California Open Online Library for Education & Accessibility

COOL4Ed (the California Open Online Library for Education) was created so that faculty can easily find, adopt, utilize, review and/or modify free and open etextbooks for little or no cost. The COOL4Ed accessibility open textbook evaluations can inform faculty, staff, and students how the free and open etextbooks meet 15 accessibility "checkpoints" that could impact the learning of learners with a range of disabilities.

SUMMARY OF ACCESSIBILITY EVALUATION:

Textbook: **Business Hub (Boundless)**
Format of Textbook: **HTML**

Assistive Technology (AT) Evaluation Score: Overall	**5.6 (Maximum score = 10)**
Assistive Technologies (AT) Evaluations applies specialized tools and software in the accessibility evaluation process. These specialized assistive technologies, see list below, are typically not used or available by the general public into the accessibility evaluation process. • Accessibility features of desktop operating systems (e.g. high-contrast display themes, settings from the Keyboard and Mouse control panels) • Accessibility-related software included with desktop operating systems (e.g. VoiceOver, Microsoft Narrator) • Third-party accessibility software and hardware: • Screen readers (e.g. JAWS, Window Eyes) • Magnification software (e.g. ZoomText Magnifier/Reader, MAGIC Pro with Speech) • Reading software for users with learning disabilities (e.g. Read and Write Gold, Kurzweil 3000) • Refreshable Braille displays	
Non- Assistive Technology (NAT) Evaluation Score: Overall	**7.2 (Maximum score =10)**
Non-Assistive Technologies (NAT) Evaluations applies only native or basic tools and software such as the keyboard and Narrator in the accessibility evaluation process. These non-assistive technologies are readily available and used by the general public.	

COOL4Ed Accessibility Evaluation Methods:

The California State University Accessible Technology Initiative and MERLOT (Multimedia Educational Resources for Learning and Online Teaching) developed the rubric or "checkpoints" for the accessibility evaluation. CAST, a nationally recognized organization with expertise in accessibility and UDL, reviewed and affirmed the appropriateness and value of the accessibility evaluation rubric and contributed the references and support resources to help people learn how best to design, evaluate, and remediate the learning materials to maximize the accessibility of the learning resources for all. The "checkpoints" have been built upon the Section 508 technical standards and has been organized and tailored to the typical characteristics of digital resources used in higher education courses.

The accessibility evaluations were performed by the Center for Usability in Design and Accessibility at California State University, Long Beach; faculty and graduate students with expertise in human factors, usability, and accessibility performed the evaluations of over 150 free and open etextbooks. COOL4ed.org has published the accessibility evaluation rubric and provides a detailed description of the methodology used to evaluate the accessibility of the etextbooks in COOL4ed.

LOOKING FOR DETAILED ACCESSIBILITY REPORTS?

See Detailed Accessibility Evaluation Report using Assistive Technologies

See Detailed Accessibility Evaluation Report using Non-Assistive Technologies

DETAILED ACCESSIBILITY EVALUATION REPORT using
Assistive Technologies

Assistive Technologies (AT) Evaluations applies specialized tools and software in the accessibility evaluation process. These specialized assistive technologies, such as Kurzweil and NVDA, are typically not used or available by the general public into the accessibility evaluation process.

1. Accessibility Documentation

A. The organization providing the online materials has a formal accessibility policy.	**Fail**
Additional Information:	**No information was found about Boundless.com's formal accessibility policy.**
B. The organization providing the online materials has an accessibility statement.	**Fail**
Additional Information:	**No information was found about Boundless.com's accessibility statement.**
C. An Accessibility Evaluation Report is available from an external organization.	**Fail**
Additional Information:	**No information was found about Boundless.com's accessibility evaluation report.**

2. Text Access

A. The text of the digital resource is available to assistive technology that allows the user to enable text-to-speech (TTS) functionality.	**Fail**
Additional Information:	**3/3 chapters (Chapters 1, 4, 7) were read in a logical order by the NVDA assistive technology, however, there are sometimes problems with navigating through the text with hotkeys. When using hotkeys, the reader jumps from place to place and does not go in order by the headings. Whenever I went on to the next section of the textbook, the NVDA reader would repeat "unknown" numerous times then would not continue reading the chapter unless you press the heading hotkey. Sometimes, the NVDA reader would also not read through the textbook's headings, it**

	would just state "no next heading." In the contents page of each chapter, the NVDA reader does not read the sections in logical order. It does not read through all of the headings of each section to tell you where you are. It skips all the way to the bottom and you are unable to go back to the top because you may not know that the sections are not headings. However, when the NVDA assistive technology did work, the regular text was read aloud in logical order.

