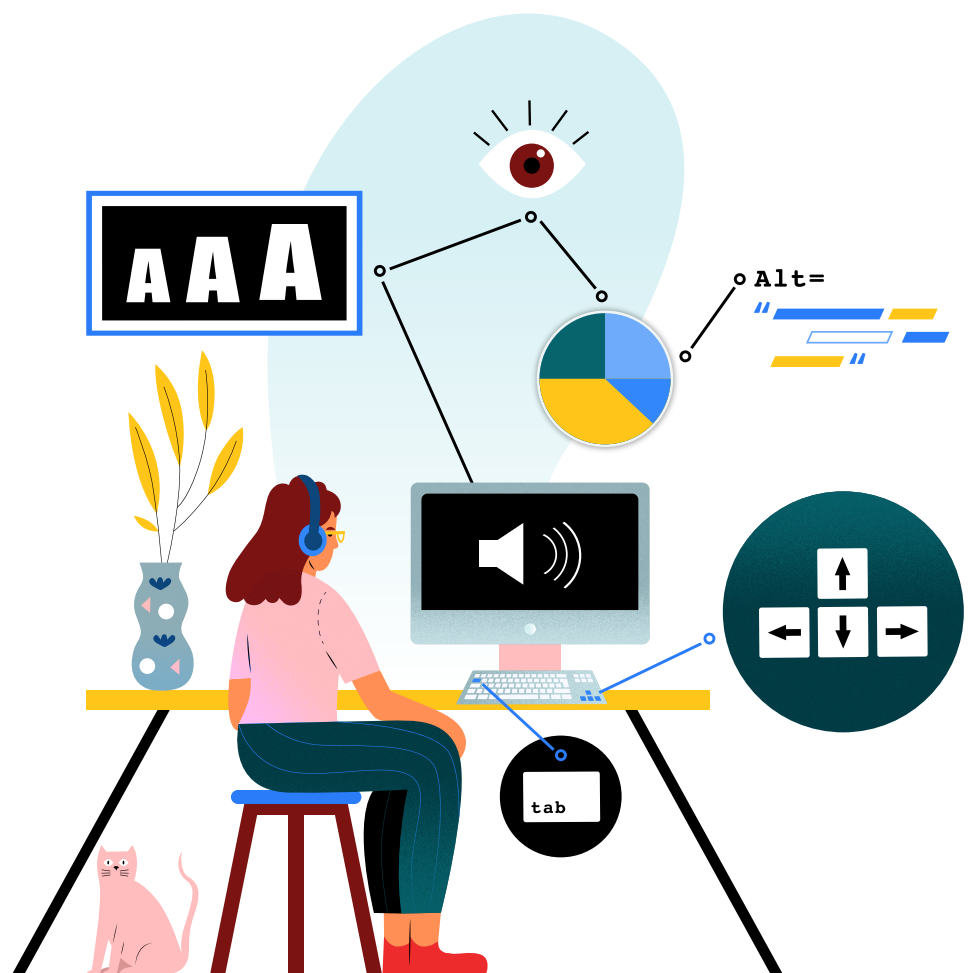


Building accessible learning products: A best practice guide to inclusive design in assessment



Contents

Learnosity's approach to accessibility	3
Boldly go beyond the guidelines	5
Refine a process for inclusive design	7
Follow our assistive technology requirements	10
A Color contrast designed for color-blind and low vision users	12
B Keyboard usability for accessible input and navigation	13
C Screen reader support for the leading tools on each platform ...	14
D Transcripts, closed captions and alternate videos for accessible audio content	16
E Adjustable fonts to improve legibility for users with reading difficulties	17
Ask vendors the right questions	19
Summary: Embrace accessibility to enhance product quality	20

Learnosity's approach to accessibility

Learnosity was founded upon a simple belief: by helping other edtech companies build better assessments, we help more learners achieve better outcomes.

Accessibility is intrinsic to that belief, because we can reach even more learners when our customer's products are more accessible. We're committed to removing all barriers to digital learning—whether they're caused by language differences, internet inequality, or disability.

That's why we've invested so much of our expertise and time on making our assessment infrastructure accessible. We put accessibility at the heart of our product development to highlight learner ability, not disability, because all learners have the right to an equal playing field.

We bake accessibility into our product development lifecycle from the get-go and continuously work to ensure legacy features are brought up to speed with the highest regulatory standards.

Building and maintaining accessibility within assessment products is a massive commitment. Learnosity is an expert in the field of accessible assessment, so we're sharing our hard-won insights and tried-and-tested methods to help you create a more inclusive learning experience.

