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: **Concept Development in Chemistry (BC Campus)**
Format of Textbook: **HTML**

Assistive Technology (AT) Evaluation Score: Overall	**7.6 (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	**8.5 (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:	**Did not find any information about Rice University's formal accessibility policy.**
B. The organization providing the online materials has an accessibility statement.	**Fail**
Additional Information:	**Did not find any information about Rice University's accessibility statement.**
C. An Accessibility Evaluation Report is available from an external organization.	**Fail**
Additional Information:	**Did not find any information about Rice University'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:	**0/3 chapters had content that was read completely without any content skipped (Ch. 2, 7, 16). All of the normal text was read aloud without any problem. However, equations and figures, which made up the majority of the chapters were skipped. When equations were skipped, sentences did not make any sense because the NVDA reader would just skip over the equation as if it were not there. The sentences would sound incomplete.**

3. Text Adjustment

A. Text is compatible with assistive technology.	**Pass**
Additional Information:	**3/3 chapters were able to adjust the size of the font while zooming in and out (Ch. 2, 7, 16). Readers also did not have to horizontally scroll in order to see the content on the screen.**
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 able to adjust font colors of words using the Care your eyes program (Ch 2, 7, 16). Normal text and equations were able to adjust colors and made up the majority of the chapters. However, the figures in the chapters were unable to change colors. The background of the figures remained white with the content of the figure remaining the same color as when the Care Your Eyes program was disabled.**

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:	**Only 17 webpages were available because there were 17 chapters. 17/17 webpages had proper reflow of text when zoomed in and out. There was no missing content or content that disappeared because of the reflow of the text.**
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	**Pass**

Additional Information:	**Only 17 webpages were available because there were 17 chapters. 17/17 webpages matched the reflow of the text in the printed material. However, I was unable to compare the page numbers in the printed material to the HTML version because there were no page numbers. The chapter content matched the content written in the printed material.**

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 (Ch. 2, 7, 9, 13, 16). Although there was content such as figures and graphs (Ch. 7, 9, 13, 16), equations (Ch. 2, 9), and tables (Ch. 2) that were skipped while read aloud. The reading order was still logical. The NVDA reader read the content from top to bottom and left to right. Though some of the content was skipped, it was read as if it was not there and you were able to tell what parts were skipped.**

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).	**Pass**
Additional Information:	**3/3 chapters were navigable using the NVDA hotkeys (Ch. 2, 7, 16). Headers, tables, and links were found with no problem.**
B. The text of the digital resource includes markup for bullets and numbered lists that is compatible with assistive technology (or is	**Fail**

rendered by an application such as a browser, media player, or reader that offers this functionality).	
Additional Information:	**Only 1 list was available. 0/1 list was navigable using the NVDA hotkeys (Ch. 2). While read aloud, the NVDA reader skipped the list and went to the website content that was not part of the textbook.**
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:	**Not using eReader application.**

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).	**Pass**
Additional Information:	**10/10 tables were properly navigable using the NVDA hotkeys (Ch. 2(2), 4, 5, 8(2), 11(4)). The tables were navigable cell by cell, but only left to right. You were not able to go up and down through the cells.**

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:	**50/50 hyperlinks were properly functioning and takes the reader where expected in the textbook (Ch. 2(2), 5(2), 6(18), 10(22), 17(5)). 50/50 hyperlinks had proper descriptions of where the links would take you (Ch. 2(2), 5(2), 6(18), 10(22), 17(5)).**
C. Live links take you to the correct webpage that is functioning properly.	**Pass**
Additional Information:	**50/50 hyperlinks were properly functioning and takes the reader where expected in the textbook (Ch. 2(2), 5(2), 6(18), 10(22), 17(5)).**
D. Live links are descriptive enough for the users to know where it should take them.	**Pass**
Additional Information:	**50/50 hyperlinks had proper descriptions of where the links would take you (Ch. 2(2), 5(2), 6(18), 10(22), 17(5)).**

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 had consistent color redundancy (Ch. 2, 7, 16). Titles were consistently navy blue and headers were consistently black before every subsection. Links were consistently dark blue and underlined.**
B. Information is conveyed from the sub-categories for contrast.	**Pass**
Additional Information:	**Headers were navy blue and black against a white background. Normal text was black and links were dark blue against a white background. Simple images were black against a white background.**

C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	**Pass**
Additional Information:	**Headers were navy blue and black against a white background.**
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	**Pass**
Additional Information:	**Normal text was black and links were dark blue against a white background.**
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	**Pass**
Additional Information:	**Simple images were black against a white background.**

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.	**Pass**
Additional Information:	**Language markup is English.**
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 passage markup.**

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 had non-decorative images that were described in enough detail for a reader with visual impairment to understand (Ch. 6, 9, 17). All of the images in chapters 6, 8, and 17 had no captions and were not described in detail when read aloud by the NVDA reader. The actual images were skipped as if they were not there.**
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 found.**
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 had complex images such as graphs that were described in detail (Ch. 11, 13, 16). The complex images were skipped and were only described through the titles of the images. The information in the titles were not enough information for a reader with visual impairment to understand. The NVDA reader did not state how the graphs looked or what content the graph held.**

