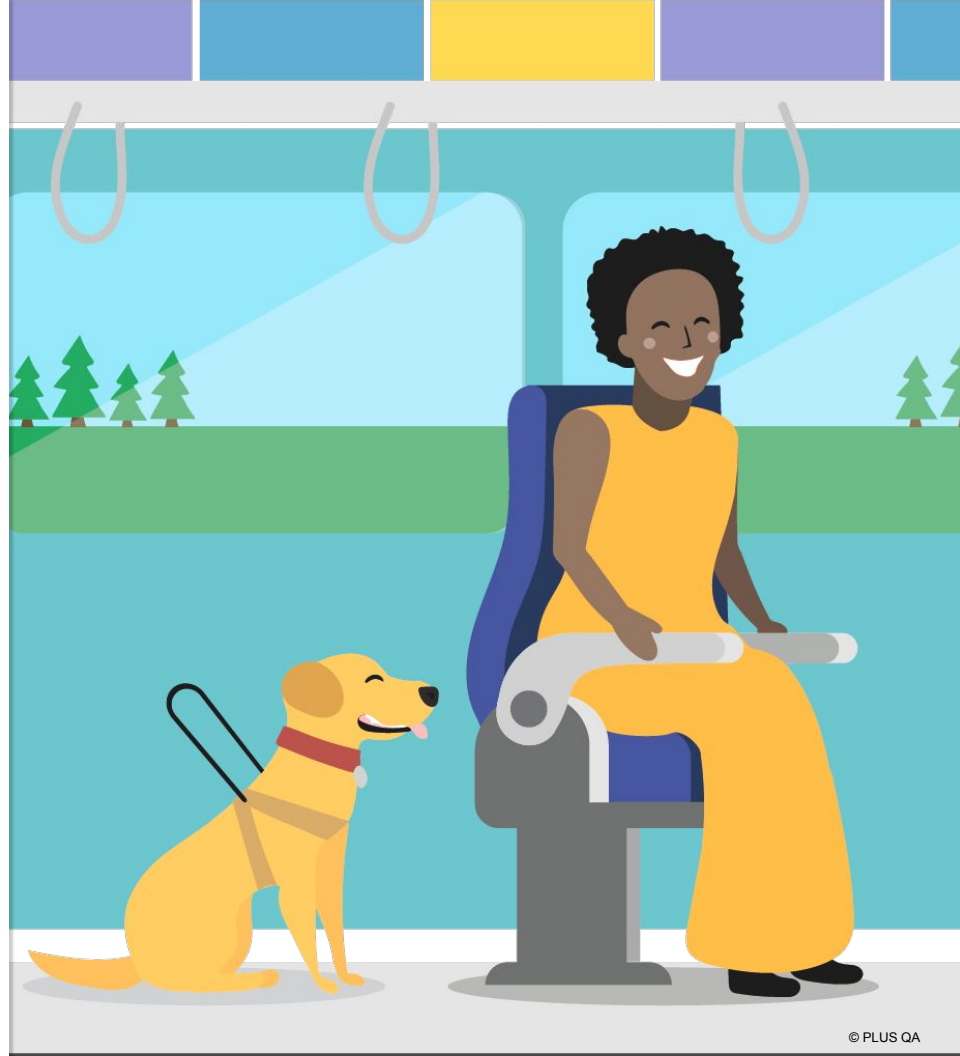


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Introduction

Global Accessibility Awareness Day (GAAD) is a global event intended to bring awareness and focus to digital access and inclusion for the millions of people with disabilities around the world. This day is celebrated annually on the third Thursday of May.

Every year PLUS QA celebrates GAAD by releasing blog posts, images and video content throughout the month of May. In addition, this year we have interviewed our team of testers with disabilities to emerge ourselves in the accessibility testing world to understand what accessibility testing means, and how to test softwares and mobile applications to guarantee that they can be accessed by anyone, anywhere.



About PLUS QA

PLUS QA was founded in 2008 in Portland OR, with the idea to change how quality assurance testing as a service was delivered to startups and digital agencies and brands.