Accessibility is not a bolt on.
It's something that must be built in
to every product we make so that
our products work for everyone.
Only then will we empower every
person and every organization
on the planet to achieve more.

Satya Nadella
Microsoft CEO¹

Boldly go beyond the guidelines

Making a product more accessible means making it more usable—which is why inclusive learning products are simply better learning products.

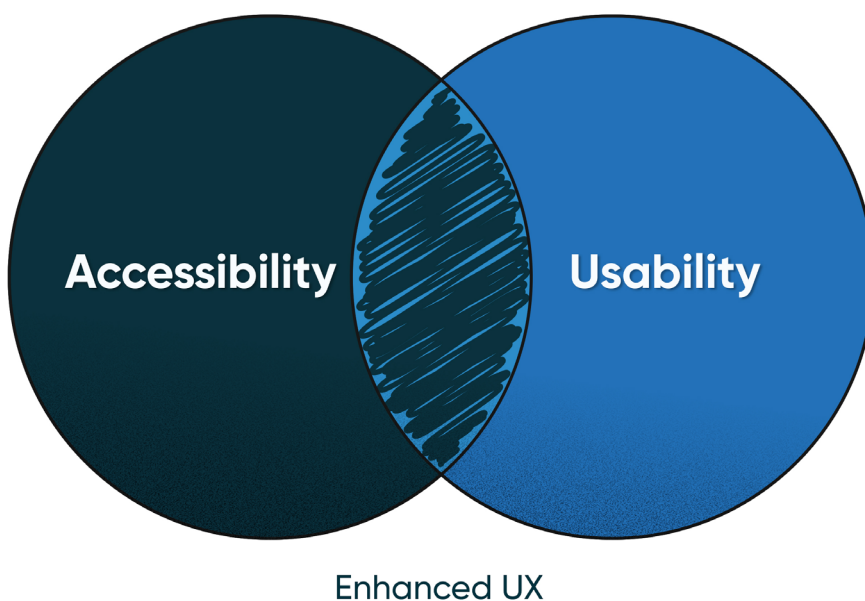
Different accessibility legislation applies to your product depending on where you play—such as the US's Section 508², the UK's Equality Act 2010³, and the EU's EN 301 549⁴—but the most universally referenced technical standards for working towards legal compliance can be found in the Web Content Accessibility Guidelines (WCAG).

However, it's widely understood that compliance to WCAG is not directly equal to accessible. Your learning product may comply with the guidelines, but the accessible user experience (UX) could still be poor.

Go further than the guidelines to ensure that your learning product is not only “theoretically” usable, but also practical for day-to-day usage for all users—including those with disabilities.

As W3C⁵ states, web accessibility is essential for some, but useful for all. All non-accessible users may be impaired at some point, either due to temporary injury or their environment—accessibility helps in these situations too.

And let's not forget that we age into disability. According to WHO⁶, an ageing global population and a rise in noncommunicable diseases means that more than 2 billion people will need at least one assistive product by 2030.



Users are disabled by environments, not impairments. Remember non-accessible users also benefit greatly from accessibility features.

- Contrast, color, and legibility improve everyday usage for sighted users too, including:
 - › People in dim or very bright environments
 - › People using dim or low-contrast displays and projectors
 - › People reviewing printed materials in hard copy
- Transcripts and captions benefit users with a broad range of accessibility needs beyond impairments to vision and hearing, including:
 - › Difficulties with language or reading
 - › People in noisy environments, quiet zones, communal areas and those without audio hardware
 - › Users with a poor or intermittent internet connection or limited bandwidth
- Keyboard commands are also often preferred by power users as they allow them to work more efficiently.

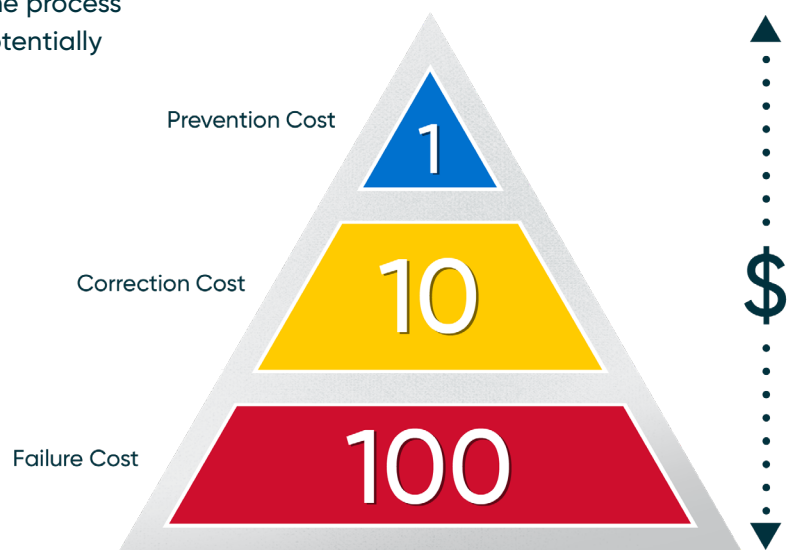
Committing to accessibility is committing to building better assessments—because users don't experience guidelines, they experience products.