3. Text Adjustment

A. Text is compatible with assistive technology.	Pass
Additional Information:	3/3 chapters (Chapters 1, 4, 7) are able to zoom in and out without having to horizontally scroll through the text.
B. The resource allows the user to adjust the font size and font/background color (or is rendered by an application such as a browser, media player, or reader) that offers this functionality).	Pass
Additional Information:	3/3 chapters (Chapters 1, 4, 7) are able to adjust font and colors while using the Care your Eyes program.

4. Reading Layout

A. Text of the digital resource is compatible with assistive technology that allows the user to reflow the text by specifying the margins and line spacing (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	Pass
Additional Information:	30/30 webpages had good reflow of the text. It was all in a logical order.
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	N/A

Additional Information:	

5. Reading Order

A. The reading order for digital resource content logically corresponds to the visual layout of the page when rendered by assistive technology.	**Fail**
Additional Information:	**2/5 pages were read in logical order without any problems (Ch. 1, Sec. 5; Ch. 4, Sec. 2; Ch. 13, Sec. 1; Ch. 18, Sec. 1; Ch. 18, Sec. 6). Tables were not read in a logical order by reading cell by cell and were not labeled as tables. Figures were also not labeled as figures. Instead, tables and figures were links and only the captions were read to describe the figures and tables. The captions were not enough information to describe them. There are also sometimes problems with navigating through the text with hotkeys. When using hotkeys, the reader jumps from place to place and does not go in order by the headings. Whenever I went on to the next section of the textbook, the NVDA reader would repeat "unknown" numerous times then would not continue reading the chapter unless you press the heading hotkey. Sometimes, the NVDA reader would also not read through the textbook's headings, it would just state "no next heading." In the contents page of each chapter, the NVDA reader does not read the sections in logical order. It does not read through all of the headings of each section to tell you where you are. It skips all the way to the bottom and you are unable to go back to the top because you may not know that the sections are not headings. However, when the NVDA assistive technology did work, the regular text was read aloud in logical order.**

6. Structural Markup/Navigation

A. The text of the digital resource includes markup (e.g. tags or styles) that allows for navigation by key structural elements (chapters, headings, pages) using assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**Fail**
Additional Information:	**3/3 chapters (Chapters 1, 4, 7) are navigable while using hotkeys, however there are times when you have to go back to the previous page and refresh the current page many times in order for the hotkeys to work. When the hotkeys do not work, the reader jumps from place to place and does not go in order by the headings. Whenever I went on to the next section of the textbook, the NVDA reader would repeat "unknown" numerous times then would not continue reading the chapter unless you press the heading hotkey.**
B. The text of the digital resource includes markup for bullets and numbered lists that is compatible with assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**Pass**
Additional Information:	**10/10 lists were read in logical order while using the NVDA assistive technology hotkeys.**
C. If the text of the digital resource is delivered within an ebook reader application, a method is provided that allows users to bypass the reader interface and move directly to the text content that is compatible with assistive technology.	**N/A**
Additional Information:	

7. Tables

A. Data tables include markup (e.g. tags or styles) that identifies row and column headers in a manner that is compatible with assistive technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	**Fail**
Additional Information:	**0/10 tables had proper markup (Ch.1, Sec. 3 (2); Ch. 4, Sec. 2;Ch. 9, Sec. 2; Ch. 13, Sec. 1; Ch. 15, Sec. 5; Ch. 18, Sec. 1, 6; Ch. 19, Sec. 5; Ch. 20, Sec. 2). All of the tables were not labeled as tables. Instead, they were links therefore I was not able to navigate to the tables by using the NVDA hotkeys.**

8. Hyperlinks

A. In-book links take you to a location within the textbook. For example, the table of contents would be considered in-book links and embedded links take you to the correct location in the book.	**N/A**
Additional Information:	
B. Live hyperlinks take you to any website or webpages external to the book.	**Pass**
Additional Information:	**50/50 links work throughout the textbook. The links went to where they were expected to go and I did not encounter any errors while interacting with any of the links.**
C. Live links take you to the correct webpage that is functioning properly.	**Pass**
Additional Information:	**50/50 links work throughout the textbook. The links went to where they were expected to go and I did not encounter any errors while interacting with any of the links.**
D. Live links are descriptive enough for the users to know where it should take them.	**Pass**

