BC Open Textbook Accessibility Toolkit

BC Open Textbook Accessibility Toolkit

BCcampus and CAPER-BC

Contents

About the Toolkit

The *Accessibility Toolkit* is a collaboration between BCcampus and the Centre for Accessible Post-secondary Education Resources BC (CAPER-BC). BCcampus is a publicly funded organization that uses information technology to connect the expertise, programs, and resources of all B.C. post-secondary institutions under a collaborative service delivery framework. BCcampus is the lead organization for the open textbook project in BC. CAPER-BC provides accessible learning and teaching materials to students and instructors who cannot use conventional print because of disabilities.

About the British Columbia Open Textbook Project

The *Accessibility Toolkit* was created as part of the B.C. Open Textbook Project. The B.C. Open Textbook Project began in 2012 with the goal of making post-secondary education in British Columbia more accessible by reducing student cost through the use of openly licensed textbooks. The BC Open Textbook Project is administered by BCcampus and funded by the British Columbia Ministry of Advanced Education.

Open textbooks are open educational resources (OER); they are instructional resources created and shared in ways so that more people have access to them. This is a different model than traditionally copyrighted materials. OER are defined as teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others (Hewlett Foundation). Our open textbooks are openly licensed using a Creative Commons license, and are offered in various e-book formats free of charge, or as printed books that are available at cost. For more information about this project, please contact opentext@bccampus.ca. If you are an instructor who is using this book for a course, please let us know.

What Is an Open Textbook?

Open textbooks are open educational resources (OERs), which are instructional resources created and shared using open licences. This means that they are free for others to use, copy, distribute, modify, or reuse. Open textbooks can be a useful pedagogical tool, as their content may be modified and customized to meet specific learning objectives of a particular course.

Why an Accessibility Toolkit?

The focus of many open textbook projects is to provide access to education at low or no cost. But what does *access* mean? If the materials are not accessible for each and every student, do they fulfill the mandate to deliver fully open textbooks?

The goal of the *Accessibility Toolkit* is to provide the needed resources needed to each content creator, instructional designer, educational technologist, librarian, administrator, and teaching assistant to create a truly open and accessible textbook — one that is free and accessible for all students.

As you work through the content of the *Accessibility Toolkit,* you will find that the suggestions provided are intended for the non-technical user. If you are looking for more technical descriptions of how to make your work accessible, we suggest you review the WCAG (Web Content Accessibility Guidelines).

Acknowledgments

Thank you to...

CAPER-BC and Tara Robertson for their continued involvement and work on ensuring educational resources are accessible to all students.

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BCcampus for leading this initiative to ensure that open textbooks are accessible both from a financial and access perspective.

Key Concepts

Universal Design

Universal Design is the process of creating products (devices, environments, systems, and processes) that are usable by people with the widest possible range of abilities, operating within the widest possible range of situations (environments, conditions, and circumstances). Universal Design emerged from the slightly earlier concept of being barrier-free, the broader accessibility movement, and adaptive and assistive technology. It also seeks to blend aesthetics into these core considerations.

Let's review some common definitions of Universal Design.

Definition 1:

Universal Design or *Universal Instructional Design (UID)*

> is an approach to teaching that consists of the proactive design and use of inclusive instructional and evaluation strategies. This approach provides academic access to a broad range of learners, including students with disabilities, while:
>
> - maintaining academic standards […]
> - reducing the need to having to retrofit after a course is already underway[1]

Definition 2:

Universal Instructional Design (UID)

> is an approach to designing course instruction, materials and content to benefit people of all learning styles without adaptation or retrofitting. UID provides equal access to learning, not simply equal access to information. UID allows the student to control the method of accessing information while the instructor monitors the learning process and initiates any beneficial methods. …It should be noted that UID does not remove academic challenges; it removes barriers to access.[2]

Why Universal Design?

For our purposes, we frame the practice of using Universal Design in a holistic and manageable way, and begin by addressing the barriers that are easy to anticipate and proactively re-mediate. This toolkit, therefore, will provide guidance to you if the answers to any of the following questions is "yes":

- Do I have visual materials that present core concepts that not all students may be able to see or understand?
- Do I have multimedia (audio, video) materials that present core concepts that not all students may be able to be hear, see, or access?

1. FAIR (Facilitating Accessible Instruction & Resources). University of Victoria
2. Universal Design for Learning. Ohio State University

- Do I have documents that present core concepts in a format that not all students may be able to access?

For the purpose of the *Accessibility Toolkit,* we focus on an adjunct to Universal Design, that being Universal Design for Learning (UDL), which is a set of principles for curriculum development that gives all individuals equal opportunities to learn. UDL provides a blueprint for creating instructional goals, methods, materials, and assessments that work for everyone. Rather than a single, one-size-fits-all solution, it offers a flexible approach that can be customized and adjusted for individual needs.[3]

3. http://www.udlcenter.org/aboutudl/whatisudl

Using Personas

Designers use personas to represent the different types of people who may be accessing a website or product. In this toolkit, we have used personas to help you keep in mind the various types students and their various abilities while you're developing content. We've also used these personas to introduce you to different types of hardware and software that students typically use.

We've adapted the personas from Sarah Horton and Whitney Queensbury's book *A Web for Everyone: Designing Accessible User Experience* to be more specific to postsecondary students with print disabilities in British Columbia (based on data from CAPER-BC and the students who attended our focus group).

