



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: **Introductory Statistics (BC Campus)**

Format of Textbook: **PDF**

Assistive Technology (AT) Evaluation Score: Overall	4.8 (Maximum score = 10)
<p>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.</p> <ul style="list-style-type: none"> • 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	5.1 (Maximum score =10)
<p>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.</p>	



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 related information found.
B. The organization providing the online materials has an accessibility statement.	Fail
Additional Information:	No related information found.
C. An Accessibility Evaluation Report is available from an external organization.	Fail
Additional Information:	No related information 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:	Not all texts are accessible (pg 16) but most can be read by NVDA (pg 1,9,16,32,42).

3. Text Adjustment

A. Text is compatible with assistive technology.	Fail
Additional Information:	Can zoom in and out but cannot reflow 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).	Fail



Additional Information:	The whole document turns into black pages.
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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).	Fail
Additional Information:	Cannot reflow text. Some formatting are off (p.16), and some are missing letter of a word, e.g. "ifure" as figure on pg 19.
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.	Pass
Additional Information:	Always reads the footer first then goes back to the top of the page and then reads from top to bottom (pg 1,9,16,32,42).

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
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Additional Information:	No heading structure markup at all (pg 1-40).
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).	Fail
Additional Information:	10 out of 10 lists are not recognized by NVDA (pg 9,10,11,24,32,103,111,118,129,140).
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:	10 out of 10 tables cannot be recognized by NVDA (pg 53,86,111,114,115,127,128,133,136,137).

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:	There are lots of underscored blue texts that appear to be links but aren't. It was misleading and



	confusing. And tab function does not work on this pdf.
B. Live hyperlinks take you to any website or webpages external to the book.	Pass
Additional Information:	The only live link I found was the footer link and it works. There are also download links (pg 63, 82), when clicked, a download file option shows up. (footer, pg 63, 82).
C. Live links take you to the correct webpage that is functioning properly.	Pass
Additional Information:	I only found 1 link and it works.
D. Live links are descriptive enough for the users to know where it should take them.	Fail
Additional Information:	Shows the whole link address instead of a description.

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:	The only active link was in black. All learning outcomes are in brown boxes, all summaries are in green boxes, and all exercises are in blue boxes. All figure titles are in brown text.
B. Information is conveyed from the sub-categories for contrast.	Pass
Additional Information:	See below.
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	Pass
Additional Information:	Black or blue on white passed, black on gray or gray yellow passed, white on blue passed, white on green passed for large font only.



D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	Pass
Additional Information:	Black on white passed, blue on white did not pass for small font, black on gray or dark yellow passed, black on light green or light blue passed, brown on white did not pass, blue on light green did not pass for small font.
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	Pass
Additional Information:	Blue on light blue did not pass, black on white passed.

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.	Failed
Additional Information:	Failed the accessibility checker.
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:	Images or graphics cannot be recognized by NVDA. Most images do not have a notation or description.



B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	Fail
Additional Information:	Images or graphics cannot be recognized by NVDA. Most images do not have a notation or description.
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:	Images or graphics cannot be recognized by NVDA. Most images do not have a notation or description. If an image is labeled is figure, then it has a title.

12.Multimedia

A. A synchronized text track (e.g. open or closed captions) is provided with all video content.	N/A
Additional Information:	No related information found.
B. A transcript is provided with all audio content.	N/A
Additional Information:	No related information found.
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 related information found.

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 found.



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

A. STEM figures have appropriate markup that indicates that the image is a figure.	Fail
Additional Information:	10 out of 10 figures do not have NVDA markup (pg 9,19,20,21,22,23,24,39,42,43).
B. STEM graphs have appropriate markup that indicates that the image is a graph.	Fail
Additional Information:	10 out of 10 graphs do not have NVDA markup (pg 39,42,43,54,59,66,71,87,88,90).
C. STEM equations have appropriate markup that indicates that the image is an equation.	Fail
Additional Information:	10 out 10 equations do not have NVDA markup. Most equations are part of an image so are not accessible. Only 4 out of 10 equations are text accessible (p.34,37,42,54,55,107,108,109,124).
D. STEM tables have appropriate markup that indicates the image is a table.	Fail
Additional Information:	10 out of 10 lists are not recognized by NVDA (pg 9,10,11,24,32,103,111,118,129,140).
E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	Pass
Additional Information:	10 out of 10 figures have a title description (pg 9,19,20,21,22,23,24,39,42,43). But some titles are not read as a whole by NVDA, aka separate as two chunks of words (pg 42).
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	Pass
Additional Information:	9 out of 10 graphs have titles. The one on pg 71's title is on previous page and not on the same page with the graph. All graphs are labeled as figures (pg 39,42,43,54,59,66,71,87,88,90).