Refine a process for inclusive design

Accessibility should be built in, not bolted on.

Accessibility should be a natural part of any product discussion and intertwined in all user-facing projects. Tacking on accessibility at the end of the process can have inefficient, insufficient, and potentially costly results.

When determining the value of building accessibility from the very beginning, it's helpful to keep the 1:10:100 Rule⁷ in mind. In short, this rule states that for every \$1 you spend on preventing a design issue, it'll save \$10 on correcting that issue, and ultimately save \$100 on fixing a failure in a live product. That's the cost of quality.



Creating a solid process for developing accessible products requires the following steps

- **Foster an inclusive company culture:** It takes a shift in mindset to make accessibility an expectation rather than an obligation. Run accessibility training for engineering, UX, support, and product teams and encourage conversation on the topic.
- Before starting any project, create an Accessibility Spec with the following breakdown:
 - › **Overview**—A high-level explanation of what is covered in the document, its purpose, and a templated reminder of a few different ways people might access the product.
 - › **Requirements**—A templated reminder of standard accessibility requirements.
 - › **Section for each of the views**—In the case that a product can be accessed from different “views” (e.g. learner view or educator view).

- › **Breakdown of the page and/or components**—Within each of the views you can list the page structure, components, focus states, tab order, colors, responsiveness, zoom, forms, and any other considerations specific to the project.
- › **Recommended implementations or enhancements**—This section is a collection of any recommendations for new products or enhancements to existing products to make them accessible.
- **External audits:** Even the most rigorous accessibility processes are fallible, so it's crucial to engage the services of a third party auditor.
- **Continuous innovation & remediation:** There's no definitive endpoint for accessibility—it's a never-ending journey, so your commitment must be equal to the challenge.

Aside from new projects, accessibility is also central to improving legacy functionality, addressing reported issues, and informing your general day-to-day activities.

Baking accessibility into your standard practices should be a no-brainer. This policy saves you from labor-intensive refactoring further down the road.

Accessibility is not a feature. Visible labels is not a feature. Color contrast is not a feature. Screen reader labels is not a feature. These are bugs. If a customer cannot use your product for an issue out of their control, that is a bug. Those bugs should be prioritized above developing new features.

Timothy Whalin

Principal UX Designer at Amazon⁸

Follow our assistive technology requirements

When it comes to education, learners need specific functionality.

Assistive technology (AT) is any item, piece of equipment, software program, or product system that is used to increase, maintain, or improve the functional capabilities of persons with disabilities⁹.

Existing technology holds the potential to make education accessible to everyone—but that doesn't mean accessibility is a given. For example, the Bureau of Internet Accessibility's a11y® analysis platform identified failures with 66% of WCAG 2.1 checkpoints on the websites of New York City public high schools¹⁰.

Failures of this variety stem from a lack of consideration for disabled end users and the POUR principles which underpin WCAG:

Perceivable:

Content and user interface elements must be presented in ways that all users can perceive.

Operable:

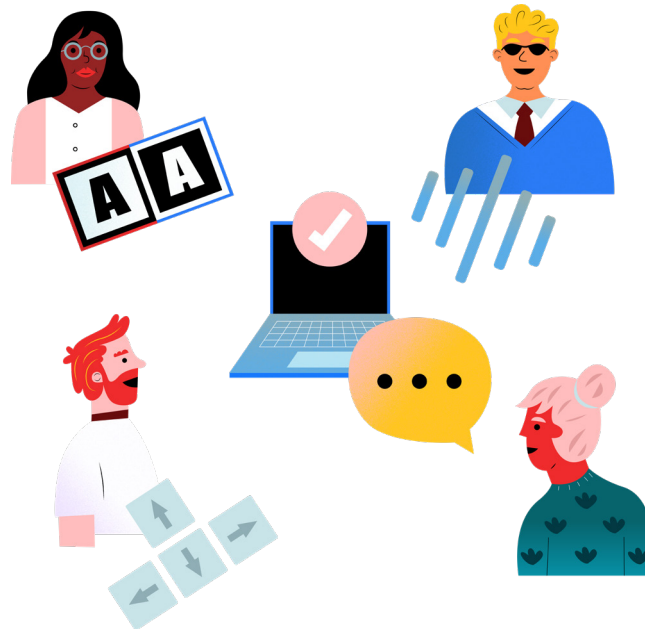
Navigation and user interface components must be operable.