These are some of the students who will be reading the open textbooks that you write.

Mark

Mark is 17 years old. He is a future heavy-duty mechanic with a learning disability that was diagnosed in Grade 8. Mark absorbs information best by hearing it and enjoys making and fixing stuff with his hands. He's in his first semester of college taking trades courses and loving it. Mark can't wait to complete the foundation courses and move into his first apprenticeship placement. He lives at home with his family who shares one computer.

Ability: Difficulty absorbing a lot of information when reading it

Aptitude: Basic technology user

Attitude: Prefers to do things himself, but can get easily frustrated or impatient, especially with technology

Assistive technology: mp3 player

Format preference: mp3 so that he can and listen on the go

Listen to an mp3 recording of a synthetic voice.

Jacob

Image from Horton, Sarah; Quesenbery, Whitney. 2014. A Web for Everyone. New York: Rosenfeld Media. rosenfeldmedia.com/books/a-web-for-everyone/

Jacob is a fourth-year business administration student who is blind and a bit of a geek. Jacob is 28 years old and can't wait to get his last few classes out of the way so he can start his career. He shares an apartment with his girlfriend.

Ability: Blind since birth

Aptitude: Skilled technology user

Attitude: Digital native, early adopter, persists until he gets it

Assistive technology:

- Screen reader (JAWS on his laptop, VoiceOver on his iPhone)
- Victor Stream
- Audio recorder (to take notes)
- Refreshable Braille display

Format preference: Electronic text, which he can easily use in JAWS and with VoiceOver; detests PDFs

Video of student using JAWS (0s-1:31)

Listen to a computer science student's screen reader.

Diana

Diana is retraining to be a personal coach after she experienced vision loss and was unable to continue working as a bus driver. She is 48 years old and taking many of her classes online. She lives with her husband.

Ability: Gradual loss of vision; can read using magnifier easily, but eyes fatigue

Aptitude: Intermediate technology user

Attitude: Has a routine and likes to stick to it

Assistive technology:

- ZoomText
- Text-to-Speech software (TextAloud)

Format preference: PDF or electronic text that she can enlarge on her computer or listen to using TextAloud.

Video of student using ZoomText (0-1:31)

Trish

Trish is a college student taking university transfer courses. She has a physical disability and uses print books. She is 18 years old and lives with her family.

Ability: Brain damage in accident caused paralysis and motor issues

Aptitude: Basic computer user, intermediate iPad user

Attitude: Generally dependent on family, so enjoys reading and studying independently

Assistive technology:

- iPad
- Motorized wheelchair

Format preference: e-book formats, such as PDF, that can easily be loaded onto her iPad

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Horton, Sarah; Quesenbery, Whitney. 2014. A Web for Everyone. New York: Rosenfeld Media. rosenfeldmedia.com/books/a-web-for-everyone/

Ann

Ann is a chemistry major with ADHD, a learning disability that makes it difficult for her to concentrate. She is 20 years old and hopes to become a pharmacist. Ann lives in a dorm on campus with two other female students.

Ability: ADHD, has difficulty concentrating

Aptitude: Intermediate computer user

Attitude: Struggles at times, but very appreciative of how much learning software has helped her

Assistive technology: Learning software (Kurzweil on laptop)
Format preference: Reading and listening at the same time
Video of student using Kurzweil on a computer (1:32-4:07)

Steven

Horton, Sarah; Quesenbery, Whitney. 2014. A Web for Everyone. New York: Rosenfeld Media. rosenfeldmedia.com/books/a-web-for-everyone/

Steven is an English major who is deaf. He is 23 years old and likes the flexibility of taking online classes. He lives by himself.

Ability: Native language is ASL; can speak and read lips
Aptitude: Intermediate technology user
Attitude: Can be annoyed about accessibility, such as lack of captions.
Assistive technology:

- CART (Communication Access Real-Time Transcription) for lectures (Watch a video demonstration of CART. Note that this video is also captioned.)
- Captions
- Video chat

Format preference: No preference for textbook format, but without captions video is meaningless.

Best Practices

Organizing Content

Organizing content so it has a logical flow just makes sense. Using chapters, headings, and subheadings to organize content allows students to clearly see how the main concepts are related. Headings are one of the main ways that students using a screen reader navigate through a chapter.

Who Are You Doing This For?

Everyone benefits from having content that's clearly organized. In addition, well-organized content supports students who:

- Have a learning disability, for example like Ann
- Are blind or have low vision, for example like Jacob

Image of Ann, original Artwork by BCcampus

Ann: "This allows me to go back and easily find the important points."

Jacob: "This gives me more control in navigating through the chapter. I can skip to the relevant section, instead of having to read the whole thing in a liner fashion."

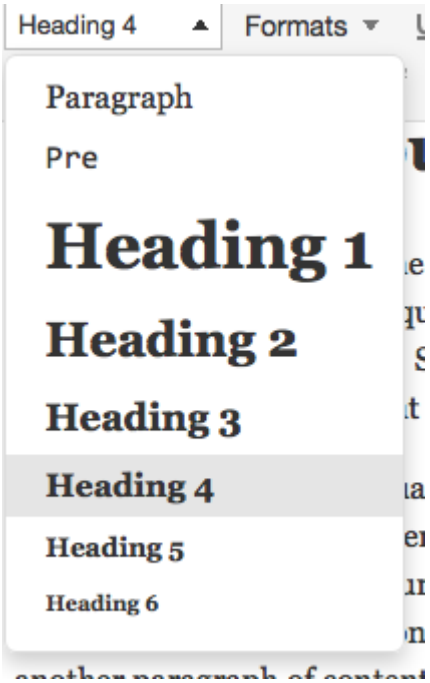
Image from Horton, Sarah; Quesenbery, Whitney. 2014. A Web for Everyone. New York: Rosenfeld Media. rosenfeldmedia.com/books/a-web-for-everyone/

What Do You Need to Do?

