



# Guidelines for Creating Accessible Content on the edX Platform

*Last Updated: November 6, 2014*

## Introduction

EdX strives to create an innovative, online-learning platform that promotes accessibility for everyone, including learners with disabilities. We intend for this document to be a shared resource for our X University partners, to help the course teams understand the importance of considering accessibility when designing courses and provide guidance so that they can serve the widest possible audience. “Accessibility” in online instruction refers to the degree to which information and activities are available to all students equally, regardless of physical or other disabilities.

Our guidance is based on international standards and principles for web accessibility (W3C WCAG 2.0) and universal design (usable by all, to the greatest extent possible, without the need for adaptation or specialized design). Instructors who build courses based on these principles promote the opportunity to create an inclusive experience that considers the diverse set of learning styles and needs of all learners—including learners with disabilities, learners who speak English as a second language, learners with technical issues such as low bandwidth internet or no access to audio, and learners with age-related capability issues. For purposes of these guidelines, we have assumed that end users will be equipped with the appropriate adaptive technology and compatible software.

Occasionally, unanticipated accessibility barriers will arise. To supplement the accessibility you can achieve within the edX platform, we recommend that you engage the resources available at your institution to support learners with disabilities. Most universities offer disability support services and information technology resources that provide accessibility advice and support. These professionals are trained in making disability accommodation decisions and can advise you on what accommodations may be appropriate in light of the goals of the course and the inherent instructional methodologies employed.

EdX is committed to providing an accessible platform, and your host institution has agreed to comply with applicable federal and state accessibility laws. As technology and accessibility improvements are constantly emerging, we plan to update these guidelines periodically. We encourage our X University partners to share information or resources that may help improve these guidelines at [accessibility@edx.org](mailto:accessibility@edx.org).

## Supporting Learners with Diverse Needs

Almost one-fifth of the world's population has some kind of disability. Online courses can reduce many barriers to education for these learners by providing access to courses from any location, at any time, and through the use of assistive technologies.

EdX is dedicated to creating a platform that is not only itself accessible, but also enables course creators to create accessible content. If you encounter platform issues that you believe may affect your ability to provide accessible course content, please contact us at [accessibility@edx.org](mailto:accessibility@edx.org). We also welcome your comments and questions.

In the following sections, we outline guidelines for creating and delivering course content that allows students to use built-in accessibility functionality (such as speech, magnification and zoom features), assistive technologies, and alternative formats. These practices consider learners such as the following:

- Blind learners who use a screen reader, which reads page text aloud, or a Braille display device, which renders page text in Braille.
- Low-vision learners who use screen magnification software to enlarge text and other onscreen content.
- Learners with vision impairments, such as difficulty seeing in low-light conditions, who modify their browser or operating system to change background colors and text settings to make text easier to read.
- Learners with learning disabilities, such as dyslexia, who use text-to-speech technology that reads page content aloud.
- Physically disabled learners who use switching devices, voice recognition software, or eye-gaze activated technology instead of a standard mouse or keyboard to control their computer.
- Learners who modify their operating system settings to make the mouse or keyboard easier to use.
- Learners with hearing impairments who cannot access audio content and need the equivalent information in an alternative format, such as captions or a transcript.

We highly recommend that you implement the best practices shared with you in this document and other widely available resources (some of which are referred to herein). As mentioned above, if you cannot easily address these barriers, we recommend that you consult with any disability-related resources at your institution (Disability Services, Assistive Technology, or Accessibility). While your ability to support students in the MOOC context may be different from supporting on-campus students, we encourage you to develop a plan to respond to students who inform you of accessibility barriers to learning. However, given the large numbers of learners enrolling in many of the courses, you will quickly see how important it is to address accessibility concerns when initially creating a course.

# Accessibility Best Practices

## Best Practices for Universal Design for Learning

Universal Design for Learning focuses on delivering courses in a format so that as many of your learners as possible can successfully interact with the learning resources and activities you provide them, without compromising on pedagogic rigor and quality.

The principles of Universal Design for Learning can be summarized as:

1. Present information and content in different ways.
2. Differentiate the ways that students can express what they know.
3. Stimulate interest and motivation for learning.