Understandable:

Information and the user interface must be clear to users.

Robust:

Content must be robust enough to be reliably interpreted by a variety of user agents, such as assistive technologies.



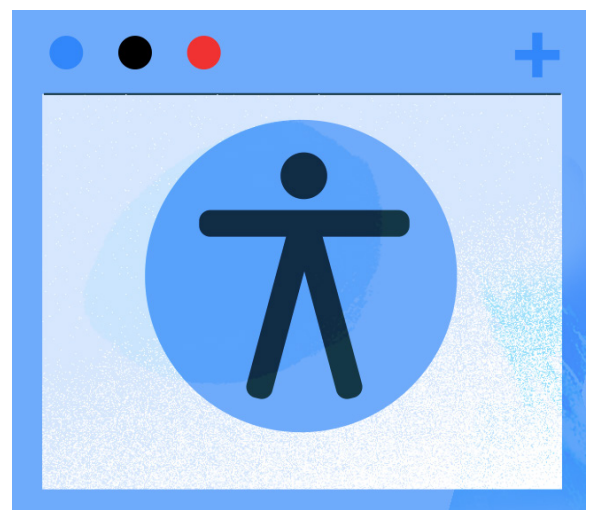
At Learnosity, we practice what we preach. With over a decade of experience in designing assessments, we've identified the key functionality for making a learning product as accessible as possible.

Accessible learning products require work on the following functionality:

- A Color contrast designed for color-blind and low vision users.**
- B Keyboard usability for accessible input and navigation.**
- C Screen reader support for the leading tools on each platform.**
- D Transcripts, closed captions and alternate videos for accessible audio content.**
- E Adjustable fonts to improve legibility for users with reading difficulties.**

Other miscellaneous tips for improving your learning product's accessibility include avoiding flickering or flashing in your animations, avoiding justify-aligned text (which can cause problems for dyslexic users), and supporting undo/redo functionality to help users recover from mistakes.

In this section, we'll outline the official standards and guidelines relevant to each area and explore practical measures to meet each need.



A Color contrast designed for color-blind and low vision users

While accessibility can be challenging at times, getting color contrast right is a relatively simple fix.

Color contrast is crucial because it makes visual elements distinct from their background and more easily distinguishable for learners with a variety of vision difficulties.

Whether you're building or buying an assessment product, here are the key specifications that should be met to create and deliver learning experiences with accessible color contrast.

Best practices for inclusive products

- Reference WCAG's AA standard contrast ratios and test the learning product's usability in grayscale for both authors and learners. (Use W3C's list of evaluation tools¹¹ to improve color accessibility.)
- Products should be easily configured to cater for specific color blindness variants if varied colors are used for a particular purpose, such as for questions featuring charts.
- Authoring tools must include iconography, text, or other accessible alternatives, so color alone is never used to convey information.
- For item types such as drawing and hotspot questions, authors must be capable of selecting default drawing, fill, stroke, and focus colors that contrast appropriately with the background.

Key WCAG standards and guidelines

- **1.4.1 - Use of Color:** Color should not be used as the only visual means of conveying information.
- **1.4.3 - Contrast (minimum):** Text should have a 4.5:1 contrast ratio with its background. Large text should have a 3:1 contrast ratio.
- **1.4.11 - Non-text contrast:** Non-text elements should have a 3:1 contrast ratio against adjacent color(s).

By setting clear priorities, using the right tools, and following the guidelines, a learning product can quickly be made more inclusive for those with visual impairments.



B Keyboard usability for accessible input and navigation

Keyboard usability is one of the most important aspects of an equitable assessment experience.

Keyboards are relied upon by users with a wide variety of disabilities, including motor and visual. Full keyboard control of features should be provided wherever possible to ensure keyboard users can interact with the same content that's available to mouse users.

Ensuring a learning product is usable by keyboard only is not an overly complex undertaking—but it does require you keep key specifications in mind.

Best practices for inclusive products

- Make keyboard usability part of the design and implementation of your UI.
- Keyboard users shouldn't be stranded on a page. All features should be usable with a combination of Tab, Space, Escape, Enter, and arrow keys.
- Provide important information in hover states and tooltips so that it's available via keyboard, touch, and screen reader-friendly elements too.
- Make sure that keyboard navigation and focus is intuitive. This includes how modal and modeless dialog windows open, close, and can be navigated.
- Offer keyboard interaction instructions where non-standard keyboard controls are implemented.