Headings help to identify the hierarchical structure of a document (e.g., sections, sub-sections). Headings provide a visual cue that helps sighted readers quickly navigate through sections of a document, skimming through content until they find a section they are looking for. Similarly, headings create logical divisions in the content and allow a non-sighted user to navigate a page or document easily using a screen reader.

When it comes to using visual references to indicate the hierarchy and structure of a document, you may be accustomed to just changing the font, enlarging the type size, making it bold or underlined or italicized, creating the impression of a heading. This approach presents problems when creating material with accessibility in mind because screen readers won't identify the text as a heading. Instead, a screen reader will just "read" through the text of a heading as if it were part of another paragraph of content, missing your intended cues about structure and organization.

To create effective, accessible headings: In Pressbooks use styles in the visual editor to tag sections with Heading 1, sub-sections with Heading 2, and sub-sections of sub-sections with Heading 3.



Heading examples from Pressbooks Visual Style Editor.

Images

In this section, we provide recommendations to guide your inclusion of accessible, image-based content.

What Are Images?

Images include: photographs, diagrams, pictures, charts, graphs, maps
File types: .gif, .jpg, .png

Before You Begin

Why Are You Including the Images You Have Selected?

Before you can determine what you need to do to make an image accessible, you first need to identify its **purpose** or **value** to your textbook. Consider the following questions:

1. Does your image serve a **functional** purpose? In other words, is it conveying non-text content to students? If so, you should:

- Provide a text alternative that serves the equivalent purpose of the non-text material[1]
- Not use colour as the only visual means of conveying information[2]

2. Does your image serve more of a **decorative** purpose? In other words, is it primarily a design element that does not convey content? If so, you should:

- Avoid unnecessary text descriptions

Who Are You Doing This For?

This work supports students who:

- Are blind or have low vision, for example Jacob
- Have poor contrast vision
- Are colour blind and cannot differentiate between certain colours
- Are using a device with monochrome display
- Have a form of cognitive disability

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1. Web Content Accessibility Guidelines (WCAG) 2.0, Guideline 1.1 Text Alternatives. Accessed from: http://www.w3.org/TR/WCAG20/#text-equiv
2. Web Content Accessibility Guidelines (WCAG) 2.0, Guideline 1.4.1 Use of Color. Accessed from: http://www.w3.org/TR/WCAG20/#visual-audio-contrast

Jacob. Image from Horton, Sarah; Quesenbery, Whitney. 2014. A Web for Everyone. New York: Rosenfeld Media. rosenfeldmedia.com/books/a-web-for-everyone/

What Do You Need To Do?

Functional Images and Alternative Text Descriptions

Consider what your content page would look like if the images didn't load. Now try writing alternative text for each image that would work as a replacement and provide the same service as the image.

As you work on developing your alternative text descriptions, keep the following recommendations and guidelines in mind:

- Remember that alternative text must convey the content and functionality of an image and is rarely a literal description of the image (e.g., "photo of cat"). Rather than providing what the image looks like, alternative text should convey what the content of the image is and what it does.[3]

- For relatively simple images (e.g., photographs, illustrations), try to keep your text descriptions short. You should aim to create a brief alternative (one or two short sentences) that is an accurate and concise equivalent to the information in the image.

- For more complex images (e.g., detailed charts, graphs, maps), you will need to provide more than a one- to two-sentence description to ensure all users will benefit from the content or context you intended to provide. In these cases, you should either provide the details in the text surrounding the image or write a

3. WebAIM (2014). Alt text blunders. Accessed from: http://webaim.org/articles/gonewild/#alttext

longer text description that students can link to on a separate page. You should still include a short text description (one to two sentences) that tells students where they can find the details you have provided in the longer description.

- Leave out any unnecessary information. For example, you do not need to include information like "image of…" or "photo of…"; assistive technologies will automatically identify the material as an image, so including that detail in your alternative description is superfluous.

- Avoid redundancy of content in your alternative description. Don't repeat the same information that already appears in text adjacent to the image.

Here are two examples of alternative text descriptions.

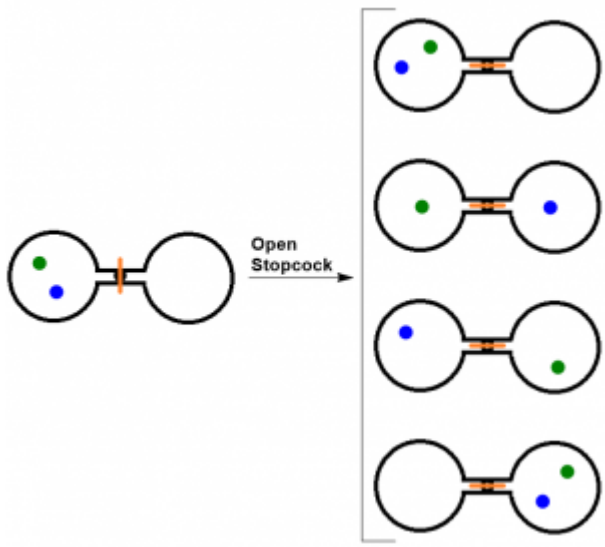
Example 1 (from Introduction to Sociology):

Figure 20.11. The slum city and the global city: the Favéla Morro do Prazères in Rio de Janeiro and the London financial district show two sides of global urbanization (Photos courtesy of dany13/Flickr and Peter Pearson/Flickr)

This photograph could be described in this way:

Figure 20.11 includes two photos. The first photo shows crowded buildings located on the hillside. They are small and shabby. The second photo shows magnificent buildings located by water.

