

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:	MicroEconomics: Theory Through Application
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	7.5 (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 <u>Accessible Technology Initiative</u> and <u>MERLOT</u> (Multimedia Educational Resources for Learning and Online Teaching) developed the rubric or "checkpoints" for the accessibility evaluation. <u>CAST</u>, 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 <u>Center for Usability in Design and Accessibility</u> 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:	URL not found. Adobe Acrobat Pro XI.
B. The organization providing the online materials has an accessibility statement.	Fail
Additional Information:	URL not found. Adobe Acrobat Pro XI.
C. An Accessibility Evaluation Report is available from an external organization.	Fail
Additional Information:	URL not found. Adobe Acrobat Pro XI.

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:	5/5 pages. Pages 1, 100, 198, 401, and 750 checked. Adobe Acrobat Pro XI.

3. Text Adjustment

A. Text is compatible with assistive technology.	Pass
Additional Information:	5/5 pages. Pages 1, 100, 198, 401, and 750 checked. Adobe Acrobat Pro XI.
 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, 	Fail



media player, or reader) that offers this functionality).	
Additional Information:	0/5 pages. Pages 1, 100, 198, 401, and 750 checked. Adobe Acrobat Pro XI. Background is responsive, but text is not. The chapter headers ("Chapter 1", "Chapter 2", etc.) do respond to the color adjustment, but no other text does.

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:	5/5 pages. Pages 1, 100, 198, 401, and 750 checked. Adobe Acrobat Pro XI.
 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	Pass
logically corresponds to the visual layout of	
the page when rendered by assistive	
technology.	
Additional Information:	5/5 pages. Pages 1, 100, 198, 401, and 750 checked. Adobe Acrobat Pro XI.

6. Structural Markup/Navigation

Α.	The text of the digital resource includes	Fail
	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).	
Additional Information:	Failed each navigation markup check (title, bookmarks, headings, etc.). Adobe Acrobat Pro XI.
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:	Failed both list markup checks (List items & Lbl and Lbody). Adobe Acrobat Pro XI.
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:	Skipped.

7. Tables

A. Data tables include markup (e.g. tags or styles) that identifies row and column headers in a manner that is compatible with assistive technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	Fail
Additional Information:	0/5 tables. Failed all table markup checks (rows, TH & TD, headers, and regularity). Manually checked tables on pages 37, 60, 65, 87, 88, and 104. Adobe Acrobat Pro XI.

8. Hyperlinks

Α.	In-book links take you to a location within the	N/A
	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.	
Additional Information:	There are no hyperlinks that lead to other areas within the book. There are no bookmarks, no TOC, footnote annotations are not links. Adobe Acrobat Pro XI.
 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:	18/21 links. Pages 19, 52, 74, 86, 89, 128, 141, 146, checked. Adobe Acrobat Pro XI. The eBook provider's website is in the footer of each page and works (but is only counted once with respect to rating this criterion). The pages that are linked on pages 74 and 141 no longer exist (404 errors). A link on page 146 directs to the home page of a domain rather than a specific page (the starpulse.com link).
D. Live links are descriptive enough for the users to know where it should take them.	Fail
Additional Information:	No alternate text for links. Fails tag check. Adobe Acrobat Pro XI.

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 1-150 checked. Links are underlined and colored differently than the regular text.
 B. Information is conveyed from the sub- categories for contrast. 	Fail



Additional Information:	Averaged score.
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	Pass
Additional Information:	Chapter headings are black on white (~21.0:1) and the chapter title at the beginning of each chapter is blue on white (6.51:1).
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	Fail
Additional Information:	Text is either black on white and passes (~11.12:1) or blue on white and fails (~3.83:1). These blue emphasized words, links, and footnote markings are not uncommon. Adobe Acrobat Pro XI and Colour Contrast Analyser.
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	Fail
Additional Information:	Pages 159-196 checked. Many graphs and charts use some unacceptable color combinations (pages 159, 161, 162, 165, 171, 182, 184, 186, and 196). Adobe Acrobat Pro XI.

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:	Passes primary language check. Adobe Acrobat Pro XI.
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 passages found. Adobe Acrobat Pro XI.



