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: **Principles of Economics (Saylor)**
Format of Textbook: **PDF**

Assistive Technology (AT) Evaluation Score: Overall	**6.4 (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	**N/A (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 – N/A

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 Saylor.org's accessibility policy.**
B. The organization providing the online materials has an accessibility statement.	**Fail**
Additional Information:	**Did not find any information about Saylor.org's accessibility statement**
C. An Accessibility Evaluation Report is available from an external organization.	**Fail**
Additional Information:	**Did not find any information about Saylor.org'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:	**Pg. 21, 51, 108, 214, 398. Normal text was read aloud by the NVDA program without skipping any words or sentences, however there were problems with reading figures, tables, and equations. Figures were not read aloud, they were just skipped over (pg. 51, fig. 2.2; 108, fig. 3.3) and the figure took up the whole page on page 51. The NVDA reader was still able to read the words in the table cell by cell, it was just unnavigable with the hotkeys. Tables were not labeled as tables and were not able to navigate through the table through cells, you were only able**

	to navigate through the table up and down (p. 21). Parts of some equations were not read in a logical way that made sense. For "/" they would be read as slashes instead of "divided by" or multiplications would not be read (pg. 214, 398).

3. Text Adjustment

A. Text is compatible with assistive technology.	**Fail**
Additional Information:	**Pg. 21, 51, 108, 214, 398. The text was able to zoom in and out, however, the textbook was zoomed in and out altogether without adjusting the amount of content you could see on the page. Since the whole textbook zoomed in and out without adjusting how the content was laid out, this caused horizontal scrolling to occur.**
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:	**Pg. 21, 51, 108, 214, 398. When I changed the color of the text and the background so that the background would be black and the text would be green in the Adobe Acrobat Reader DC program, the whole textbook turned black and I was not able to read anything.**

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:	**Pg. 21, 51, 108, 214, 398. The text was able to zoom in and out, however, the textbook was zoomed in**

	and out altogether without adjusting the amount of content you could see on the page. Since the whole textbook zoomed in and out without adjusting how the content was laid out, this cause horizontal scrolling to occur. The text reflowed properly, however I had to scroll through the text horizontally in order to get to the beginning of each line once the previous line ended.
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:	**Pg. 21, 51, 108, 214, 398. Normal text was read aloud by the NVDA program without skipping any words or sentences, however there were problems with reading figures, tables, and equations. Figures were not read aloud, they were just skipped over (pg. 51, fig. 2.2; 108, fig. 3.3) and the figure took up the whole page on page 51. The NVDA reader was still able to read the words in the table cell by cell, it was just unnavigable with the hotkeys. Tables were not labeled as tables and were not able to navigate through the table through cells, you were only able to navigate through the table up and down (p. 21). Parts of some equations were not read in a logical way that made sense. For "/" they would be read as slashes instead of "divided by" or multiplications would not be read (pg. 214, 398).**

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:	**Pg. 11-15, 260-290, 572-592. I was unable to navigate through the headings of the entire textbook. I was only able to navigate through the headings that were on the current page, and even then there was still some problems with navigating through it since some of the headings were not read in a logical way that a person could understand. Headings in the blue "End of Chapter Exercises" sections were not read properly. Headings such as PROBLEMS or TRUE OR FALSE would be read out as the individual letters that made up the words. They would just be skipped over. I was only able to navigate through the heading of the current page instead of being able to navigate through the whole book's headings.**
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 navigable using the NVDA hotkeys (pg. 2-4, 7, 9-10, 15-16, 279, 519, 532, 560, 827). I was able to navigate to the list and through each item in the lists with no problems.**
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).	**Pass**
Additional Information:	**10/10 tables were marked up properly and were easy to navigate to using the NVDA hotkeys (pg. 21, 22-24, 50, 107, 108, 120, 121, 280, 539, 649). However, I was not able to navigate through the tables' cells in all directions the only way that I could navigate through it was with the up and down directional keys and the cells would be read from the left to right. I could not go to the cells to the up or down.**