In 2015 we founded an Accessibility Testing Team which has only grown over the years. In 2019, we partnered with the Oregon Commission for the Blind. Since then, we have built one of the sharpest accessibility teams in the country and have helped dozens of companies allow millions of users with disabilities around the world to access their apps.

This guide will interest you if you are a product/project manager, a designer, a developer or anyone who is interested to make the digital space accessible to all.

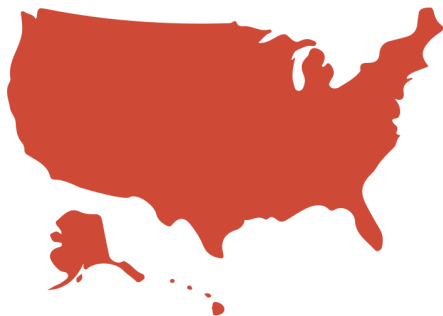


Disabilities in the United States

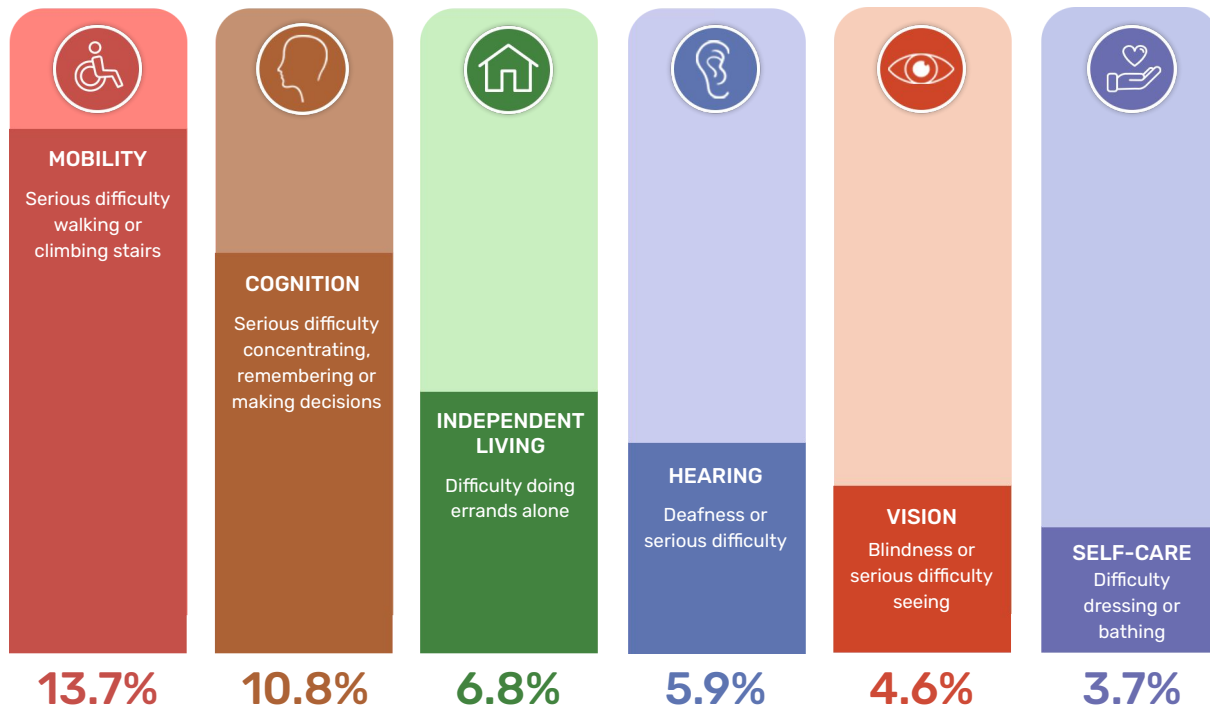
26%

(1 in 4)

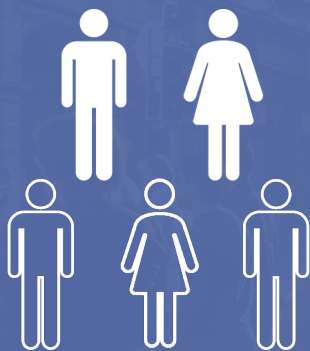
of all Adults in the United States
have some type of disability