Instructors can apply these principles in course design by:

- Designing resources and activities that can be accessed by learners in different ways (for example, providing text that allows a student to enlarge it or change color, a diagram with an equivalent text description, or a video with audio and text captions).
- Providing multiple ways for learners to engage with information and demonstrate their knowledge. This is particularly important when developing exercises and assessments.
- Identifying activities that require specific sensory or physical capability, such as activities that require color identification, for which accommodating the specific accessibility needs of students will be difficult or impossible. In these cases, consider whether there is a pedagogical justification for these requirements. If there is a justification, consider communicating these requirements to prospective students in the course description and establish a plan for responding to students who encounter barriers that can be addressed without fundamental alteration. If there is no justification for the requirements, we recommend that you modify the learning activities to be more flexible and broadly accessible.

## Resources

- [Delivering Accessible Digital Learning \(JISC Techdis\) provides a useful overview of an inclusive approach to course design](#)
- [The National Center on Universal Design for Learning provides a helpful overview on Universal Design for Learning](#)

## Best Practices for Readability

EdX courses have a global and diverse audience. Learners will be better positioned to access the concepts of your content if it is written in clear, straightforward language and the content is well structured. Use appropriate terminology to your subject area, but keep it as clear and unambiguous as possible to help learners who:

- are not native English speakers; or
- have a disability that affects reading, such as dyslexia or a visual impairment.

To produce content that is more readable by all students:

- Make the names of elements such as course sections, subsections, units, components, and discussion topics descriptive and easy to skim by putting the important information first in the name. These names are used in navigation menus, page headings, and section headings and are signposts that help learners navigate your course and read course content. Descriptive links and headings particularly helps screen reader users, who can more quickly assess the relevance of a link or heading.
- When creating written learning resources, break text into sections by using HTML elements, such as headings, paragraphs, and lists. Long blocks of unbroken text are a barrier to most readers. Segmented content is more inviting and is easier to navigate and search. See “Best Practices for HTML Markup,” below, for guidance on creating accessible HTML.
- Avoid jargon. If unfamiliar words or phrases are relevant to the subject, explain them when they are first used, and include a glossary with your course materials. When using an abbreviation or acronym, write out the phrase the first time it appears: for example, “National Aeronautics and Space Administration (NASA).”
- Use link text that clearly explains the link destination (for example, “Review the Course Syllabus”). Avoid using constructs like “You can review the Course Syllabus here.” Screen reader users will often view text links out of context, in a list for example. Verify that your link text describes the action or destination so that it will be understandable when consumed out of context. For links that point to documents rather than web pages, include the document type in the link (e.g., “Course Syllabus (PDF)”).

## Resources

- [The Center for Plain Language provides detailed resources on writing clearly and concisely, in language appropriate for your content and target audience](#)

## Best Practices for Accessible PDFs

PDF is a common format for course materials, including textbooks supplied by publishers. However, converting materials to PDFs can create accessibility barriers, particularly for learners with visual impairments. To improve the accessibility of your PDFs, review the guidance below about preparing documents for conversion, using Adobe Acrobat Professional, and working with third-party suppliers.

### *Converting Microsoft Office documents to PDF*

The teaching materials that you will convert to PDFs may use different formats—for example, your syllabus may be in Word, your presentation slides in PowerPoint, and your textbooks in publisher-supplied PDF. Use the tools available in the applicable software to create well-structured source documents. This early step helps minimize issues that may be difficult or impossible to address later in the conversion process.

#### *Preparing Word documents*

- Keep formatting simple. Use headings, paragraphs, lists, images, and captions, and tables for tabular data. Don't add unnecessary indents, rules, columns, blank lines, and typographic variation. The simpler the formatting, the easier it will be to make an accessible PDF document.
- Use styles for formatting your text, such as Normal, Heading 1, and Heading 2, rather than manually formatting text using bold and indents. Add alternative text to images (see "Best Practices for Describing Images," below) using Word's picture formatting options.