Key WCAG standards and guidelines

- **2.1.1 - Keyboard:** Keyboard users should have access to all the same functionality as mouse or touchscreen users.
- **2.1.2 - No Keyboard Trap:** Keyboard focus can't get stuck on part of the page at any time.
- **2.4.3 - Focus Order:** Tabbing order should match user expectations.
- **3.2.1 - On Focus:** Tabbing shouldn't trigger disorienting, unexpected changes.

Keyboard usability isn't a "nice-to-have"—it's a "must-have".



🕒 Screen reader support for the leading tools on each platform

The level of screen reader support provided by a learning product is a useful indicator of the product's overall accessibility.

Screen reader compliant products meet many requirements that aren't only important to users with visual disabilities, but other types of disability too. For example, there's a lot of overlap between the work needed to provide screen reader support and optimizing for keyboard-only use. Screen reader-ready learning products should meet the following requirements.

Best practices for inclusive products

- Develop and test your assessment to make sure they make sense when accessed with a screen reader.
- Focus your efforts on supporting the leading screen readers which are optimized for each major platform:
 - › ChromeVox for Google Chromebooks
 - › JAWS for Chrome on Windows
 - › NVDA for Firefox on Windows
 - › VoiceOver for Safari and Mac OS X
- Use semantic, hierarchical HTML to make your tools more accessible for users with assistive technologies, including screen readers and navigation tools.
- Textual descriptions of visual content should be provided by your authoring tools:
 - › Videos should have transcripts
 - › All images should have ALT text
- Math and chemistry formulas should use MathML or have equivalent assistive MathML content for screen reader users.
- Include specific UI enhancements for screen reader users. For example, the sighted user might see a "Next Month" button and understand it within the context of the page, while a screen reader might read "Go to August" to convey that button's function independent of the context.

Key WCAG standards and guidelines

- **1.1.1 - Non-text Content:** Any content that is not text should have a text alternative.
- **1.3.1 - Info and Relationships:** Relationships between page elements should be available in the page markup.
- **1.3.2 - Meaningful Sequence:** The order of elements in the page markup should match the order in which they're presented.
- **1.3.3 - Sensory Characteristics:** Don't describe things in terms of shape, size, visual location, orientation, or sound—not all users will perceive your content the same way.

Screen reader tests reveal a learning product's level of accessibility, so don't be found wanting.



D Transcripts, closed captions and alternate videos for accessible audio content

Many users won't be able to engage with your content without accompanying text or sign language.

One in five people around the world live with hearing loss, according to WHO¹². Any video with important information should come with a transcript that covers both the visual and audio information to assist users with hearing, vision, or cognitive impairments.

Your authoring tools should be guided by W3C's Authoring Tool Accessibility Guidelines (ATAG)¹³, which explain how to make the authoring tools themselves accessible (so that accessible users can create content) and help authors create more accessible web content.

Learning products with accessible audio content should meet the following specifications.

Best practices for inclusive products

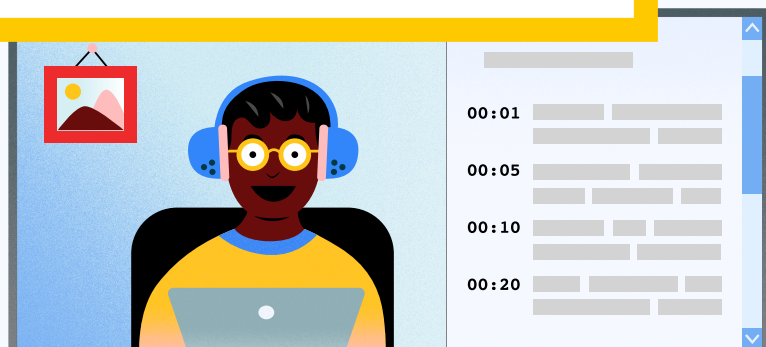
- Audio features should also have the ability to provide a transcript.
- Enable the addition of closed captions to video within an assessment's video player.
- Use third-party services—such as Youtube, Brightcove and Vimeo—to host video, so authors can use the closed caption features provided by those services.
- Enable the option to add sign language videos in the stimulus of any question.

Key WCAG standards and guidelines

- **1.1.1 - Non-text Content:** Any content that is not text should have a text alternative.
- **1.2.1 - Audio-only and Video-only:** Audio-only or video-only content should have alternative presentations, including text or audio versions.
- **1.2.2 - Captions:** Provide captions for all audio content (including audio in videos).