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 content found.**
B. A transcript is provided with all audio content.	**N/A**
Additional Information:	**No multimedia content 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 multimedia content 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.	**Pass**
Additional Information:	**10/10 figures were properly marked as figures (Ch. 4, 6, 7(6), 9(2)).**
B. STEM graphs have appropriate markup that indicates that the image is a graph.	**Fail**
Additional Information:	**0/10 graphs were properly marked as graphs (Ch. 4(3), 5(5), 11(2)). Instead of marked as graphs, 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 were properly marked up (Ch. 2(6), 4(2), 5, 9). The equations were all visible and none were blacked out.**
D. STEM tables have appropriate markup that indicates the image is a table.	**Pass**
Additional Information:	**10/10 tables were properly marked up as tables (Ch. 2(2), 4, 5, 8(2), 11(4)).**
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 properly described in detail (Ch. 4, 6, 7(6), 9(2)). While the NVDA reader was reading, the images were skipped. None of the content within**

	the figures were described. The only information that described the figures were the captions, but it was still not an adequate amount of information for a reader with visual impairment to understand.
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 properly described in detail (Ch. 4(3), 5(5), 11(2)). All of the graph content was skipped, the only information that described the graphs were the titles and captions if the graphs had titles or captions. However, even if there was captions or titles to describe the graphs, it was still not enough information to describe the content of the graphs.**
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Fail**
Additional Information:	**2/10 equations were properly read in a logical way (Ch. 2). However, the remaining 8 equations were skipped (Ch. 2(4), 4(2), 9).**
H. Assistive technology used can access the content from the STEM tables.	**Fail**
Additional Information:	**5/10 tables were read in a way that was easy to understand (Ch.2, 11(4)). However, the remaining five had formulas that were not read aloud (Ch. 2, 4), blanks were read aloud even though there was no content (Ch. 5), and one table did not make any sense when read aloud (Ch. 8). There was also one table that was skipped completely (Ch. 8).**

15.Interactive Elements

A. Each interactive element (e.g. menu, hyperlink, button) and function (e.g.	**N/A**

annotations) allows keyboard-only operation both with and without assistive technology.	
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 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 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:	**3/3 chapters work with text to speech function on Google Chrome. Chapter 2, 5 & 11 were checked.**

3. Text Adjustment

A. Text is compatible with assistive technology.	**Pass**
Additional Information:	**3/3 chapters work. Chapters 2, 5 & 11 were checked.**
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 pass. 2, 5 & 11 were checked and all passed with care your eys on Google Chrome.**

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:	**17/17 chapters/pages reflow when making the webrower smaller and when zooming up to 200%.**
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	**Pass**
Additional Information:	**17/17 HTML chapters/pages match pdf format.**

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.	**N/A**
Additional Information:	**Non-assistive technology only.**

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:	**Non-assistive technology only.**
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:	**Non-assistive technology only.**
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:	**Non-assistive technology only.**

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	**N/A**

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:	**Non-assistive technology only.**
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 links checked pass. Most links are in tables on contents. Not many are found in body.**
D. Live links are descriptive enough for the users to know where it should take them.	**Pass**
Additional Information:	**20/20 links checked 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.	**Fail**
Additional Information:	**When you hover over links on table on contents they change color by are not given another code to show they are links.**
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:	**Chapters 17/17 pass. White backgroun and dark gray text.**
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	**Pass**
Additional Information:	**Chapters 17/17 pass. White Background and black text.**
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 in the three chapters checked. 2, 5 and 11 were checked.**

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.	**Pass**
Additional Information:	**3/3 Chapters pass. 2, 5 and 11 were checked.**
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 browser, media player, or reader that offers this functionality).	**Pass**

Additional Information:	**Chpaters 2, 5 and were check with w3c and passed.**
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	**Pass**
Additional Information:	**Chapter 2, 5 and 7 wer checked with w3c and passed.**
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:	**STEM images found chapters 2, 5 and7 have null alt tags. These tags should not be null, they should have a description of the image.**

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 found.**
B. A transcript is provided with all audio content.	**N/A**
Additional Information:	**No multimedia 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 multimedia 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. Chapter 1-17 were checked.**

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

A. STEM figures have appropriate markup that indicates that the image is a figure.	**Pass**
Additional Information:	**No multimedia found.**
B. STEM graphs have appropriate markup that indicates that the image is a graph.	**Pass**
Additional Information:	**10/10 stem graphs found in chapter 4 & 5 have a proper mark up. Chapters 4 & 5 were checked.**
C. STEM equations have appropriate markup that indicates that the image is an equation.	**Fail**
Additional Information:	**None of the equations found in chapter 3, 4 and 5 have a mark up. Chapter 3, 4 and 5 were checked.**
D. STEM tables have appropriate markup that indicates the image is a table.	**Fail**
Additional Information:	**0/7 tables have a mark up. 17 chapters 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 Stem figures such as molecule bonds and structure have proper description. Chapter 6 & 7 were checked.**
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Pass**
Additional Information:	**10/10 stem graphs found in chapter 4 & 5 have a proper description.**
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Pass**
Additional Information:	**Equations found in chapters 3, 4 and 5 have proper descriptions. Chatpers 3, 4 and 5 were checked.**

H. Assistive technology used can access the content from the STEM tables.	**Pass**
Additional Information:	**7/7 table found throughout the content have proper description.**

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.	**Pass**
Additional Information:	**Chapter 2, 5, 11 were checked and the tab key & enter key work properly. NOTE: The interactive elements are only found in the navigation panel.**
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:	**Non assistive technology only.**
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:	**Non assistive technology only.**