#### *Preparing PowerPoint documents*

- To help make your content accessible and comprehensible to learners who use screen reading software, start in Outline view and include all of your content as text. Add design elements and images after completing the outline, and use PowerPoint's picture formatting options to include detailed descriptions of images that convey information. Avoid adding animations or transitions, as they will not be saved with the PDF format.
- Use the Home > Drawing > Arrange > Selection Pane option to view the reading order of objects on each slide. If the reading order is not logical, reorder the objects.
- Provide text alternatives for all images.
- Use the Home > Slides > Reset option to give each slide a unique and informative title. The title can be hidden if preferred.
- Identify column headers for any data table using PowerPoint's table formatting options (Tables > Table Options > Header Row), and ensure that each header contains informative text describing the data in that column.

## ***Preparing Excel spreadsheets***

- Use a unique and informative title for each worksheet tab.
- Include text alternatives for images (see “Best Practices for Describing Images,” below) using Excel’s picture formatting options.
- Identify column headers using Excel’s table formatting options (Table > Table Options > Header Row), and include in each header cell informative text describing the data in that column.
- Do not use blank cells for formatting.
- Use descriptive link text rather than URLs in data cells.

## ***Converting Word, PowerPoint, and Excel documents to PDF***

To generate PDFs from Microsoft Office documents, use the “Save as PDF” option. Make sure the “Document Structure Tags for Accessibility” option is selected (consult your software documentation for more details). Note that PDFs generated from Windows versions of Office will be more accessible than those generated from Mac OS. LibreOffice produces the most accessible PDF documents using the software’s “Export as PDF” option. Check the “Tagged PDF” checkbox when exporting. Regardless of which software you use to export your document, always use Adobe Acrobat Professional’s “Make Accessible” Tool on your exported PDF for best results.

## ***Working with third-party supplied PDFs***

When you control the creation of a PDF, you have greater control over the document’s accessibility. If you use PDFs provided by third parties, including textbooks supplied by publishers, the document’s accessibility may be unknown.

## ***Asking the right questions about accessible PDFs***

Where possible, ask the supplier of the PDF if the PDF is accessible. If it isn’t, ask whether the supplier can provide an accessible version. Questions to ask include:

- Can screen readers read the document text?
- Do images in the document include text descriptions?
- Are all tables, charts, and math provided in an accessible format?
- Does all media include text equivalents?
- Does the document have navigational aids, such as a table of contents, index, headings, and bookmarks?
- Has the document passed Adobe Acrobat Professional’s Accessibility Checker?

## ***Updating PDFs for accessibility***

You may need to update your existing teaching materials in PDF format to improve accessibility. This might include PDFs that were:

- created by scanning a hard-copy document;
- generated from a document that was not created with accessibility in mind; or
- generated by a process that does not preserve source accessibility information.

In such cases, you need special software, such as Adobe Acrobat Professional, to enhance the accessibility of the PDF. PDFs that are created from scanned documents require a preliminary Optical Character Recognition (OCR) step to generate a text version of the document. The procedure checks documents for accessibility barriers, adds properties and tags for document structure, sets the document's language, and prompts the user to add alternative text for images.

## ***Resources***

- [Microsoft provides detailed guidance on generating accessible PDFs from Microsoft Office applications, including Word, Excel, and PowerPoint](#)
- [Converting Word to PDF or HTML: Options for Accessibility](#)
- [Adobe provides a detailed accessibility PDF repair workflow using Acrobat XI](#)
- [Adobe Accessibility \(Adobe\) is a comprehensive collection of resources on PDF authoring and repair, using Adobe's products](#)
- [PDF Accessibility \(University of Washington\) provides a step-by-step guide to creating accessible PDFs from different sources and using different applications](#)
- [PDF Accessibility \(WebAIM\) provides a detailed and illustrated guide on creating accessible PDFs](#)
- [The National Center of Disability and Access to Education has a collection of one- page "cheat sheets" on accessible document authoring](#)
- [The Accessible Digital Office Document \(ADOD\) Project provides guidance on creating accessible Office documents](#)

## Best Practices for Custom Content Types

Using different content types can significantly add to the learning experience. We discuss below how to design several custom content types to be accessible to students with disabilities.

### *Information graphics (charts, diagrams, illustrations)*

Although images can be helpful for communicating concepts and information, they present challenges for people with visual impairments. For example, a chart that requires color perception or a diagram with tiny labels and annotations will likely be difficult to comprehend for learners with color blindness or low vision. All images present a barrier to learners who are blind.

