



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: Online Statistics Education
Format of Textbook: HTML

Assistive Technology (AT) Evaluation Score: Overall	7.1 (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	7.2 (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:	Did not find any information about the reading's formal accessibility policy.
B. The organization providing the online materials has an accessibility statement.	Fail
Additional Information:	Did not find any information about the reading's accessibility statement.
C. An Accessibility Evaluation Report is available from an external organization.	Fail
Additional Information:	Did not find any information about the reading'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.	Pass
Additional Information:	3/3 chapters had text that was properly read aloud by the NVDA reader (Ch. 2, 11, 19). No content was skipped and everything was read in a logical order that was easy to follow and understand.

3. Text Adjustment

A. Text is compatible with assistive technology.	Fail
Additional Information:	3/3 chapters were capable of adjusting in size (Ch. 2, 11, 19). However, when zoomed in, it requires the



	reader to horizontally scroll while reading the content.
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 were capable of adjusting font and background colors (Ch. 2, 11, 19). However, the graphs did not change color.

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 proper text reflow (Ch. 2(12), 11(11), 14(7)) because the text did not reposition when zoomed in.
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 available.

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:	5/5 pages had proper reading order of the textbook content (Ch. 2(2), 11(1), 19(1)). All of the material was read in a logical order and none of the content was skipped.



6. Structural Markup/Navigation

<p>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).</p>	<p>Fail</p>
<p>Additional Information:</p>	<p>0/3 chapters had proper navigation of the text (Ch. 2, 11, 19). All of the chapters had headers that were not found, but the links, lists, and tables were navigable by using the NVDA hotkeys.</p>
<p>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).</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>10/10 lists were properly navigable using the NVDA hotkeys (ch. 2(2), 11(5), 19(3)).</p>
<p>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.</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No eReader application.</p>

7. Tables

<p>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).</p>	<p>Pass</p>
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Additional Information:	10/10 tables had proper markup and was read aloud cell by cell (Ch. 2(3), 17(4), 19(3))). However, the cells could only be read from left to right rather than in all directions using the directional keys.
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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 hyperlinks are live
B. Live hyperlinks take you to any website or webpages external to the book.	Pass
Additional Information:	46/50 hyperlinks were properly functioning (Ch. 2(18), 11(15), 19(13)). The remaining four links were not found online and the last two were links that were blank (ch. 11(4)). 47/50 hyperlinks were properly described (Ch. 2(15), 11(19), 19(13)). The remaining hyperinks were labeled as "relevant sections" but it does not describe exactly where the links lead to.
C. Live links take you to the correct webpage that is functioning properly.	Pass
Additional Information:	46/50 hyperlinks were properly functioning (Ch. 2(18), 11(15), 19(13)). The remaining four links were not found online and the last two were links that were blank (ch. 11(4)).
D. Live links are descriptive enough for the users to know where it should take them.	Pass
Additional Information:	47/50 hyperlinks were properly described (Ch. 2(15), 11(19), 19(13)). The remaining hyperlinks were labeled as "relevant sections" but it does not describe exactly where the links lead to.



9. Color and Contrast

<p>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.</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>3/3 chapters had consistent color redundancy of headers, links, and normal text (Ch. 2, 11, 19). Main headers were consistently red, subheaders were consistently black, links were consistently blue, and normal text was consistently black against a white background.</p>
<p>B. Information is conveyed from the sub-categories for contrast.</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>Subheaders were black against a white background and passed the color contrast ratio evaluation. Main headers, on the other hand, were red against a white background but did not pass the color contrast ratio evaluation. Normal text was black against a white background and links were blue against a white background. No simple images were found.</p>
<p>C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>Subheaders were black against a white background and passed the color contrast ratio evaluation. Main headers, on the other hand, were red against a white background but did not pass the color contrast ratio evaluation.</p>
<p>D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>Normal text was black against a white background and links were blue against a white background.</p>
<p>E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No simple images found.</p>



10. Language

<p>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.</p>	<p>Fail</p>
<p>Additional Information:</p>	<p>Language markup was not stated.</p>
<p>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.</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No passage markup.</p>