The provision of accessible audio content is too widespread to ignore.

Don't let your learning product fall behind.



E Adjustable fonts to improve legibility for users with reading difficulties

By simply providing more font size options from the outset, a learning product can instantly reach more learners.

Larger font sizes can help readers with dyslexia and other reading disabilities read significantly faster. Users with these difficulties appreciate the ability to customize fonts to suit their particular needs.

Accessible learning products adhere to the following font requirement

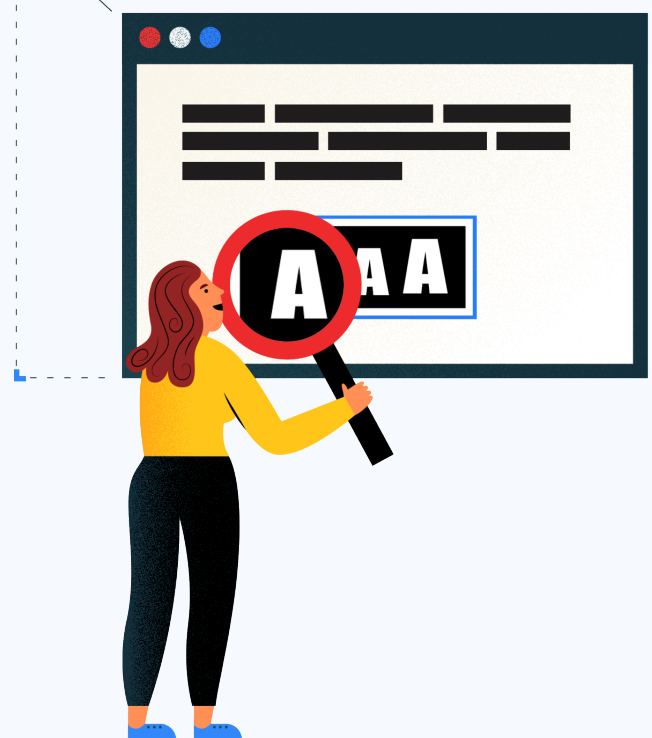
Best practices for inclusive products

- Authors should be capable of specifying font size within specific questions and sections of content.
- Icons implemented with fonts should be retained when switching the content font.

Key WCAG standards and guidelines

- **1.3.1 - Info and Relationships:** Relationships between page elements should be available in the page markup.
- **1.4.4 - Resize Text:** Content should still be usable when the text is resized up to 200%.

This functionality immediately empowers users with reading problems and provides them with the experience they're looking for.



The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect.