Example 2 (Figure 18.1. Two-Atom, Double-Flask Diagram from Introductory Chemistry):



When the stopcock is opened between the flasks, the two atoms can distribute in four possible ways. Figure 18.1 could be described as follows:

> Figure 18.1 shows a diagram with five pairs of circles. All of these circles are open. The left one opens on the right and the right one opens on the left. They are connected with lines at their open points. One pair is located on the left and between their two connecting lines is a black dot with a red vertical line going across. The other four pairs arranged in a column are located on the right and between the connecting lines of each pair is a a small circle with a red horizontal line going through. A right arrow labelled Open Stopcock links the pair sitting on the left to the four pairs on the right. Each of these five pairs has two dots (green and blue) arranged in different patterns. For the pair on the left, the two dots, sitting obliquely, appear only in left circle. The green dot is at the left upper part of the circle and following it the blue dot is close to the bottom right. The first pair on the right has the similar situation. The only difference is that the green dot is at the right upper part of the circle and the blue dot is close the middle left. The second pair has a green dot in the centre of the left circle and a blue dot in the centre of the right circle. The third pair has a blue dot sitting at the left upper part of the left circle and a green dot sitting close to bottom right of the right circle. For the last pair, the two dots appear in oblique direction only in the right circle. A green dot is at the right upper part of the circle and a blue dot is close to bottom left.

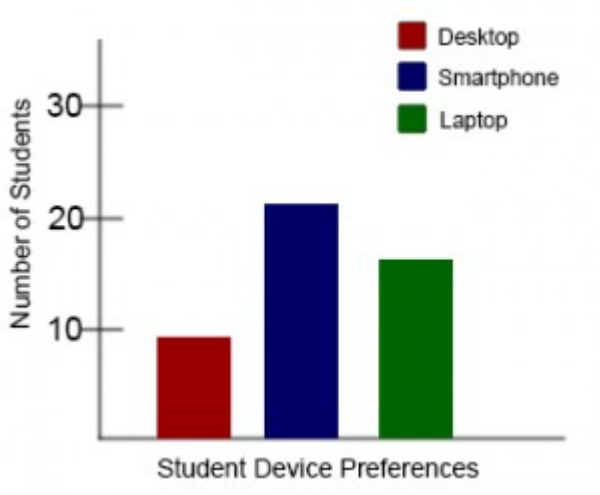
Using Colour

Consider what your images would look like if they only displayed in black and white. Would any necessary context or content be lost if the colour was "turned off"? Images should not rely on colour to convey information; if the point you are making depends on colour to be understood, you may need to edit your image or formatting so that concepts presented are not lost to those who are colour blind or who require high contrast between colours.

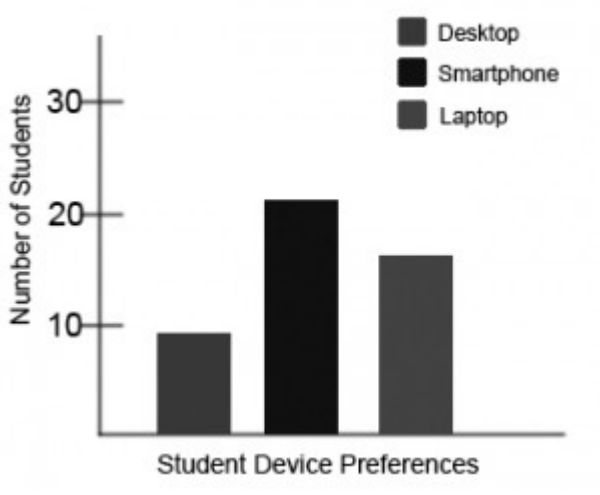
Example 1 — not accessible:

In this basic bar chart, colour is the only means by which information is conveyed.

Example 2 — not accessible:



In this example of a bar chart, colour is the sole means of communicating the data.

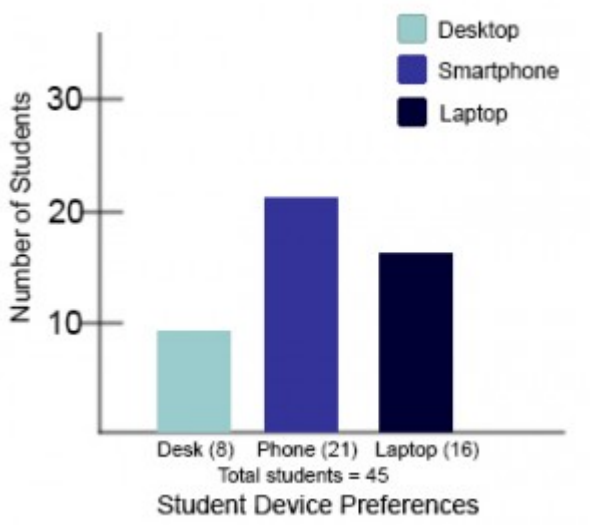


This view of the same bar chart displays how the chart might appear to a student who is colour blind, or whose device does not display colour. All of the meaningful data is lost.