61 million adults in the United States live with a disability



Source: CDC.gov - Disability Impacts All Of Us



2 in 5

Adults aged 65 years and older
have a disability



1 in 4

Women have a disability



2 in 5

Non-Hispanic American Indians /
Alaskan Natives have a disability

Source: CDC.gov - Disability Impacts All Of Us

POUR Principles

WCAG 2.0 and 2.1 provide referenceable technical standards. For each guideline there are testable success criteria that are categorized into 3 levels of conformance. These levels each address the needs of different groups and situations.



VISION

- Text spacing & sizing
- Color scheme & contrast
- Content is not designed in a way that is known to cause seizures
- Ease of navigation
- Usability of site when using Magnifier / Zoom



HEARING

- Video captions are provided
- Text alternatives are provided for any non-text content
- Ease of navigation



PHYSICAL

- Keyboard only pass
- Mouse only pass
- Screen Reader pass
- Ease of navigation
- Usability when images are turned off



COGNITIVE

- Alternatives for time-based media are provided
- Users have enough time to read and use content
- Ease of navigation
- Usability when images are turned off
- Mouse only pass

Levels of Accessibility

The 3 Levels of Conformance are:

- ▶ A (lowest)
- ▶ AA (mid-range)- includes all A and AA requirements
- ▶ AAA (highest)- includes all A, AA, AAA requirements

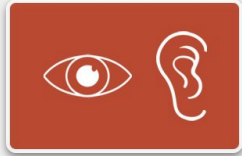
Overall, most companies aim to hit AA compliance. Some examples of WCAG 2.1 requirements are 'text alternatives,' 'does not cause seizures or physical reactions,' 'readable and understandable text' and 'compatibility with current and future user tools.'

The updated WCAG 2.2 compliance is said to launch later in 2021.

Source: US Census Bureau

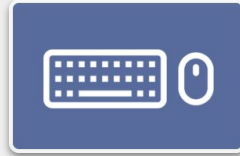


POUR is an acronym for four high-level principles that describe functional accessibility. Accessible technology is Perceivable, Operable, Understandable and Robust. In addition to websites, most other information technology can be made accessible by applying the POUR principles. Many of the technology challenges faced by people with disabilities can be described using one of the POUR principles:



Perceivable

Text alternatives
Time-Based Media
Adaptable
Distinguishable



Operable

Keyboard accessible
Enough Time
Seizures and Physical
Reactions
Navigable
Input Modalities