Tim Berners-Lee

W3C Director and inventor of the World Wide Web¹⁴

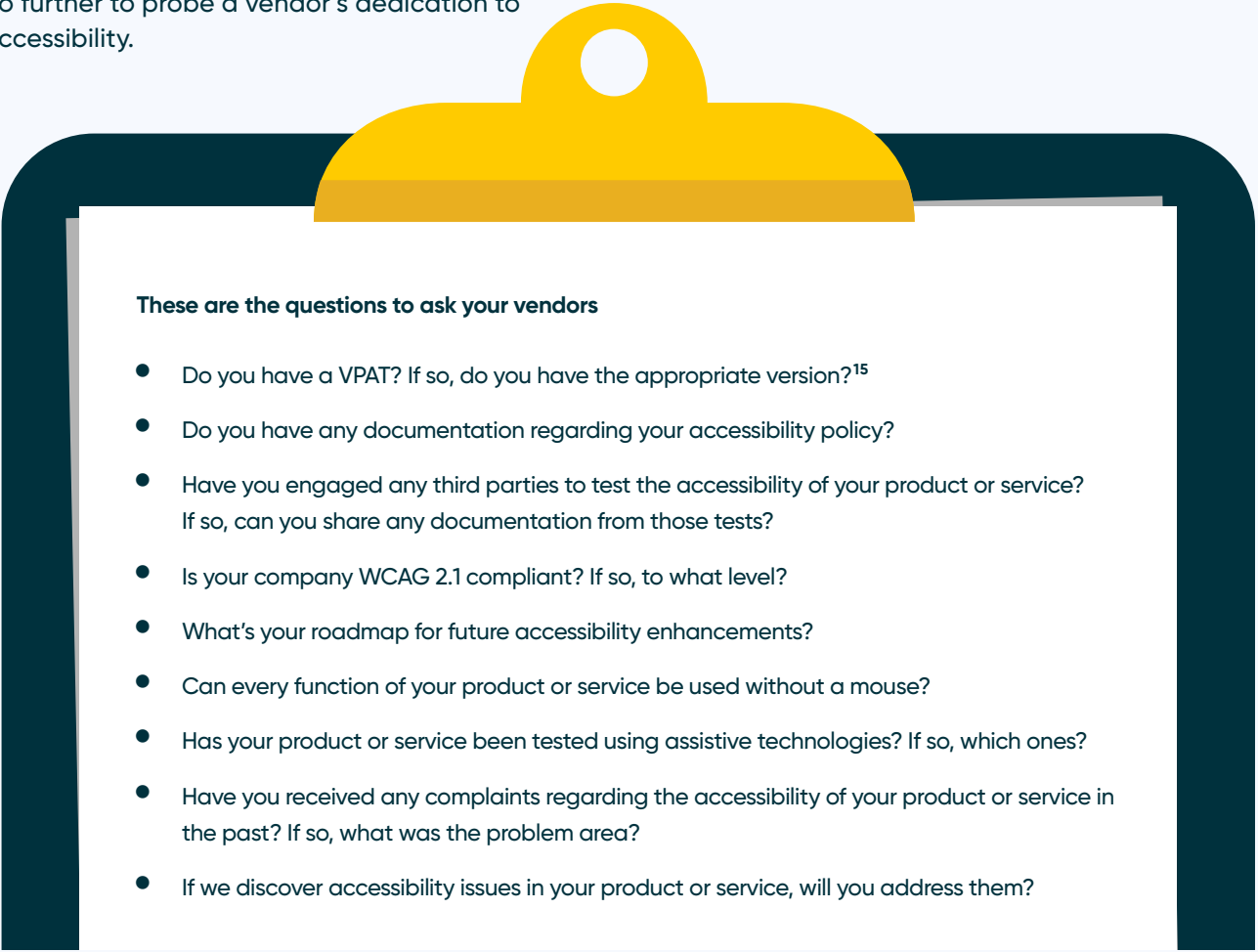
Ask vendors the right questions

Any company you work with needs to have the same level of commitment to accessibility as you do—or they may leave you vulnerable to noncompliance issues.

A crucial piece of documentation to seek is a VPAT (or Voluntary Product Accessibility Template), which is a voluntary document that states their conformance to WCAG.

It lists all of the standards that are relevant to their product, how they comply with them, and states whether their product meets, partially meets, or does not meet each standard.

While a VPAT helps communicate their efforts, you need to be aware that it's a very high level overview of their product or service's overall accessibility. That's why it's important to go further to probe a vendor's dedication to accessibility.



These are the questions to ask your vendors

- Do you have a VPAT? If so, do you have the appropriate version?¹⁵
- Do you have any documentation regarding your accessibility policy?
- Have you engaged any third parties to test the accessibility of your product or service? If so, can you share any documentation from those tests?
- Is your company WCAG 2.1 compliant? If so, to what level?
- What's your roadmap for future accessibility enhancements?
- Can every function of your product or service be used without a mouse?
- Has your product or service been tested using assistive technologies? If so, which ones?
- Have you received any complaints regarding the accessibility of your product or service in the past? If so, what was the problem area?
- If we discover accessibility issues in your product or service, will you address them?

Your vendors won't always be as accessible as you'd like them to be, so it's important you receive a guarantee they will work closely with you to ensure they can help you achieve your accessibility goals.

Perfect product accessibility does not exist, but you need to confirm that whatever vendors you engage have an ongoing commitment to evolve in step with regulations.

Summary: Embrace accessibility to enhance product quality

Assistive technology now has the potential to add accessibility to any learning product, but just because your product is technically advanced does not mean it's accessible.

Staying compliant is a challenge and backsliding into noncompliance is a very real possibility. In fact, there have even been cases where schools across the US rolled out new special educational technology that actually made assessments more difficult for the learners they were meant to assist¹⁶.