For a student who is colour blind or who has poor contrast vision, all of the relevant information is lost in a colour chart.

Example 3 — accessible:

Students who are colour blind can distinguish between high-contrast shades. In this example, contextual labels have been added to each bar at the bottom of the chart. Note that the chart will still require an alternative text description.



In this view of the bar chart, high-contrast colours have been used so that shading differences will still display in grey scale. Text labels have also been added so that the data is not just being communicated with colour.

Decorative Images

If your image does not add meaning and is included for decorative or design purposes only, the space for the alternative text description should still be included with your image, but it should be left empty or blank. Assistive technologies will detect the image, and by leaving the alternative text description blank, you will signal to the student that there isn't any contextual content embedded. Including alternative text descriptions for decorative images "simply slows the process down with no benefit because the screen-reading software vocalizes the content of the [alternative text description], whether that alternative text adds value or not."[4]

4. webAccess (2012). Adapted from: Top Ten Tips for making your website accessible. Accessed from: http://webaccess.berkeley.edu/developer-information/top-ten-tips/#alt

Tables

In this section, we provide guidelines and recommendations for formatting tables.

What Are Tables?

Tables: In this context, we are referring to **data tables,** which are tables that include row and/or column header information to categorize content)

File types: .doc, .html, .pdf

Before You Begin

Are Your Tables Simple or Complex?

A simple table includes a maximum of one header column and/or one header row. A complex table includes more than one header column and/or header row, and may include merged or split cells.[1]

We recommend you make every effort to keep data tables as simple in structure as possible. The more complex the design of a data table, the less accessible it will be for some students using screen-reading technology to access their textbook materials. Screen readers move left-to-right, top-to-bottom, one cell at a time, and because a screen reader does not repeat a cell, merging or splitting cells may affect the reading order of a table.

Who Are You Doing This For?

This work supports students who:

- Are blind or have low vision, for example Jacob
- Have a form of cognitive disability, for example Ann

What Do You Need To Do?

In the same way that your content hierarchy needs true headings and structure, tables need a properly defined structure to be accessible. This means that you must add row and column headers to define the different sections of data. Screen readers read tables horizontally – cell by cell, row by row – and row and column headers help give the context of the data in each cell to students who are blind, have low vision, or have a cognitive disability.

Creating Simple Tables

A simple table includes:

1. AccessAbility: Accessibility and Usability at Penn State. Table Headers and Captions. Accessed from: http://accessibility.psu.edu/tables

Profile of Anne, original Artwork by BCcampus

1. A table title or caption
2. Maximum of one row of column headers and/or maximum of one column of row headers
3. No merged or split cells
4. Adequate cell padding for visual learners.

Example:

The table below is a simple table. Reviewed against the preceding requirements list, this table:

1. Includes a **title** (Spring Blossoms)
2. Has one row in which cells are tagged as **column headers** (Colour Family, Bulbs, Shrubs, Trees), and one column (beginning on the second row) in which the cells are tagged as **row headers** (Pink, Yellow)
3. Contains no merged or split cells
4. Has adequate **cell padding** to provide space buffering around the data in each cell. (Cell padding in this table is set at "10").

Spring Blossoms

Colour Family	Bulbs	Shrubs	Trees
Pink	Tulips	Flowering currant	Ornamental plum
Yellow	Daffodils	Forsythia	Star magnolia

For a student accessing the table through a screen reader, the first row of data will be presented along the lines of:

- Pink, Bulbs: Tulips
- Pink, Shrubs: Flowering currant

- Pink, Trees: Ornamental plum

Weblinks

In this section, we review how to add accessible weblinks to content.

What Are Weblinks?

Weblink: a link from a file or document to another location (such as a website address) or file, typically activated by clicking on a highlighted word or image on the screen.

File types: .html, .pdf, .doc, .xls

Before You Begin

Why Are You Including the Weblinks You Have Selected?

Generally weblinks are included within content to provide the user with additional information that is available at a another location.

Who Are You Doing This For?

This work supports students who:

- Have a form of cognitive disablity, for example Ann
- Have a physical disability, for example Trish
- Are deaf or hard of hearing
- Are blind or have low vision

What Do You Need To Do?

Descriptions

Ensure that all web pages and weblinks have titles that describe a topic or purpose.

The purpose of the link can be determined by the text alone. That is, you don't need to include additional information justifying the use of the link. You want the link to be meaningful in context. For example, do not use generic text such as "click here" or "read more" unless the purpose of the link can be determined by meaning in the surrounding content.[1]

Consider the following examples.

Example 1 — unclear:

- Click here for information on the BC Open Textbook Project.

1. https://www.webaccessibility.com/best_practices.php?best_practice_id=1301

Horton, Sarah; Quesenbery, Whitney. 2014. A Web for Everyone. New York: Rosenfeld Media. rosenfeldmedia.com/books/a-web-for-everyone/

Example 12 — clear and accessible:

- Information on the BC Open Textbook Project is available online.