11.Images

Α.	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
Additic	onal Information:	Only one non-decorative image found (page 334).
В.	Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	N/A
Additic	onal Information:	No decorative images found.
C.		N/A
	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).	

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. Adobe Acrobat Pro XI.
B. A transcript is provided with all audio content.	N/A
Additional Information:	No multimedia found. Adobe Acrobat Pro XI.
 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. Adobe Acrobat Pro XI.



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:	Pages 1-200 checked. No flickering. Adobe Acrobat Pro XI.

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

A. STEM figures have appropriate markup that indicates that the image is a figure.	Fail
Additional Information:	No markups. Pages 219, 222, 244, 248, 253, 342, 390, 512, 536, and 558 checked. Adobe Acrobat Pro XI.
B. STEM graphs have appropriate markup that indicates that the image is a graph.	Fail
Additional Information:	No markups. Pages 220, 224, 227, 229, 231, 233, 235, 236, 238, and 240 checked. Adobe Acrobat Pro XI.
C. STEM equations have appropriate markup that indicates that the image is an equation.	Fail
Additional Information:	No markup. Pages 221, 416, and 417 checked. Many operators/symbols are not narrated (ex. "x" and the up arrow [indicating an increase in something]). Adobe Acrobat Pro XI.
 STEM tables have appropriate markup that indicates the image is a table. 	Fail
Additional Information:	
 E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content. 	Pass
Additional Information:	Pages 219, 222, 244, 248, 253, 342, 390, 512, 536, and 558 checked. The purpose of the figures on pages 512 and 558 is to summarize previous information. Though that information can be found throughout the section, the user loses the



	localization/summarization of the information at the end of the sections. Adobe Acrobat Pro XI.
 F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content. 	Pass
Additional Information:	Pages 220, 224, 227, 229, 231, 233, 235, 236, 238, and 240 checked. Most graphs have adequate captioning describing the information they portray (ex. Page 235), though some are relatively lacking (ex. Page 231). Adobe Acrobat Pro XI.
 G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content. 	Fail
Additional Information:	Pages 221, 416, and 417 checked. Much of the equations' meaning is localized in the equation itself (i.e., little-to-no captioning outside of the equation). Since many of the equations are incorrectly narrated, this meaning is lost. Adobe Acrobat Pro XI.
 H. Assistive technology used can access the content from the STEM tables. 	Fail
Additional Information:	

15.Interactive Elements

 A. Each interactive element (e.g. menu, hyperlink, button) and function (e.g. annotations) allows keyboard-only operation both with and without assistive technology. 	N/A
Additional Information:	No interactive elements found. Adobe Acrobat Pro XI.
 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. Adobe Acrobat Pro XI.
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. Adobe Acrobat Pro XI.

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 Included
 B. The organization providing the online materials has an accessibility statement. 	Fail
Additional Information:	Not Included
C. An Accessibility Evaluation Report is available from an external organization.	Fail
Additional Information:	Not Included



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:	Text was converted to speech without a problem.

3. Text Adjustment

A. Text is compatible with assistive technology.	Pass
Additional Information:	Reflows with text size change, pages: 20-25.
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:	Background changes to black but text does not change to green, pages: 400-450.

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:	Reflows with text size change, pages: 20-25.
 B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material. 	Pass
Additional Information:	

5. Reading Order

Α.	The reading order for digital resource content	Pass
	logically corresponds to the visual layout of	



the page when rendered by assistive technology.	
Additional Information:	Text is read in a logical order including bullets and list, pages: 700-800.

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:	There are no naviation links, Acc Checker yielded problems for Title, bookmarks, Tagged PDF, and Appropriate Nesting. Pages: 1-20.
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:	Lists and bullets a logical fashion, pages: 1-20.
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

Α.	Data tables include markup (e.g. tags or	Fail
	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).	
Additional Information:	Acc Checker yields failure for Headers, Regulation, TH and TD, and Rows pages: 100-150.