The following are best practices for making information graphics accessible to visually impaired students:

- Avoid using only color to distinguish important features of the image. For example, on a line graph, use a different symbol as well as color to distinguish the data elements.
- Whenever possible, use an image format, such as SVG, that supports scaling. Consider providing a high-resolution version of complex graphics that have small but essential details.
- Provide a text alternative that describes the information in the graphic. For charts and graphs, a text alternative could be a table displaying the same data. See “Best Practices for Describing Images,” below, for details about providing text alternatives for images.

### *Math content*

Math in online courses has been challenging to deliver in a way that is accessible to people with vision impairments. Instructors frequently create images of equations rather than including text equations. Math images cannot be modified by people who need a high-contrast display and cannot be read by screen reader software.

EdX uses MathJax to render math content in a format that is clear, readable, and accessible to people who use screen readers. MathJax works together with math notation, like LaTeX and MathML, to render mathematical equations as text instead of images. We recommend that you use MathJax to display your math content. You can learn more about using MathJax in the edX101 course, the Studio support documentation and in the MathJax documentation on accessibility (see the link in “Resources” below). We will update these guidelines as improvements to MathJax are developed.

## *Simulations and interactive modules*

Simulations, including animated or gamified content, can enhance the learning experience. In particular, they benefit learners who may have difficulty acquiring knowledge from reading and processing textual content alone. However, simulations can also present some groups of learners with difficulties. To minimize barriers, consider the intended learning outcome of the simulation. Is it to reinforce understanding that can also come from textual content or a video lecture, or is it to convey new knowledge that other course resources can't cover? Providing alternative resources will help mitigate the impact of any barriers.

Although you can design simulations to avoid many accessibility barriers, some barriers, particularly in simulations supplied by third parties, may be difficult or impossible to address for technical or pedagogic reasons. Understanding the nature of these barriers can help you provide workarounds for learners who are affected. Keep in mind that attempted workarounds for simulations supplied by third parties may require the supplier's consent if copyrighted material is involved.

Consider the following questions when creating simulations, keeping in mind that as the course instructor, you enjoy considerable freedom in selecting course objectives and outcomes. Additionally, if the visual components of a simulation are so central to your course design, providing alternate text description and other accommodations may not be practical or feasible:

- Does the simulation require vision to understand? If so, provide text describing the concepts that the simulation conveys.
- Is the mouse necessary to operate the simulation? If so, provide text describing the concepts that the simulation conveys.
- Does the simulation include flashing or flickering content that could trigger seizures? If so and this content is critical to the nature of the simulation:
  - do not require learners to use the simulation for a required assessment activity; and
  - provide a warning that the simulation contains flickering or flashing content. As best practices continue to emerge in this area, we will update these guidelines.

## ***Online exercises and assessments***

For activities and assessments, consider difficulties students may have in completing an activity and consider using multiple assessment options, keeping in mind that some of the end users have disabilities. Focus on activities that allow students to complete the activity and submit their work without difficulties.

Some students take longer to read information and input responses, such as students with visual or mobility impairments and students who need time to comprehend the information. If an exercise has a time limit, consider whether it's long enough to allow students to respond. Advanced planning may help cut down on the number of students requesting time extensions.

Some online exercise question types may be difficult for students who have vision or mobility impairments. For example:

- Exercises requiring fine hand-eye coordination, such as image mapped input or drag and drop exercises, may present difficulties to students who have limited mobility. Consider alternatives that do not require fine motor skills, unless, of course, such skills are necessary for effective participation in the course. For example, for a drag-and-drop exercise mapping atoms to compounds, provide a checkbox or multiple-choice exercise.
- Highly visual stimuli, such as word clouds, may not be accessible to students who have visual impairments. Provide a text alternative that conveys the same information, such as an ordered list of words in the word cloud.

## ***Third-party content***

When including links to third-party content in your course, be mindful as to the accessibility of such third party resources, which may not be readily accessible to learners with disabilities. We recommend that you test any links prior to sharing them with users.

You can use the eReader tool or the "Files and Uploads" option in edX Studio to incorporate third-party textbooks and other publications in PDF format into your course. You can also incorporate such materials into your course in HTML format. See "Best Practices for Accessible PDFs," above, for guidance on working with third-party supplied PDFs, and "Best Practices for HTML Markup," below, for guidance on creating accessible HTML.