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.	**Fail**
Additional Information:	**0/30 hyperlinks to places within the book did not work (pg. 20, 22, 53, 58, 59, 81, 85, 103, 129(2), 131, 147, 164, 272(2), 392(3), 394*3(, 395(5), 402(2), 449, 451). They all looked as though they would be links to places in the book, however none of the links took you anywhere.**
B. Live hyperlinks take you to any website or webpages external to the book.	**Pass**
Additional Information:	**15/20 hyperlinks were able to connect to the internet without any problems (pg. 1, 2, 14, 20, 24, 31, 34, 84(3), 163(2), 837, 842) . The remaining 5**

	hyperlinks were linked to errors on the internet, were not found, and could not be opened (pg. 24, 164, 534, 540, 857).
C. Live links take you to the correct webpage that is functioning properly.	**Pass**
Additional Information:	**15/20 hyperlinks were able to connect to the internet without any problems (pg. 1, 2, 14, 20, 24, 31, 34, 84(3), 163(2), 837, 842). The remaining 5 hyperlinks were linked to errors on the internet, were not found, and could not be opened (pg. 24, 164, 534, 540, 857).**
D. Live links are descriptive enough for the users to know where it should take them.	**Fail**
Additional Information:	**0/20 hyperlinks were properly described as the location of the links (pg. 1, 2, 14, 20, 24, 34, 84(3), 163(2), 164, 534, 540, 834, 837, 842, 857). Instead they were labeled as the URL's with descriptions of where they would go next to them.**

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:	**Pg. 1-150, 400-405. Headings were easily distinguishable in black/dark blue and in bold. It was a little difficult to tell what links were because they remained the same color as the rest of the text but they were distinguishable from consistent underlining.**
B. Information is conveyed from the sub-categories for contrast.	**Pass**
Additional Information:	**Pg. 1-150, 400-405. Headings and regular text passed the color contrast analysis because the text was in black or dark blue and the color of the background was white. However, sections that were sectioned**

	off by colored blocks that were blue or green did not pass the color contrast analysis because of the links. The links within these colored sections did not pass the contrast analysis because they were in blue font, but the regular text within these areas still passed because they were in black.
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	**Pass**
Additional Information:	**Pg. 1-150, 400-405. Headings passed the color contrast analysis because the text was in black or dark blue and the color of the background was white.**
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	**Pass**
Additional Information:	**Pg. 1-150, 400-405. Regular text passed the color contrast analysis because the text was in black or dark blue and the color of the background was 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:	

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.	**N/A**
Additional Information:	
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).	**N/A**
Additional Information:	**No images that were just photos, all just complicated graphs and tables.**
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:	
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).	**Pass**
Additional Information:	**Pg. 379-485. The captions of all the graphs were read aloud, however the graphs were not given more information to describe the graphs. The captions that were provided did not provide information that described how the graphs look, what the axes are, where the lines begin and end, or how they curve.**

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.	**Pass**
Additional Information:	**10/10 figures were marked up properly as figures (pg. 50, 52, 54, 55, 59, 103-104, 108, 110, 268, 820).**
B. STEM graphs have appropriate markup that indicates that the image is a graph.	**Fail**
Additional Information:	**0/10 graphs were marked up as graphs. Instead they were marked as figures (pg. 50, 52, 54, 55, 59, 103-104, 108, 268. 271, 273).**
C. STEM equations have appropriate markup that indicates that the image is an equation.	**Pass**
Additional Information:	**10/10 equations were marked up properly as equations (pg. 384(2), 392, 397, 398(3), 401, 411(2)).**
D. STEM tables have appropriate markup that indicates the image is a table.	**Pass**
Additional Information:	**10/10 tables were marked up properly as tables (pg. 21, 22-24, 50, 107, 108, 120, 121, 280, 539, 649).**
E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Pass**
Additional Information:	**7/10 figures had proper notation markup with the captions beneath each figure (pg. 50, 52, 54, 55, 59, 103-104, 108, 110, 268, 820). However, the captions did not describe what were in the figures in detail**

	and therefore was not enough information for the person reading the textbook to understand. A person with visual impairments would not be able to understand what was going on in the graphs and figures. 3/10 graphs also did not have captions that described what were in the figures (pg. 52, 110, 112).
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 graphs had proper notation markup with the captions beneath each figure (pg. 50, 52, 54, 55, 59, 103-104, 108, 268. 271, 273). However, there should have been more information provided to the person reading the textbook because the captions do not provide enough information on what the graphs look like exactly, such as where lines start and stop, how they curve, or what the axes are.**
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Fail**
Additional Information:	**4/10 equations had proper notation markup when the textbook was read aloud (pg. 384, 392, 401, 411). However, the remaining 6 equations were not read properly (pg. 384, 397, 398(3), 411). Instead of division signs or multiplication signs being read as so, they were read as "slashes" or were skipped. Greater than (>) or less than signs (<) were also skipped when read aloud.**
H. Assistive technology used can access the content from the STEM tables.	**Fail**
Additional Information:	**0/10 tables were properly read aloud by the NVDA assistive program. The tables were read cell by cell, but you were not able to read through it in different directions. You were only able to navigate through the cells using the up and down 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:	
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:	