Understandable

Readable
Predictable
Input Assistance



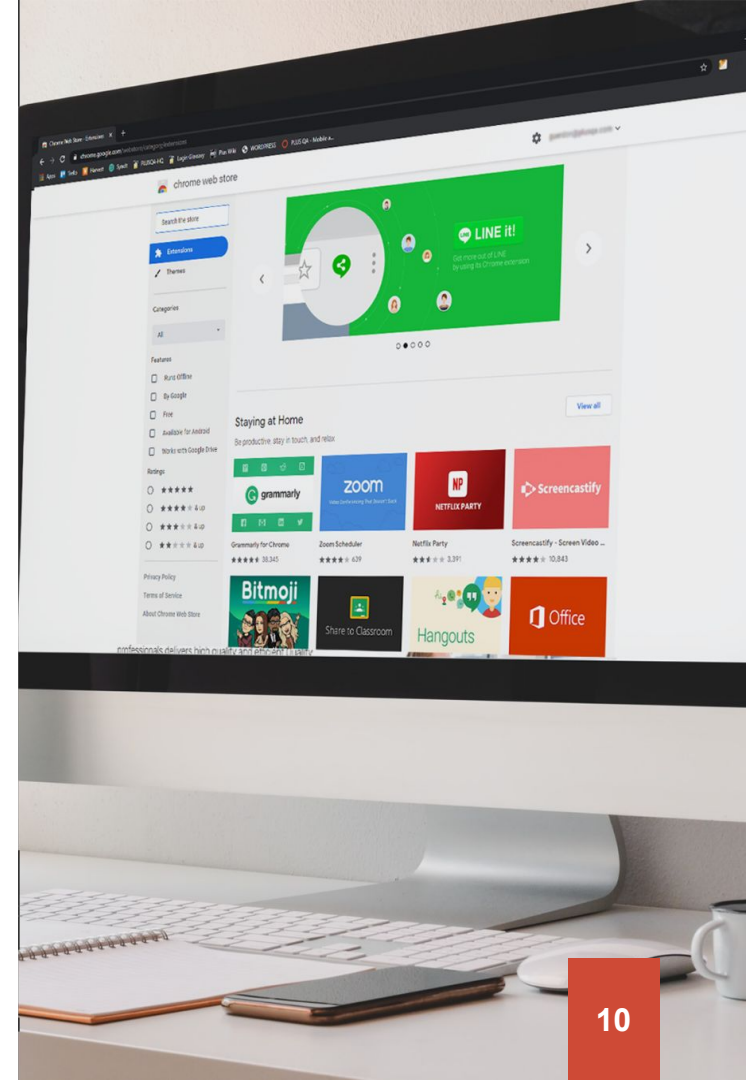
Robust

Compatible
(website's content
and back-end coding
are compatible with
assistive
technologies)

Testing Tools

Automated testing tools can increase the efficiency of testing a website or mobile application. Although these tools can't identify every error, they can often highlight programmatic or semantic markup issues that are present. There are multiple tools, from Chrome extensions to mobile apps that can help identify potential accessibility issues for you:

- ▶ **WAVE**
A Chrome extension that allows users to click on the icon while visiting a web page to receive visual feedback about the accessibility of its content.
- ▶ **Siteimprove Accessibility Checker**
A Chrome extension that provides intuitive, visual feedback about your content by highlighting detected issues right on the page.
- ▶ **axe DevTools**
A Chrome extension that can help find and fix accessibility issues on your website.
- ▶ **Colour Contrast Analyser**
A Chrome extension that helps determine and change the contrast of visual elements, and includes a color blindness simulator and text legibility feature.
- ▶ **Accessibility Scanner**
An Android app that scans mobile applications and identifies areas that could be improved for greater accessibility.

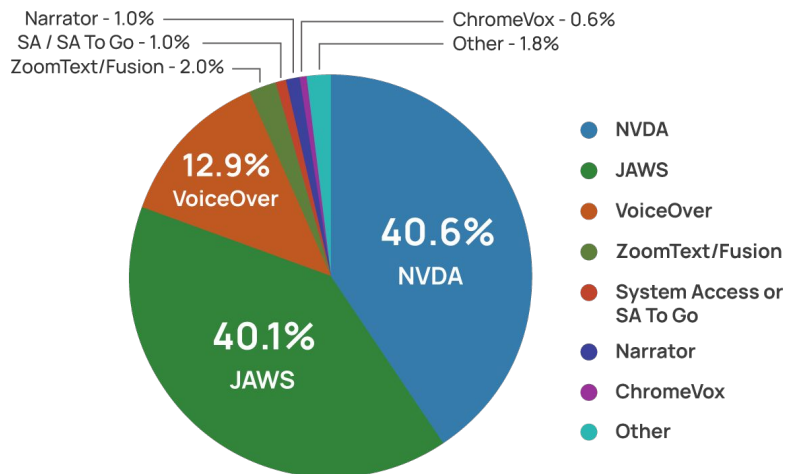


Automated Solutions

Automated solutions are more common and a lot of companies claim this is the new solution to solve accessibility problems by implementing specific line of codes in your application. This type of information is often misleading and automated testing currently cannot replace the quality of a professional accessibility tester to find bugs in a piece of software.

- ▶ Designers and developers often assume a site is good if after automated testing no bugs are reported, but even the best automated tools can only catch about a third of WCAG compliance accessibility errors.
- ▶ An automated testing tool can tell you if something is missing such as an image alternative description, but for example, it lacks the ability to decipher if a description is accurate or used in the right context.
- ▶ The best way to ensure you catch all issues and bugs on a site is by combining both automated solutions and manual testing, so you utilize the efficiency from automated tools as well as the out of the box and critical thinking of a person.