## **Resources**

- [Effective Practices for Description of Science Content within Digital Talking Books, from the National Center for Accessible Media, provides best practices for describing graphs, charts, diagrams, and illustrations](#)
- [The University of Washington's DO-IT project provides guidance on creating accessible math content](#)
- [AccessSTEM provides guidance on creating accessible science, technology, engineering and math educational content](#)
- [The National Center on Educational Outcomes \(NCEO\) provides Principles and Characteristics of Inclusive Assessment and Accountability Systems](#)
- [MathJax provides guidance on creating accessible pages with the display engine](#)

## Best Practices for Describing Images

Pictures, diagrams, maps, charts, and icons can present information very effectively. However, some visually impaired students, including people who use screen reader software, need text alternatives to understand the information conveyed by these images. The text alternative for an image depends on the image's context and purpose, and may not be a straight description of the image's visual characteristics.

Use the following guidelines when you include images in your course:

- Provide a short text description that conveys the purpose of the image, unless the image conveys a concept or is the only source for the information it presents, in which case a long text description is appropriate. Note that you don't need to provide a long description if the information appears elsewhere on the page. For example, you don't need to describe a chart if the same data appears as text in a data table.
  - For a representative image, such as a photograph of Ponte Vecchio, a short description could be "Photo of Ponte Vecchio." If the photograph's purpose is to provide detailed information about the location, the long description should be more specific: "Photo of Ponte Vecchio showing its three stone arches and the Arno River."
  - For a chart, diagram, or illustration, the short description might be "Diagram of Ponte Vecchio." The long description should include the details conveyed visually, such as dimensions and materials used.
  - For a map, a short description might be "Map showing location of Ponte Vecchio." If the map is intended to provide directions to the bridge, the long description should provide text directions.
  - For icons, the short description should be the equivalent to the information that the icon provides. For example, for a Course Syllabus link containing a PDF icon, the text equivalent for the icon would be "PDF," which would be read as "Course Syllabus PDF."
  - For an image that serves primarily as a link to another web page, the short description should describe the link's destination, not the image. For example, an image of a question mark that serves as a link to a Help page should be described as "help," not "question mark."
  - Images that don't provide information don't need text descriptions. For example, a PDF icon that is followed by link text reading "Course Syllabus (PDF)" or a banner graphic whose function is purely aesthetic, does not need a description. However, you must include an empty or null alt attribute so that the image is not presented to the user at all, i.e. alt="".
- Include the short description in the alt attribute of the HTML image element, as follows (see Add an Image to an HTML Component for more information about adding images):

```

```

- Include an empty alt attribute for non-informative images. When image elements do not include an alt attribute, screen reader software may skip the image, announce the image filename, or, in the case of a linked image, announce the link URL. An empty alt attribute tells screen reader software to skip the image.

```

```

- Consider using a caption to display long descriptions so that the information is available to all users. In the following example, the image element includes the short description as the alt attribute and the paragraph element includes the long description.

```

```

```
<p>Photo of Ponte Vecchio showing its three stone arches and the Arno river</p>
```

- The figure and figcaption elements can also be used to achieve the same effect:

```
<figure>
```

```

```

```
<figcaption>Photo of Ponte Vecchio showing its three stone arches and the Arno river</figcaption>
```

```
</figure>
```

- Alternatively, provide long descriptions by creating an additional unit or downloadable file that contains the descriptive text and providing a link to the unit or file below the image.

```

```

```
<p><a href="description.html">Description of Ponte Vecchio Diagram</a></p>
```

- The longdesc attribute can be used to achieve the same effect:

```

```

## Resources

- [A decision tree for choosing appropriate alternative text for images \(Dey Alexander\)](#)
- [W3C Web Accessibility Tutorials: Images Concepts](#)
- [General guidance on appropriate use of alternative text for images \(WebAim\)](#)
- [HTML5: A more detailed description of techniques for providing useful alternative text for](#)

[images](#)

- [The DIAGRAM Center, established by the US Department of Education \(Office of Special Education Programs\), provides guidance on ways to make it easier, faster, and more cost effective to create and use accessible images](#)

## Best Practices for Accessible Media

Media-based course materials help convey concepts and bring course information to life. We require all edX courses to use videos with interactive, screen-reader- accessible transcripts. This built-in universal design mechanism helps enhance your course's accessibility. When you create your course, you need to factor in time and resources for creating these transcripts.