New Tabs/Windows

In general, it is better if weblinks do **not** open new windows and tabs since they can be disorienting for people, especially people who have difficulty perceiving visual content.[2]

However, if a link must open in a new window, it is best practice to include a textual reference. For example, Information on the BC Open Textbook Project [New Window] is available online.[3]

2. http://www.w3.org/TR/2014/NOTE-WCAG20-TECHS-20140916/G200
3. http://accessibility.psu.edu/linkshtml

Multimedia

In this section, we provide recommendations to guide your inclusion of accessible multimedia content.

What Is Multimedia?

Multimedia includes: videos, audio, animations, slideshows
File types: .mp3, .mp4, ppt., etc.

Before You Begin

What Type of Multimedia Are You Including?

Before you can determine what you need to do to make media materials accessible, you need to understand what is required for different types of multimedia. Consider the following questions:

1. Does your multimedia resource include **audio narration** or **instruction**? If so, you should:

- Provide a complete transcript of all speech content and relevant non-speech content in the resource.

2. Does your multimedia resource include **audio that is synchronized with a video presentation?** If so, you should:

- Provide captions of all speech content and relevant non-speech content in the resource.

3. Does your multimedia resource include **contextual visuals** (e.g., charts, graphs) that are not addressed in the spoken content? If so, you should:

- Provide audio descriptions of relevant visual materials in the resource.

Who Are You Doing This For?

This work supports students who:

- Are deaf or hard of hearing, for example Steven.
- Are blind or have low vision, for example Jacob
- Have a form of cognitive disability
- Are in a location where they cannot play or hear audio
- Are not native-English speakers and need written-word formats to support understanding

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Steven. Image from Horton, Sarah; Quesenbery, Whitney. 2014. A Web for Everyone. New York: Rosenfeld Media. rosenfeldmedia.com/books/a-web-for-everyone/

Jacob. Image from Horton, Sarah; Quesenbery, Whitney. 2014. A Web for Everyone. New York: Rosenfeld Media. rosenfeldmedia.com/books/a-web-for-everyone/

What Do You Need To Do?

Transcripts

Consider what your students would get out of your multimedia resource if they were not able to hear the audio portion, or if they had difficulty understanding your spoken word. A text transcript provides students with equivalent information to the audio content in a multimedia resource.[1]

As you work on developing your text transcript, keep in mind the following recommendations about what to include:

1. **Speaker's name**
2. **All speech content:** If there is speech that is not relevant, it is usually best to indicate that it has been excluded from the transcript. For example: "[A & B chatted while slides were loading]."
3. **Relevant descriptions about the speech:** Descriptions that convey emotions, mood, etc. are usually provided in brackets. For example: "Don't touch that! [shouted]."
4. **Descriptions of relevant non-speech audio:** These are usually provided in brackets. For example: "[metal pipes crashing to concrete floor]." Background noise that isn't relevant can be left out.
5. **Headings and sub-headings:** Where they will make the transcript more usable or easy to navigate, headings and sub-headings can be helpful aids, especially when the transcript is long. When including these, put them in brackets to show that they were not part of the original audio. For example: [Introduction]; [Group Discussion]; [Case Study].

Transcripts and third-party videos

If you are not producing your own video resource but are planning to embed video materials from a third-party source (e.g., YouTube), be aware that not all third-party sources include transcripts. While services like YouTube technically support transcripts, not all contributors to YouTube include these. If you select a video resource that does not already have a transcript, you will need to produce one yourself.*

*__Copyright note__: Producing your own transcript for a third-party video could infringe on copyright, depending on how the video has been licensed. Before you proceed with producing a transcript for media materials you did not create yourself, you should contact the copyright holder of that material to obtain permission to do so.

Captions

Captions are the text that is synchronized with the audio in a video presentation. Captions are important when people need to see what's happening in the video and get the audio information in text at the same time.

The work you put into creating a text transcript for a video resource can be repurposed to provide the captions. Keep in mind the following recommendations about what to include in your captions:

1. **All speech content:** If there is speech that is not relevant, it is usually best to indicate that it has been excluded from the captions. For example: "[A & B chatted while slides were loading]."

1. Web Content Accessibility Guidelines (WCAG) 2.0, Guideline 1.2 Time-based Media: Provide alternatives for time-based media. Accessed from: http://www.w3.org/TR/WCAG20/#media-equiv

2. **Descriptions of relevant non-speech audio:** These are usually provided in brackets. For example*:* "[metal pipes crashing to concrete floor]"; "[background music by XXX plays]." Background noise that isn't relevant can be left out.

Audio Descriptions

Consider what your students would get out of a multimedia resource if they were not able to see embedded visual materials critical for comprehension. Audio descriptions are helpful if visual content (e.g., a chart or a map) in a video or presentation provides important context that is not available through the audio alone.[2]

When describing visual elements in your multimedia resources, keep in mind the following recommendations and guidelines.

1. When contextual visual content on the screen is not described in the audio itself, you will need to provide an audio description that is an objective description of the visual element.

Example:

To help students fully grasp a concept that you are trying to convey in your video, you have included some contextual visual references (e.g., maps, charts, physical demonstrations of a process). However, you realize after making the video that the audio portion does not describe these visuals in enough detail for a student like Jacob to be able to access all of the concepts you intended to convey.

In this case, you would need to record an audio description of the visual material that provides enough detail to provide students like Jacob with the same content available to visual learners.