Additional Information:	**50/50 links had the correct description of where the links would go on the internet and they were not just labeled as URL's.**

9. Color and Contrast

A. All information within the material that is conveyed using color is also available in a manner that is compatible with those that do not perceive color, and information conveyed by color is also conveyed in other ways.	**Pass**
Additional Information:	**3/3 chapters (Chapters 1, 4, 7) have good color redundancy throughout the textbook. The subheadings, links, and regular text are in black and white. The links also have a blue underline underneath to distinguish them as links. The main headings are consistently blue throughout the textbook.**
B. Information is conveyed from the sub-categories for contrast.	**Pass**
Additional Information:	**A majority of the three chapters (Chapters 1, 4, 7) passed the color contrast evaluation, however there was some text that did not pass the color contrast ratio evaluation.**
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	**Fail**
Additional Information:	**The main headings are in a light blue color and did not pass the color contrast evaluation. The subheadings beneath the main heading passed because the text was in black and the background was white.**
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	**Pass**
Additional Information:	**All of the regular text passed the color contrast evaluation because the font was black and the background was white.**

E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	**Pass**
Additional Information:	**There are portions of the simple images that I found that did not pass the color contrast evaluation, such as anything in red color. However, a majority of the simple images passed the color contrast evaluation.**

10.Language

A. The text of the digital resource includes markup that declares the language of the content in a manner that is compatible with assistive technology.	**Fail**
Additional Information:	**Language markup was not found in the source code.**
B. If the digital resource includes passages in a foreign language, these passages include markup that declares the language in a manner that is compatible with assistive technology.	**N/A**
Additional Information:	

11.Images

A. Non-decorative images have alternative text that is compatible with assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**Fail**
Additional Information:	**0/3 chapters (Ch. 1, 5, 9) had non-decorative images that were labeled and read by the NVDA assistive technology correctly. None of the images that were found in these chapters were labeled correctly as figures or tables. Instead they were links and the NVDA assistive technology did not describe the images in more detail other than what was written in each caption.**

B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	**Fail**
Additional Information:	**0/3 chapters (Chapters 1, 5, 9) had decorative images that were skipped while the NVDA assistive technology read the text aloud. The decorative images had captions beneath that were read by the NVDA reader, and the NVDA reader also read through advertisements that had nothing to do with the textbook.**
C. Complex images, charts, and graphs have longer text descriptions that are compatible with assistive technology (or are rendered by an application such as a browser, media player, or reader) that offers this functionality).	**Fail**
Additional Information:	**0/3 chapters (Ch. 1, 5, 9) had complex images that were labeled and read by the NVDA assistive technology correctly. None of the images that were found in these chapters were labeled correctly as figures or tables. Instead they were links and the NVDA assistive technology did not describe the images in more detail other than what was written in each caption.**

12. Multimedia

A. A synchronized text track (e.g. open or closed captions) is provided with all video content.	**N/A**
Additional Information:	
B. A transcript is provided with all audio content.	**N/A**
Additional Information:	
C. Audio/video content is delivered via a media player that is compatible with assistive technology. This includes support for all criteria listed in Section 15 below.	**N/A**
Additional Information:	

13.Flickering

A. The digital resource content does not contain anything that flashes more than three times in any one-second period.	**Pass**
Additional Information:	**No flickering content.**

14.Science, Technology, Engineering, and Math (STEM)

A. STEM figures have appropriate markup that indicates that the image is a figure.	**Fail**
Additional Information:	**0/10 figures were marked as figures. None of the figures in Chapters 1, 2, 10, 17, and 20 were labeled as figures. Instead, they were links.**
B. STEM graphs have appropriate markup that indicates that the image is a graph.	**Fail**
Additional Information:	**0/10 graphs were labeled as graphs. None of the figures in chapters 1 and 2 were labeled. Instead, they were links.**
C. STEM equations have appropriate markup that indicates that the image is an equation.	**N/A**
Additional Information:	
D. STEM tables have appropriate markup that indicates the image is a table.	**Fail**
Additional Information:	**0/10 tables had proper markup (Ch.1, Sec. 3 (2); Ch. 4, Sec. 2;Ch. 9, Sec. 2; Ch. 13, Sec. 1; Ch. 15, Sec. 5; Ch. 18, Sec. 1, 6; Ch. 19, Sec. 5; Ch. 20, Sec. 2). All of the tables were not labeled as tables. Instead, they were links therefore I was not able to navigate to them using NVDA hotkeys.**
E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Fail**