### *Audio transcription*

Audio transcripts are essential for presenting audible content to students who can't hear and are helpful to students who are not native English speakers. Synchronized transcripts allow students who can't hear to follow along with the video and navigate to a specific section of the video by clicking the transcript text. Additionally, all students can use transcripts of media-based learning materials for study and review.

A transcript starts with a text version of the video's spoken content. If you created your video using a script, you have a great start on creating the transcript. Just review the recorded video and update the script as needed. Otherwise, you'll need to transcribe the video yourself or engage someone to do it. There are many companies that will create timed video transcripts (i.e., transcripts that synchronize the text with the video using time codes) for a fee.

The edX platform supports the use of transcripts in .srt format. When you integrate a video file into the platform, you should also upload the .srt file of the timed transcript for such video. Consult the edX Studio support guides for details on how to add timed transcripts.

### *Video description*

When creating video segments, consider how to convey information to learners who can't see. For many topics, you can fully cover concepts in the spoken presentation. If practical, you might also describe visual information, for example, by speaking as you are writing on a tablet.

### *Downloadable transcripts*

For both audio and video transcripts, consider including a text file that students can download and review using tools such as word processing, screen reader, or literacy software. The downloadable transcript should be text only, without time codes.

### *Resources*

- [Accessible Digital Media Guidelines provides detailed advice on creating online video and audio with accessibility in mind](#)

## Best Practices for HTML Markup

HTML is the best format for creating accessible content. It is well supported and adaptable across browsers and devices, the information in the markup helps assistive technologies, such as screen reader software, provide information and functionality to people with vision impairments.

To make it easier for our course teams to create content with good HTML markup, we are working to make all templates in edX Studio conform to the best practices. Studio also allows you to manually edit HTML to create custom widgets and controls. Depending on the type of component you are adding to your course in edX Studio, the raw HTML data will be available either automatically or by selecting the “Advanced Editor” or “HTML” views. You should confirm that your HTML follows the best practices set forth below.

Keep the following guidelines in mind when you create HTML content:

- Use HTML to describe your content’s meaning rather than its appearance. A phrase marked as a level 1 heading (`<h1>`) clearly indicates the topic of the page, while a phrase marked as bold text (`<bold>` or `<strong>`) may be a heading or may just be text that the instructor wants to emphasize. A group of items marked up as a list are related in the code, without relying on visual cues such as bullets and indents. Coding meaning into content is particularly useful for students using screen readers, which, for example, can read through headings or announce the number of items in a list.
- Use HTML heading levels in sequential order to represent the structure of the document. Well-structured headings help students navigate a page and find what they are looking for.
- Use HTML list elements to group related items and make content easier to skim and read. HTML offers three kinds of lists:
  - Unordered lists, where each item is marked with a bullet.
  - Ordered lists, where each item is listed with a number.
  - Definition lists, where each item is represented using term and description pairs (like a dictionary).
- Use table elements to mark up data sets—that is, information that works best in a grid format—with descriptive rows and columns. Mark up row and column headers using the `<th>` element so screen readers can effectively describe the content in the table.

## Resources

- [Creating Semantic Structure provides guidance on reflecting the semantic structure of a web page in the underlying markup \(WebAIM\)](#)
- [Creating Accessible Tables provides specific guidance on creating data tables with the appropriate semantic structure so that screen readers can correctly present the information \(WebAIM\)](#)

## Conclusion

At edX, the heart of our mission is to provide global access to higher-level learning with only a computer and the Internet. We have designed a platform that enables course creators to reach thousands of learners, some of whom will lack the typical backgrounds and resources of resident students taking traditional courses on college campuses. We hope that these guidelines prove useful to you as you work with your institution's disability support services and information technology resources to comply with applicable accessibility laws. As we are all on this learning venture together, we encourage you to share your thoughts with us at [accessibility@edx.org](mailto:accessibility@edx.org).