Most Used Screen Readers



Screen Reader	# of Respondents	% of Respondents
NVDA	493	40.6%
JAWS	487	40.1%
VoiceOver	157	12.9%
ZoomText/Fusion	24	2.0%
Other	22	1.8%
System Access or SA To Go	12	1.0%
Narrator	12	1.0%
ChromeVox	7	0.6%

[WebAIM](#), a non-profit organization based at the Center for Persons with Disabilities at Utah State University, surveyed 1,224 screen reader users in 2019 about their preferences on desktops/laptops.

The survey demonstrated that NVDA and JAWS were the most popular. NDVA was preferred by 40.6% of users, followed closely by JAWS at 40.1%. VoiceOver accounted for 12.9%. Usage of all other screen readers taken together only accounted for 6.4% of the respondents.

The Importance of Video Captions

Video captions are an important part of creating accessible content. Although captions are vital for the deaf and low hearing community, they can also be beneficial to everyone. Many people watch videos without the audio on social media sites, and captions can be beneficial to blind people as well.

Clarity

Speech is often unclear in videos and providing captions allows for viewers to better understand the content. It can also be hard for users to follow along to the speech when the user is not a native speaker of the language in the video. This can be true for blind users as well, the captions need to be properly utilized so a screen reader can convey the information at the right time. Adding captions allows all users to understand the content better.

Video Navigation

Skipping forward or rewinding videos is a visual endeavor, wherein sighted watchers scrub through to the scene they're looking for. Blind watchers often use hearing to recognize the scene, but there are scenarios where captions are better than audio.



The Importance of Video Captions

Obstacles

Although captions are clearly beneficial for everyone, they are not often accessible to blind users. Open captions, which are burned into the video and can't be turned off, are totally inaccessible for screen readers. Closed captions can be accessible but aren't by default. These captions need to be made accessible to screen readers and read automatically by them to be beneficial. In addition to that, they need to be tagged correctly so that they are read in the right order for screen readers (scrolling captions often cause such issues).

Testing Captions

Testing video captions involves confirming multiple aspects of the user experience, some of which are detailed below:

- Confirm that captions can be accessed and controlled with screen readers on mobile and desktop.
- Confirm that captions are automatically and accurately read by different screen readers.
- Include the correct localization attributes if providing foreign language captions, and confirm that the screen reader reads the correct captions for the user.
- Navigate to the text with a screen reader to confirm that the caption can be read manually.

Experience and Interviews with Testers

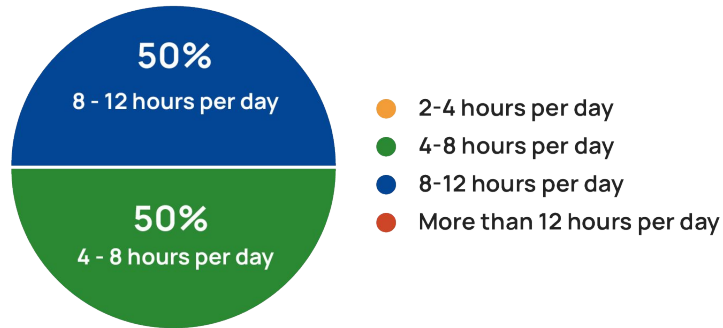
We interviewed testers with disabilities to gather information about what tools they use the most as well as what platforms they prefer to use. With this information, we were able to gather some hands on experience on the top Screen Readers, whether a desktop or app is preferable and what kind of technologies are most helpful and impactful.