Additional Information:	**0/10 figures were described in more detail other than what was written in the captions beneath the figures. The captions were not enough information to fully understand each figure.**
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Fail**
Additional Information:	**0/10 graphs were described in more detail other than what was written in the captions beneath them. These captions did not provide enough information to fully understand what was going on in the graphs. The captions did not describe the axes or how high lines and bars went on the graph.**
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**N/A**
Additional Information:	
H. Assistive technology used can access the content from the STEM tables.	**Fail**
Additional Information:	**0/10 tables were described in more detail other than what was written in the captions beneath them. These captions did not provide enough information to fully understand what was going on in the tables. The NVDA reader also did not read the tables in order of the cells and the person reading the textbook would not be able to navigate through the table cell by cell.**

15. Interactive Elements

A. Each interactive element (e.g. menu, hyperlink, button) and function (e.g. annotations) allows keyboard-only operation both with and without assistive technology.	**N/A**
Additional Information:	

B. Each interactive element conveys information to assistive technology regarding the element's name, type, and status (e.g. "Play, button, selected").	**N/A**
Additional Information:	
C. All instructions, prompts, and error messages necessary to complete forms are conveyed as text to assistive technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	**N/A**
Additional Information:	

DETAILED ACCESSIBILITY EVALUATION REPORT using
Non-Assistive Technologies

Non-Assistive Technologies (NAT) Evaluations applies only native or basic tools and software such as the keyboard and Narrator in the accessibility evaluation process. These non-assistive technologies are readily available and used by the general public.

1. Accessibility Documentation

A. The organization providing the online materials has a formal accessibility policy.	**Fail**
Additional Information:	**Nothing found.**
B. The organization providing the online materials has an accessibility statement.	**Fail**
Additional Information:	**Nothing found.**
C. An Accessibility Evaluation Report is available from an external organization.	**Fail**
Additional Information:	**Nothing found.**

2. Text Access

A. The text of the digital resource is available to assistive technology that allows the user to enable text-to-speech (TTS) functionality.	**Pass**
Additional Information:	**Ch. 1-3.**

3. Text Adjustment

A. Text is compatible with assistive technology.	**Pass**
Additional Information:	**OK up to 200%; anything beyond that level gets kinda crowded. "hello there, let us know…" bar at the bottom becomes more intrusive at each zoom level.**
B. The resource allows the user to adjust the font size and font/background color (or is rendered by an application such as a browser, media player, or reader) that offers this functionality).	**Pass**
Additional Information:	**All text and bg colors change, ch. 1-3.**

4. Reading Layout

A. Text of the digital resource is compatible with assistive technology that allows the user to reflow the text by specifying the margins and line spacing (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**Pass**
Additional Information:	**All text reflows.**
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	**N/A**
Additional Information:	**No printed material.**

5. Reading Order

A. The reading order for digital resource content logically corresponds to the visual layout of	**N/A**

the page when rendered by assistive technology.	
Additional Information:	**Need assistive technology.**

6. *Structural Markup/Navigation*

A. The text of the digital resource includes markup (e.g. tags or styles) that allows for navigation by key structural elements (chapters, headings, pages) using assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**N/A**
Additional Information:	**Need assistive technology.**
B. The text of the digital resource includes markup for bullets and numbered lists that is compatible with assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**N/A**
Additional Information:	**Need assistive technology.**
C. If the text of the digital resource is delivered within an ebook reader application, a method is provided that allows users to bypass the reader interface and move directly to the text content that is compatible with assistive technology.	**N/A**
Additional Information:	**Need assistive technology.**

7. *Tables*

A. Data tables include markup (e.g. tags or styles) that identifies row and column headers in a manner that is compatible with assistive technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	**N/A**