G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	Fail
Additional Information:	10 out of 10 equations do not have title/notation (pg 34,37,42,54,55,107,108,109,124).
H. Assistive technology used can access the content from the STEM tables.	Fail
Additional Information:	2 out of 10 tables have titles (pg 53, 86, 111, 114, 115, 127, 128, 133, 136, 137).

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:	URL not found.
B. The organization providing the online materials has an accessibility statement.	Fail
Additional Information:	URL not found.
C. An Accessibility Evaluation Report is available from an external organization.	Fail
Additional Information:	URL not 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:	Pages 359-363; footer would be narrated each page.

3. Text Adjustment

A. Text is compatible with assistive technology.	Pass
Additional Information:	Pages 359-363.
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).	Fail



Additional Information:	All pages become completely black (when using green-on-black color contrast settings).
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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).	Fail
Additional Information:	Pages 359-363. The embedded image on page 359 does not reflow, the graph on page 360 does not reflow and the text below it responds to reflow haphazardly, the text and table on page 361 reflow well, page 362 is fine, and the embedded image on page 363 does not reflow. 2/5 pages passed.
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	N/A
Additional Information:	Skipped

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.	Pass
Additional Information:	Pages 359-363.

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	Fail
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such as a browser, media player, or reader that offers this functionality).	
Additional Information:	Accessibility Checker: "Tagged PDF - Failed, Title - Failed, Bookmarks - Failed, Headings (Appropriate nesting) - Passed."
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).	Fail
Additional Information:	Accessibility Checker: "Lists (List items) - Failed, Lists (Lbl and Lbody) - Failed."
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:	No markups for any of the 5 tables checked (pages 137, 157, 158(2), and 159). Failed Accessibility Checker.

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	N/A
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embedded links take you to the correct location in the book.	
Additional Information:	There are many blue, underlined figure and section references in the book that are not actually links. Technically not broken links, just not marked up (if they intended to use them as links, which I could not assume).
B. Live hyperlinks take you to any website or webpages external to the book.	Fail
Additional Information:	Averaged score
C. Live links take you to the correct webpage that is functioning properly.	Pass
Additional Information:	Links on pages 63(6), 82(4), 83(3), 419(3), and 420(2) work (all lead to data download pages in the flatworldknowledge.com domain), but other ones of the same nature on page 339(3) are not marked up as links. Technically, those links aren't "dead", they just aren't functional at all. 18/21 pass.
D. Live links are descriptive enough for the users to know where it should take them.	Fail
Additional Information:	No alt text.

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:	Pages 400-452; links are underlined.
B. Information is conveyed from the sub-categories for contrast.	Pass
Additional Information:	Pages 400-452.
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	Pass



Additional Information:	Dark gray on white, blue on white; "Key Takeaways" header (white on green) does not pass small text criterion.
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	Pass
Additional Information:	Blue on white hyperlinks do not pass; black on white text (>90%) does pass.
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	Pass
Additional Information:	Red-on-white (e.g., graphs on pages 398, 407, and 410) areas of graphs do not pass. Not present in all simple images.

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:	Accessibility Checker: "Primary language - Failed."
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
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Additional Information:	Accessibility Checker: "Figures alternate text - Failed."
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	Pass
Additional Information:	Author portraits on first page; no alt text.
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 imagery.

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.



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

A. STEM figures have appropriate markup that indicates that the image is a figure.	Fail
Additional Information:	Embedded images.
B. STEM graphs have appropriate markup that indicates that the image is a graph.	Fail
Additional Information:	Embedded images.
C. STEM equations have appropriate markup that indicates that the image is an equation.	Fail
Additional Information:	Read as regular text (ignoring superscript and subscripts).
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.	Fail
Additional Information:	No alt text.
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	Fail
Additional Information:	No alt text.
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	Fail
Additional Information:	No alt text; part of embedded images as well.
H. Assistive technology used can access the content from the STEM tables.	N/A
Additional Information:	



15. Interactive Elements

<p>A. Each interactive element (e.g. menu, hyperlink, button) and function (e.g. annotations) allows keyboard-only operation both with and without assistive technology.</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No interactive elements.</p>
<p>B. Each interactive element conveys information to assistive technology regarding the element’s name, type, and status (e.g. “Play, button, selected”).</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No interactive elements.</p>
<p>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).</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No interactive elements.</p>

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