What screen reader do you use?
JAWS
NVDA
VoiceOver

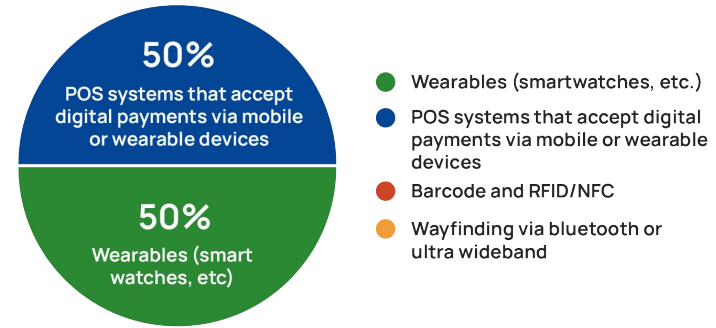
When you shop online, which websites apps do you use the most?
Amazon
Instacart
Apple Store
Target

(Nearly all respondents preferred using these services apps)

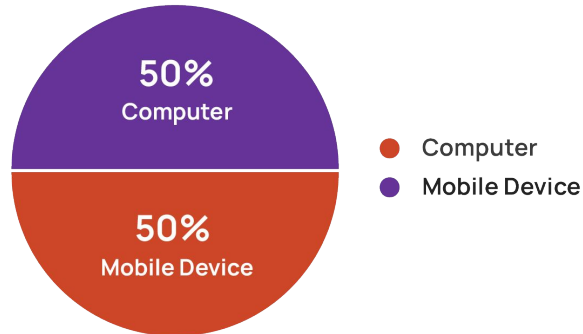
Time Spent Per Day Using Desktop & Mobile Devices



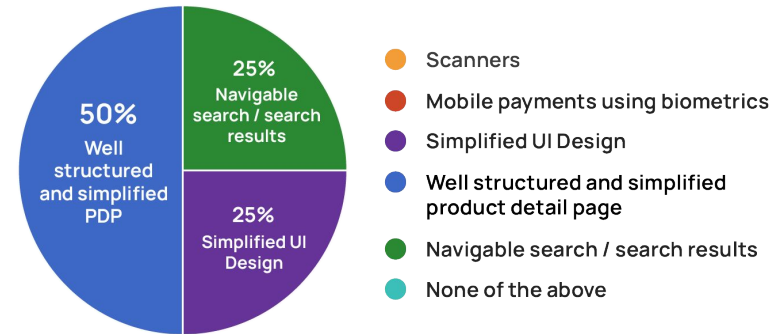
Most Helpful and Impactful Technologies



Personal Devices with Most Usage



Most Encouraging Features for E-Commerce



Accessible Game Design

Making accessible products doesn't solely help individuals with disabilities go about their day-to-day. Accessibility testing also helps give users with disabilities access to entertainment products like gaming which for some can offer therapy, pain relief, escapism and independence. (Game Accessibility Guidelines)

If a game is still in the design documentation phase, it can be significantly easier to implement accessibility since guidelines can be met with simple design decisions instead of needing to retrofit later. In the case that accessibility is approached later in the development process, a choice can be made on the level of accessibility that makes sense for the project based on the reach, impact and value (cost to implement).



Accessibility in Game Design can be broken down into four primary categories: motor, cognitive, vision and hearing. Within each of these categories, a variety of accessibility options are available that include: control remapping and sensitivity, subtitles and high contrast text, no mandatory quick time events or rapid button pressing, scaling the level of difficulty and even options to entirely skip sections of the game. The Last of Us Part II (Sony Interactive Entertainment, Naughty Dog), released in June 2020 with more than 60 accessibility settings, including expanded options focused on fine-motor and hearing, as well as completely new features that benefit low-vision and blind players. The game received a Game Award the same year for Innovation in Accessibility and is lauded by the gaming community as being one of the most accessible video games ever released.

Accessibility Gamers Worldwide

Over 2.8 billion people across the world participate in digital gaming (Mut) and according to research conducted by the Accessibility Foundation in Utrecht, The Netherlands, approximately 92% of people with some kind of impairment also play video games. Furthermore, people with disabilities play a lot of video games each week - as much as 10.3 hours on average or in some cases, as high as 25 hours. (Wing Chin)

For gamers with motor impairments, it is often difficult or impossible to use conventional controllers such as a keyboard & mouse or a gamepad to play video games. Thankfully, there has been a ton of innovation in the development of alternate input devices and adaptive controllers, and organizations like Microsoft or AbleGamers are connecting with impaired players and empowering them with technology to help them play video games. These include switch inputs, brain wave controllers, head trackers, eye controllers, mouth controllers or one-handed controllers. (Yuan, Folmer, Harris Jr.)