Additional Information:	**Need assistive technology.**

8. Hyperlinks

A. In-book links take you to a location within the textbook. For example, the table of contents would be considered in-book links and embedded links take you to the correct location in the book.	**N/A**
Additional Information:	**All HTML links are live.**
B. Live hyperlinks take you to any website or webpages external to the book.	**Pass**
Additional Information:	**All links work and have descriptive text.**
C. Live links take you to the correct webpage that is functioning properly.	**Pass**
Additional Information:	**All links work.**
D. Live links are descriptive enough for the users to know where it should take them.	**Pass**
Additional Information:	**All links have descriptive text (some descriptions could be better).**

9. Color and Contrast

A. All information within the material that is conveyed using color is also available in a manner that is compatible with those that do not perceive color, and information conveyed by color is also conveyed in other ways.	**Pass**
Additional Information:	**There is an arrow ">" which shows that each subsection is clickable. Giving a 9/10 because some links outside of the book content are not underlined or do not have arrows next to them by default and the "[edit]" texts are not underlined either. "Register for FREE to stop seeing ads" is blue and not underlined.**

B. Information is conveyed from the sub-categories for contrast.	**Pass**
Additional Information:	**Tested Ch. 8 only because lots of sub sections/content.**
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	**Pass**
Additional Information:	**Some light gray and light blue sub section headers fail for their text size.**
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	**Pass**
Additional Information:	**Main text passes, but brief descriptions of sub sections do not, e.g. Ch. 8 Management > An Introduction to Management (section 1) > Definition of Management (in blue), brief description directly underneath is light gray (fails).**
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	**Fail**
Additional Information:	**Most fail, a few pass.**

10. Language

A. The text of the digital resource includes markup that declares the language of the content in a manner that is compatible with assistive technology.	**Fail**
Additional Information:	**No "lang" tag in source code.**
B. If the digital resource includes passages in a foreign language, these passages include markup that declares the language in a manner that is compatible with assistive technology.	**N/A**
Additional Information:	**No foreign languages.**

11.Images

A. Non-decorative images have alternative text that is compatible with assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**Fail**
Additional Information:	**Out of 18 images, 18 were ND and they all failed: Ch. 16 Product Distribution.**
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	**N/A**
Additional Information:	**No decorative images**
C. Complex images, charts, and graphs have longer text descriptions that are compatible with assistive technology (or are rendered by an application such as a browser, media player, or reader) that offers this functionality).	**N/A**
Additional Information:	**No complex images**

12.Multimedia

A. A synchronized text track (e.g. open or closed captions) is provided with all video content.	**N/A**
Additional Information:	**No multimedia.**
B. A transcript is provided with all audio content.	**N/A**
Additional Information:	**No multimedia.**
C. Audio/video content is delivered via a media player that is compatible with assistive technology. This includes support for all criteria listed in Section 15 below.	**N/A**
Additional Information:	**No multimedia.**

13.Flickering

A. The digital resource content does not contain anything that flashes more than three times in any one-second period.	**Pass**
Additional Information:	**No flickering content.**

14.Science, Technology, Engineering, and Math (STEM)

A. STEM figures have appropriate markup that indicates that the image is a figure.	**N/A**
Additional Information:	**No STEM content.**
B. STEM graphs have appropriate markup that indicates that the image is a graph.	**N/A**
Additional Information:	**No STEM content.**
C. STEM equations have appropriate markup that indicates that the image is an equation.	**N/A**
Additional Information:	**No STEM content.**
D. STEM tables have appropriate markup that indicates the image is a table.	**N/A**
Additional Information:	
E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**N/A**
Additional Information:	**No STEM content.**
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**N/A**
Additional Information:	**No STEM content.**
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**N/A**

Additional Information:	**No STEM content.**
H. Assistive technology used can access the content from the STEM tables.	**N/A**
Additional Information:	

15. Interactive Elements

A. Each interactive element (e.g. menu, hyperlink, button) and function (e.g. annotations) allows keyboard-only operation both with and without assistive technology.	**N/A**
Additional Information:	**No interactive elements.**
B. Each interactive element conveys information to assistive technology regarding the element's name, type, and status (e.g. "Play, button, selected").	**N/A**
Additional Information:	**No interactive elements.**
C. All instructions, prompts, and error messages necessary to complete forms are conveyed as text to assistive technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	**N/A**
Additional Information:	**No interactive elements.**