11. Images

<p>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).</p>	<p>Fail</p>
<p>Additional Information:</p>	<p>0/10 non-decorative images were properly described by the NVDA reader when read aloud (Ch. 2, 11, 16, 19). If captions were available, they were read aloud but the information was not enough to describe what was in the images.</p>
<p>B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No decorative images found.</p>
<p>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).</p>	<p>Fail</p>
<p>Additional Information:</p>	<p>0/10 complex images were properly described by the NVDA reader when read aloud (Ch. 2, 11, 16, 19). If</p>



	captions were available, they were read aloud but the information was not enough to describe what was in the images.
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12. Multimedia

A. A synchronized text track (e.g. open or closed captions) is provided with all video content.	Fail
Additional Information:	0/3 multimedia videos had text track available while the video was playing (Ch. 2, 11, 17). There were no closed captioning that dictated what was being said in the video.
B. A transcript is provided with all audio content.	Fail
Additional Information:	0/3 multimedia videos had transcripts available while the videos were playing (Ch. 2, 11, 17). There was no closed captioning available. However, some of the content of the video was written in the textbook's text content and read word for word what the video was saying, but not all of the video was written in the text content.
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 assistive player 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 content.

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

A. STEM figures have appropriate markup that indicates that the image is a figure.	Fail
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Additional Information:	0/10 figures had proper markup that described the figures properly as figures (Ch. 2(5), 11(2), 19(3)). A majority of the figures were listed as figures even though they were graphs.
B. STEM graphs have appropriate markup that indicates that the image is a graph.	Fail
Additional Information:	0/10 graphs had proper markup and marked as graphs (Ch. 2(5), 11(3), 16, 19). All of the graphs were labeled as figures.
C. STEM equations have appropriate markup that indicates that the image is an equation.	Pass
Additional Information:	10/10 equations had proper markup (Ch. 11(7), 19(3)). All of the equations were visible and there were no equations that were blacked out from view.
D. STEM tables have appropriate markup that indicates the image is a table.	Pass
Additional Information:	10/10 tables had proper markup (Ch. 2(3), 17(4), 19(3)).
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 had proper notation markup (ch. 2(5), 11(2), 19(3)). A majority of the figures were skipped when read aloud by the NVDA reader (Ch. 2(2), 11(2), 19(3)). While the remaining 3 figures were described as "blank" figures (Ch. 2(3)). The figures were only described by what was written in the captions following it and sometimes there would not be any captions describing it. The captions also did not give enough information to understand the figures, especially for readers with visual impairments.
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 had proper notation markup (Ch. 2(5), 11(3), 16, 19). None of the graphs were fully described when read aloud by the NVDA reader. Only the captions described what were in the graphs, and some graphs did not have any captions. The captions also did not provide enough information to describe what was in the graphs alone.
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	Pass
Additional Information:	8/10 equations had proper notation markup and was read aloud properly by the NVDA reader (Ch. 11(7), 19(1)). The remaining two equations, however, were not read properly. The minus and division symbols were skipped by the NVDA reader.
H. Assistive technology used can access the content from the STEM tables.	Pass
Additional Information:	10/10 tables had proper markup and was read aloud cell by cell (Ch. 2(3), 17(4), 19(3))). However, the cells could only be read from left to right rather than in all directions using the directional keys.

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 found.
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 found.
C. All instructions, prompts, and error messages necessary to complete forms are conveyed as	N/A



text to assistive technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	
Additional Information:	No interactive elements found.

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:	Not found
B. The organization providing the online materials has an accessibility statement.	Fail
Additional Information:	Not found
C. An Accessibility Evaluation Report is available from an external organization.	Fail
Additional Information:	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:	7/7 chapters pass. 1, 7, 14 and 21 pass from lecture chapters. 1, 7 and 10 pass from activities. These



	chapter were checked using text to speech on google chrome.
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3. Text Adjustment

A. Text is compatible with assistive technology.	Pass
Additional Information:	7/7 chapters pass. 1, 7, 14 and 21 pass from lecture chapters. 1, 7 and 10 pass from activities.
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:	7/7 chapters pass. 1, 7, 14 and 21 pass from lecture chapters. 1, 7 and 10 pass from activities.

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:	0/7 chapters reflow when zooming to 200% and when making the web browser smaller. 1, 7, 14 and 21 fail from lecture chapters. 1, 7 and 10 fail from activities.
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	Pass
Additional Information:	22/22 chapter pass. The lecture chapters were compare with pdf version and content matched. No pdf version found for activity chapters.