2.8 billion

People across the World
participate in digital gaming



10.3 hours

of gameplay on average,
per week

Video Game Accessibility Resources

AbleGamers

Modifies and adapts controllers for gamers with disabilities and raises awareness of the importance of accessibility within the gaming community. Publishes articles on trends in accessible gaming and presents at gaming conferences. A nonprofit organization that does not charge for its services.

www.ablegamers.org

AppleVis

Publishes accessibility reviews of iOS applications, including more than four hundred games, submitted by Apple users who are blind or visually impaired.

www.applevis.com

Accessible Games

Provides standards from the AbleGamers Foundation for making games accessible to people with visual, physical, auditory and cognitive disabilities.

<https://accessible.games>

Game Accessibility Guidelines

Offers examples and advice on how to structure video games for people with disabilities. Developed by gaming studios and academics.

www.gameaccessibilityguidelines.com

Source: National Library Service For the Blind and Print
Disabled Library of Congress:

Accessibility in the Mixed Reality Universe

Augmented and virtual reality is becoming more popular, but the experiences are often not designed with accessibility in mind. It's important that AR and VR products and services function well with screen readers, keyboard-only users and other assistive technologies. There are also key elements to AR and VR design that improve accessibility for different disabilities.

Mixed reality headsets are often cumbersome and heavy to wear. Many use hand-tracking or handheld controls that can be hard for people with limited mobility to use. These aspects need to be addressed in the design of the devices, so that they don't rely on motion control or voice navigation only, but are also compatible with accessible gamepads.

Creating accessible augmented and virtual reality environments for those with visual disabilities is actually as easy as adhering to common website accessibility standards. Being purposeful with color and contrast ratios, including immersive sound effects, adding audio descriptions and allowing magnification of images and text can create an accessible AR/VR space.

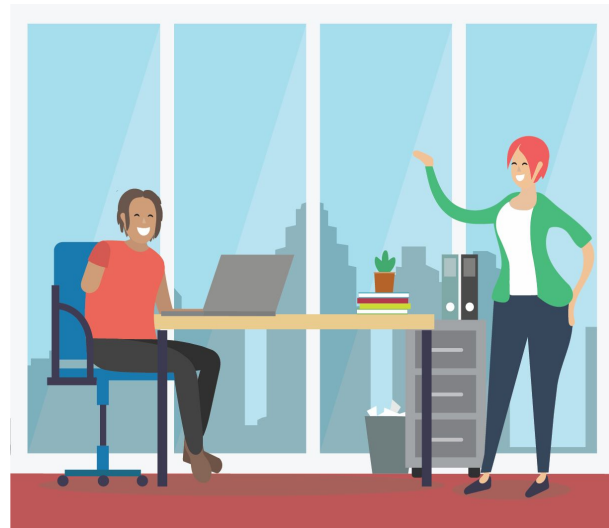
To ensure accessibility for people who are deaf or hard of hearing, simply adhere to the standards for website accessibility. Including captions that identify the speaker and note other sound effects or significant audio in addition to dialog will allow these users to effectively experience augmented and virtual reality.

Conclusion

Accessibility is a human right and by making your applications accessible to everyone, you are opening your digital space to millions of more users. Although this day is only celebrated once a year, this topic should be more consistently top of mind. Accessibility is something that needs to be continually tested for, not only before the release of a live product, but after updates and fixes as well. Small details can easily be looked over.

We have discussed accessibility in regards to customer facing, but by also allowing for an accessible digital space internally, you allow for a diverse profile of employees. Even in testing, you can create accessible platforms for bug tracking so that people with disabilities can join your development team.

At PLUS QA, our Accessibility Team stays up to date with testing approaches and finds innovative ways to allow for a better user experience for those with disabilities. If you need accessibility testing completed on your site or app, we would be happy to connect you with our [professional team](#).





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