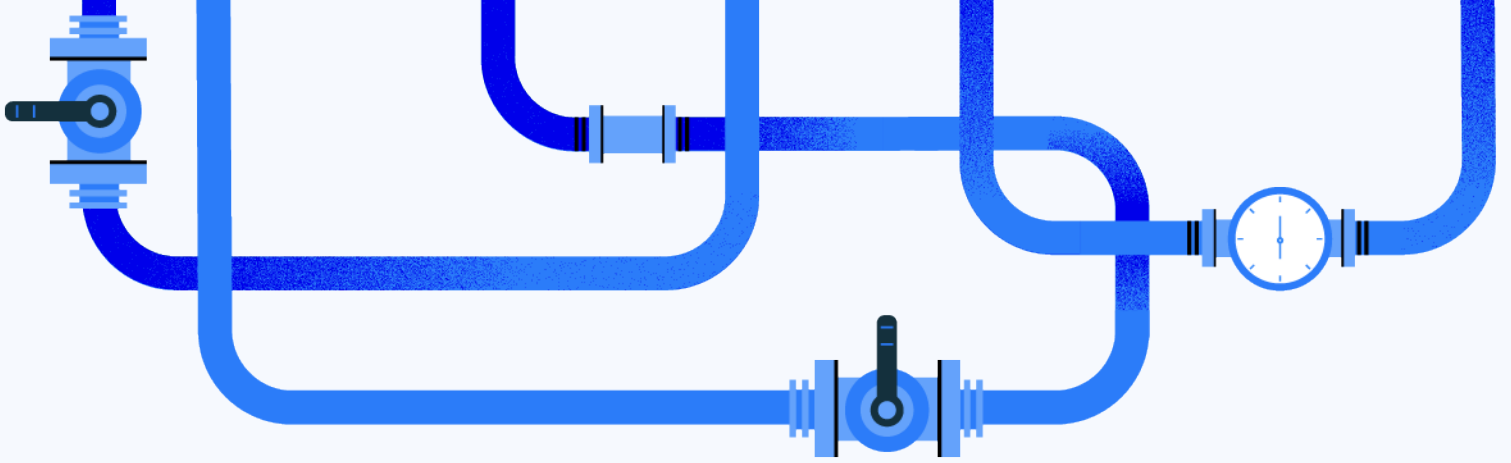
By adhering to the guidance laid out in this whitepaper, you can safely navigate your way towards an accessible, more usable learning product.

- Boldly go beyond the guidelines
- Refine a process for inclusive design
- Follow our assistive technology requirements
- Ask vendors the right questions

Accessibility guidelines, technology, and products are constantly evolving; for example, WCAG 2.2 was officially released in 2023 and focuses on cognitive disability¹⁷. Your accessibility practices will have to keep pace with these new standards. That's why Learnosity is continuously improving our user experience for users with disabilities—and why you should too.

Ultimately, building accessibility into your assessment product is inevitable. The only question is: will you take the easier route and embrace accessibility from the get-go, or will you take the harder route and retrofit only when forced?

The choice is yours.



About Learnosity

Learnosity is the global leader in assessment solutions. Serving over 750 customers and more than 40 million learners, our mission is to advance education and learning worldwide with best-in-class technology.

Our APIs make it easy for modern learning platforms to quickly launch fully featured products, scale on demand, and always meet fast-evolving market needs.

More at learnosity.com

References

- 1 Microsoft Accessibility Twitter account - <https://twitter.com/MSFTEnable/status/714621589334036481/photo/1>
- 2 Section 508 website - <https://www.section508.gov/>
- 3 Legislation.gov.uk's website - <https://www.legislation.gov.uk/ukpga/2010/15/contents>
- 4 ETSI's website - https://www.etsi.org/deliver/etsi_en/301500_301599/301549/03.01.01_60/en_301549v030101p.pdf
- 5 W3C website - <https://www.w3.org/WAI/perspective-videos/>
- 6 World Health Organization website - <https://www.who.int/news-room/fact-sheets/detail/assistive-technology>
- 7 Making Strategy Happen website - <https://www.makingstrategyhappen.com/the-cost-of-quality-the-1-10-100-rule/>
- 8 UX Collective website - <https://uxdesign.cc/gaining-buy-in-for-accessibility-b19d90ac3fa>
- 9 Assistive Technology Industry Association website - <https://www.atia.org/home/at-resources/what-is-at/>
- 10 Bureau of Internet Accessibility website - <https://www.boia.org/blog/back-to-school-the-pandemic-makes-accessibility-in-education-more-important-than-ever>
- 11 W3C website - <https://www.w3.org/WAI/ER/tools/>
- 12 World Health Organization website - <https://www.who.int/health-topics/hearing-loss>
- 13 W3C website - <https://www.w3.org/WAI/standards-guidelines/atag/>
- 14 W3C website - <https://www.w3.org/WAI/fundamentals/accessibility-intro/#context>
- 15 Information Technology Industry Council (ITI) website - <https://www.itic.org/policy/accessibility/vpat>
- 16 The Hechinger Report website - <https://hechingerreport.org/new-tools-meant-help-special-education-students-take-standardized-tests-actually-made-harder/>
- 17 W3C website - <https://www.w3.org/TR/WCAG22/>