5. Reading Order

<p>A. The reading order for digital resource content logically corresponds to the visual layout of the page when rendered by assistive technology.</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>Non-Assistive Technology Only.</p>

6. Structural Markup/Navigation

<p>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).</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>Non-Assistive Technology Only.</p>
<p>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).</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>Non-Assistive Technology Only.</p>
<p>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.</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>Non-Assistive Technology Only.</p>

7. Tables

<p>A. Data tables include markup (e.g. tags or styles) that identifies row and column headers in a manner that is compatible with assistive</p>	<p>N/A</p>
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technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	
Additional Information:	Non-Assistive Technology Only.

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:	HTML document only contains live link, no inbook links available.
B. Live hyperlinks take you to any website or webpages external to the book.	Pass
Additional Information:	Average Score
C. Live links take you to the correct webpage that is functioning properly.	Pass
Additional Information:	20/20 link pass.
D. Live links are descriptive enough for the users to know where it should take them.	Pass
Additional Information:	20/20 link pass.

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:	Non-Assistive Technology Only.
B. Information is conveyed from the sub-categories for contrast.	Pass
Additional Information:	Average Score



C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	Pass
Additional Information:	7/7 chapters pass. 1, 7, 14 and 21 pass from lecture chapters. 1, 7 and 10 pass from activities. Headers are red and background is white.
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	Pass
Additional Information:	7/7 chapters pass. 1, 7, 14 and 21 pass from lecture chapters. 1, 7 and 10 pass from activities. Text black and background is white.
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	N/A
Additional Information:	No simple images found.

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:	0/7 chapters pass. No language mark up on lecture or activity chapters.
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 other language found.

11.Images

A. Non-decorative images have alternative text that is compatible with assistive technology (or is rendered by an application such as a	Pass
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browser, media player, or reader that offers this functionality).	
Additional Information:	7/7 chapters pass. 1, 7, 14 and 21 pass from lecture chapters. 1, 7 and 10 pass from activities. These chapters were checked using w3c.
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	Pass
Additional Information:	7/7 chapters pass. 1, 7, 14 and 21 pass from lecture chapters. 1, 7 and 10 pass from activities. These chapters were checked using w3c.
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:	Complex images throughout the book do not have proper alt tags. For example all the graphs under chapter 8 (advance plots, well over 30 graphs) need alt tags.

12. Multimedia

A. A synchronized text track (e.g. open or closed captions) is provided with all video content.	Fail
Additional Information:	0 videos pass. Every chapter has a video and all videos are msing text track.
B. A transcript is provided with all audio content.	Fail
Additional Information:	0 videos pass. Every chapter has a video and all videos are missing transcripts.
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:	Non-Assistive Techonology Only.



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. Home page and Chapters 1-10 checked. Google Chrome.

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

A. STEM figures have appropriate markup that indicates that the image is a figure.	Pass
Additional Information:	10/10 figure have proper mark up. Chapter 6 and 8 were checked.
B. STEM graphs have appropriate markup that indicates that the image is a graph.	Pass
Additional Information:	10/10 figure have proper mark up. Chapter 6 and 8 were checked.
C. STEM equations have appropriate markup that indicates that the image is an equation.	Pass
Additional Information:	10/10 figure have proper mark up. Chapter 6 and 8 were checked.
D. STEM tables have appropriate markup that indicates the image is a table.	Pass
Additional Information:	10/10 figure have proper mark up. Chapter 6 and 8 were checked.
E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	Pass
Additional Information:	10/10 figure have proper description. Chapter 6 and 8 were checked.
F. STEM graphs have appropriate notation markup that conveys both the notation	Pass



(presentation) and meaning (semantics) of the STEM content.	
Additional Information:	10/10 figure have proper description. Chapter 6 and 8 were checked.
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	Pass
Additional Information:	10/10 figure have proper description. Chapter 6 and 8 were checked.
H. Assistive technology used can access the content from the STEM tables.	Pass
Additional Information:	10/10 figure have proper description. Chapter 6 and 8 were checked.

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 content in the book.
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 content in the book.
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 content in the book.



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