2. Whenever possible, avoid creating the need for audio descriptions in the first place by being proactive at the time of recording. If you pay attention to contextual visuals during the recording of the media piece, you may find opportunities to convey the visual content within the spoken material itself; you will not need to provide audio descriptions of the visual content after the fact.

Example:

You are recording a video or presentation that includes a chart that tracks coal production in British Columbia, and as part of the presentation you want to focus attention on specific data in the chart. The narrator or presenter might point to sections on the chart and say:

> *"As you can see, metallurgical coal projection increased by 3 million tonnes over these two years."*

In this case, audio descriptions would be necessary to provide the missing context to students with visual disabilities; these students cannot see the data on the chart that tells visual learners what the production figures are and for what dates. However, if the narrator or presenter instead says:

> *"This chart illustrates that metallurgical coal production in B.C. increased from 23 million tonnes in 1999 to 26 million tonnes in 2001,"*

the visual content is conveyed through the audio and no audio description will be necessary.

2. Web Content Accessibility Guidelines (WCAG) 2.0, Guideline 1.2.3 Audio Description or Media Alternative (Prerecorded). Accessed from: http://www.w3.org/TR/WCAG20/#media-equiv

Formulas

In this section, we review how to add accessible formulas to the content.

What Are Formulas?

Formulas include: Math equations or science formulas
File types: LaTex or MathType

Before You Begin

Who Are You Doing This For?

This work supports students who:

- Are blind or have low vision
- Have a form of cognitive disability, for example Mark
- Have a physical disability

Profile of Mark, original Artwork by BCcampus

The following content is a derivative of Equations: Images vs. MathML from Accessibility and Usability at Penn State, http://accessibility.psu.edu/equations.

What Do You Need To Do?

There are several ways to handle equations from images with ALT tags to MathML. Having access to an equation editor such as MathType or MathMagic can streamline processing and converting equations considerably. These tools are similar to equation editors found in the ANGEL HTML Editor and Microsoft Office.

MathML

Math ML is a text-based XML markup language designed for math equations. Browsers that support MathML are able to translate the XML into a formatted equation. Since MathML with MathJax can be rendered in many systems, including HTML, Sites at Penn State, ANGEL and Drupal, it is considered the best choice for accessibility.

Information about creating and viewing MathML is available on that page.

MathML may vary from system to system and the content can change rapidly.

Image with ALT tag

A safe option to create an image of an equation (or export it from an equation editor) and then insert the image into a document with an ALT tag.

Note: ALT tags can be written in Nemeth MathSpeak for students who have learned that system.

Example 1– an equation in HTML:

$$m = \frac{m_0}{\sqrt{1-\frac{v^2}{c^2}}}$$

View the ALT Tag

ALT= "m equals begin fraction m sub 0 over begin square root 1 minus begin fraction v sup 2 over c sup 2 end fraction end square root end fraction"

LaTeX

LaTeX is a math markup language familiar to many in the science and math community, but unfortunately it is not currently supported by screen reader technology**.** However, it is fairly simple to convert LaTeX to an image or MathML in most equation editors.

To import LaTeX, follow these steps in MathMagic and MathType:

1. Copy a piece of LaTeX code such as

```
m &= \frac{m_0}{\sqrt{1-\frac{v^2}{c^2}}}
```

into an equation editor's main editing window.

2. The equation should appear fully formated. Make minor adjustments as needed.

At our BCcampus user testing, students indicated that it would helpful to have an audio file of the formula or equation. The audio file would be placed beside the formula or equation and would allow the user to hear exactly how the formula or equation is interpreted.

Example — equation with audio:

$$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

Font size

In this section, we review the two main concerns of font size on the web.

What Is Font Size?

Font size: The size of text visible on the screen.

Before You Begin

Who Are You Doing This For?

This work supports students who:

- Are blind or have low vision, for example Diana
- Have a form of cognitive disability
- Are deaf or hard of hearing
- Have a physical disability

Profile of Diana, original artwork by BCcampus.

What Do You Need To Do?

There are two main concerns when working with font sizes.

1. Ensuring that default font sizes are not too small.
2. Ensuring that text can be expanded to 200% on websites.[1]

Keep in mind these recommendations and guidelines:

- **12 point for body text**: For most documents, body text should be around 12 points. Small fonts may be illegible for some audiences.
- **9 point for footnotes**: If a document contains footnotes or endnotes, the minimum size should be about 9 points
- **200% zoom**: The Web Content Accessibility Guidelines (WCAG 2.0) recommend ensuring that text can be zoomed to 200%. As well, we recommend using liquid layouts[2] that can accommodate 200% text.

1. http://sites.psu.edu/accessibility/fontsizehtml/

2. Liquid layout are layouts that are based on percentages of the current browser window's size. They flex with the size of the window, even if the current viewer changes their browser size as they're viewing the site. Liquid width layouts allow a very efficient use of the space provided by any given Web browser window or screen resolution.

Colour Contrast

In this section, we provide guidelines and recommendations about colour contrast in your textbook materials.

What Is Colour Contrast?

Colour contrast includes: hue, lightness and saturation of text, images, and background
File types: .doc, .html, .pdf, .jpg, .gif

Before You Begin

What Role Does Colour Play in the Delivery of Your Content?

When documents or web pages do not provide enough contrast between foreground elements (e.g., text, images) and background elements (e.g., colour, watermark images), some students will have difficulty reading the content. Consider the following questions:

1. Have you presented text- or image-based content on a coloured or textured background? If so, you should:
    - Confirm that there is sufficient contrast between your foreground content and the chosen background colour or texture.