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:	There are no naviation links, pages: 770-775.
 B. Live hyperlinks take you to any website or webpages external to the book. 	Pass
Additional Information:	
C. Live links take you to the correct webpage that is functioning properly.	Pass
Additional Information:	Do Not Work- pages: 720-730 http://www.cbo.gov/ftpdoc.cfm?index=3521 AND Do Work-pages: 720-730 http://www.gao.gov/cghome/d08395cg.pdf AND http://www.govtrack.us/congress/billtext.xpd?bill= h110-493&show-changes=0&page-command=print AND http://www.saylor.org/books AND http://supreme.justia.com/us/221/1/case.html.
 D. Live links are descriptive enough for the users to know where it should take them. 	Pass
Additional Information:	Links do not provide decription of their destination, they are only written out in the standard "www" format, 720-730 http://www.cbo.gov/ftpdoc.cfm?index=3521 AND Do Work-pages: 720-730 http://www.gao.gov/cghome/d08395cg.pdf AND http://www.govtrack.us/congress/billtext.xpd?bill= h110-493&show-changes=0&page-command=print



AND http://www.saylor.org/books AND http://supreme.justia.com/us/221/1/case.html.

9. Color and Contrast

A. All information within the material that is	Pass
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.	
Additional Information:	Headers are bolded and larger paragraph text and
	links are denoted with an underline.
B. Information is conveyed from the sub-	Pass
categories for contrast.	
Additional Information:	
C. Contrast for headers passed WCAG AA	Fail
standards for large texts (contrast ratio 3:1).	
Additional Information:	Headers are ok, Key Takeaways headers do not pass
	regular text size AAA and Table headers fail them all,
	figure titles fail as well pages: 170-180.
D. Contrast for text passed WCAG AA standards	Pass
for normal texts (contrast ratio of 4.5:1).	
Additional Information:	pages: 1-30 ratio: 12.63:1
E. Contrast for simple images (for example,	Pass
images of atoms) passed WCAG AA standards	
(contrast ratio of 4.5:1).	
Additional Information:	Some simple images do not pass contrast standards,
	pages: 150-170.

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:	



 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 is in the text.

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
Additic	onal Information:	Acc Checker yields failure for Figures alternate text, Nested alternate text, Associated with content, Hides annotation, and Other elements alternate text, also page 334 has image with text but is not read with the Read Out Loud function.
В.	Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	N/A
Additic	onal 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).	Fail
Additic	onal Information:	Acc Checker yields failure for Figures alternate text, Nested alternate text, Associated with content, Hides annotation, and Other elements alternate text.

12.Multimedia

A. A synchronized text track (e.g. open or closed	N/A
captions) is provided with all video content.	



Additional Information:	Did not find any examples of these in a manual search.
B. A transcript is provided with all audio content.	N/A
Additional Information:	Did not find any examples of these in a manual search.
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:	Did not find any examples of these in a manual search.

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:	

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

A. STEM figures have appropriate markup that indicates that the image is a figure.	Fail
Additional Information:	Not enough information is conveyed about this item within an alt tag or the surrounding text, pages: 660- 680.
B. STEM graphs have appropriate markup that indicates that the image is a graph.	Fail
Additional Information:	Not enough information is conveyed about this item within an alt tag or the surrounding text, pages: 660- 680.
C. STEM equations have appropriate markup that indicates that the image is an equation.	Fail
Additional Information:	Not enough information is conveyed about this item within an alt tag or the surrounding text, pages: 660- 680.



 D. STEM tables have appropriate marku indicates the image is a table. 	o that N/A
Additional Information:	
 E. STEM figures have appropriate notati markup that conveys both the notatio (presentation) and meaning (semanti STEM content. 	on
Additional Information:	
 F. STEM graphs have appropriate notati markup that conveys both the notatio (presentation) and meaning (semanti STEM content. 	on
Additional Information:	
 G. STEM equations have appropriate normarkup that conveys both the notation (presentation) and meaning (semanti STEM content. 	on
Additional Information:	Not tagged appropritely, is not read correclty pages: 818-828.
H. Assistive technology used can access content from the STEM tables.	the N/A
Additional Information:	

15.Interactive Elements

A.	Each interactive element (e.g. menu, hyperlink, button) and function (e.g. annotations) allows keyboard-only operation both with and without assistive technology.	N/A
Additio	nal Information:	
В.	Each interactive element conveys information to assistive technology regarding the element's name, type, and status (e.g. "Play, button, selected").	N/A
Additio	nal Information:	



С.	All instructions, prompts, and error messages	N/A
	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).	
Additior	nal Information:	

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