2. Have you included links in your content? If so, you should:
    - Confirm that the colour of your web links is distinct from both your background colour and the colour of the surrounding text.

3. Have you used colour to convey concepts or information? If so, you should:
    - Confirm that you are not using colour alone to convey this information.

Who Are You Doing This For?

This work supports students who:

- Have low vision, like Diana
- Have poor contrast vision
- Are colour blind and cannot differentiate between certain colours
- Are using a device with monochrome display

Profile of Diana, original artwork by BCcampus

What Do You Need To Do?

Contrast

Students with low vision and/or a form of colour blindness may have difficulty reading text that does not contrast enough with the background colour you have selected. If the colour palette you have adopted is too subtle (e.g., white text on a pastel background; medium-grey text on a light-grey background), the contrast between your foreground and background is probably insufficient for some students.

Web Content Accessibility Guidelines (WCAG 2.0) require that "the visual presentation of text and images of text has a contrast ratio of at least 7:1."[1] The image below presents four different foreground/background colour-contrast examples to illustrate insufficient and sufficient colour contrast ratios.

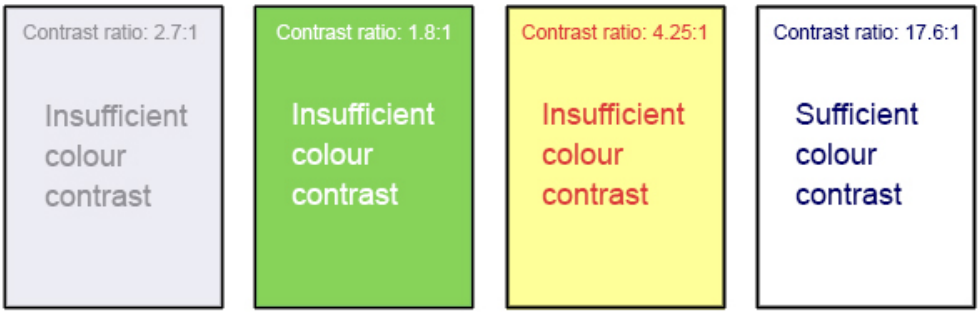

Image displays four examples of foreground (text) colour against background colours; only the example on the far right presents combinations with sufficient colour contrast.

1. Web Content Accessibility Guidelines (WCAG) 2.0, Guideline 1.4.6 Contrast (Enhanced). Accessed from: http://www.w3.org/TR/UNDERSTANDING-WCAG20/visual-audio-contrast7.html

Not sure how to test your materials for colour contrast ratios?

There are many online and downloadable tools available to help you evaluate colour contrast ratios. Here are a few we have tried and like:

- **WebAIM's Color Contrast Checker:** This web-based tool allows you to select or enter colour values to test and provides you with a "pass" or "fail" on your contrast ratio.
- **ACART's Contrast Checker:** This is a straightforward, web-based tool you can use to both check colour contrast and view your selections in grey scale. This tool also allows you to keep a history of the colour combinations you have tested.
- **Giacomo Mazzocato's Accessibility Color Wheel:** This web-based tool includes several options for testing your colour selections, including simulations of three types of colour blindness. You can also opt to test what your contrast ratio is when the foreground and background colour selections are inverted.

Weblink Colours

Weblinks must be visually distinct from both the surrounding, non-linked text and background colour. If you do not underline your links (or provide some other non-colour cue), you must ensure that you provide both sufficient contrast between the link and background colours *and* between the link colour and that of the surrounding text.

Web Content Accessibility Guidelines (WCAG 2.0) require a:

- 4.5:1 contrast between the link text color and the background
- 3:1 contrast between the link text color and the surrounding non-link text color[2]

High-Contrast Mode

Some students need to see light text on a dark background for it to be readable, while others require dark text on a light background. Students with low vision (like Diana) must be able to see content when it is displayed in high-contrast mode. This can be a subjective experience, based on individual student needs. We recommend that you try testing your text and image-based content as you go by using high-contrast mode on your own computer and making adjustments as needed.

All content items such as text, images, bullets, and table borders must be visible in both regular and high-contrast modes.

2. WebAIM (2015), WCAG 2.0 and Link Colors. Accessed from: http://webaim.org/blog/wcag-2-0-and-link-colors/

Not sure how to test your content in high-contrast mode?

To test the visibility of your content in this mode, turn on high contrast by simultaneously pressing the following keys on your (PC) keyboard:

Left ALT + Left SHIFT + Print Screen.

To turn off high contrast mode, repeat this step.

*Use of Colour**

You should not rely on colour as the sole means of conveying information and instruction. If the point you are making depends on colour to be understood, you will need to edit your materials so that concepts presented in the visuals are not lost to those who are colour blind or who require high contrast between colours.[3]

**This topic is also addressed in the Images section of the Toolkit.*

3. Web Content Accessibility Guidelines (WCAG) 2.0, Guideline 1.4.1 Use of Color. Accessed from: http://www.w3.org/TR/WCAG20/#visual-audio-contrast

Conclusion

Next Steps

This is the first version of this document. We intend for there to be future versions and appreciate any feedback you want to send to us.

We hope we have provided people who are writing open textbooks with a clear understanding of what they need to think about as content creators to ensure that their content is accessible.