

To: Robert Van Rennes, Big Ten Academic Alliance  
From: Grey L. Pierce, MSU Usability/Accessibility Research and Consulting  
Subject: ProQuest Ebook Central High-Level Accessibility Evaluation for the Library  
Accessibility Alliance  
Date: April 16, 2021

MSU Usability/Accessibility Research and Consulting (MSU UARC) conducted a high-level accessibility evaluation of the ProQuest Ebook Central platform to evaluate its conformance with WCAG 2.1 AA Criteria. This evaluation did not include all functionality or content of the site or all WCAG 2.1 AA Success Criteria.

During this evaluation, a number of issues were found that will make the site impossible to use for many individuals with disabilities, and difficult to use for many others.

Critically, the "Accessibility Mode" of the Read Online page removes functionality and content and is not fully accessible to users with disabilities, and therefore does not meet the requirements of an alternate conforming version.

Keyboard users, including screen reader users and users with dexterity impairments, will find it difficult or impossible to access or use some content. Some content cannot be reached or operated via keyboard, making it impossible to use for those that rely on keyboard access. Some interactive elements lack a sufficiently visible focus indicator, making it difficult for many keyboard-only users to effectively use them, as they cannot determine when they have reached the correct element. Some content unexpectedly changes when keyboard focus shifts and focus order is incorrect in some places, increasing the difficulty of using the site with a keyboard.

Individuals who rely on screen readers, including many users with visual, reading, and language impairments, will have problems using the site. Some content is not read out correctly and structural information (including headings and lists) is not appropriately conveyed to users, making it difficult or impossible to understand content and organization in places. Some form inputs are not appropriately labeled, making those inputs difficult to use for those that rely on screen readers. Some custom elements do not correctly announce themselves to screen readers, making them difficult to understand and use. Some images have inappropriate alternative text, significantly impacting users with visual impairments.

Headings in the PDF have not been tagged, making it difficult to use and navigate for users with disabilities. Additionally, no title or language is provided to assistive technologies and images in the PDF lack alternative text.

Other issues were found that will make it difficult for users with a variety of disabilities to effectively use the system, insufficient color contrast, use of color alone to distinguish content, images of text being used instead of styled text, content and functionality being removed when the viewport or text size is changed, and inappropriate page titles.

To improve access for users with disabilities, MSU UARC recommends a full WCAG 2.1 AA evaluation and that the problems discovered be remediated.

*Note: Results for "global warming" were used as an example of a Search Results page, "Our Energy Future: Introduction to Renewable Energy and Biofuels" was used as an example of*

*a Book and Read Online page, and Chapter 2 ("Why Fossil Fuels Energize Our Society") was used as an example of a PDF.*

*For reference, screenshots of the Home page (wide, medium, and narrow viewport widths) at the time this evaluation was completed have been included at the end of this memo.*

## High-Level Findings

### Conformance

- The "Accessibility Mode" does not provide an alternate conforming version. [[WCAG 2.1 CR 1](#)]
  - Functionality is removed (e.g., images, highlighting)
  - New content that is not accessible is introduced (e.g., broken text).
  - The accessibility of some existing content is broken when the mode is enabled (e.g., cannot close sidebar via keyboard)
  - Many of the same inaccessible elements as the primary mode are still present
  - The mode cannot be reached by all users (requires user to create and account and be signed in)
  - Link to enable the mode is not visible on screen
  - Users should not be forced to access a separate version of a page to use assistive technologies when there is no reason that the primary page could not be made accessible

### Document Structure

- Headings are not appropriately structured. [[WCAG 2.1 SC 1.3.1](#)]
  - On the Home page, "Authoritative ebooks at your fingertips." is not an appropriate h1 for the page
  - On the Search Results page, "Book Results" should be tagged as an h2 when active or book titles should be tagged as h2s, not h3s
  - On the Book page, "Availability", "Description", "Table of Contents", and "Book Details" should be tagged as h2s, not h1s
  - On the Book page, "About The Author" and "Tags" should be tagged as h2s, not h3s
  - On the Book page, "TITLE", "SUBTITLE", etc. should not be tagged as h6s
  - On the Read Online page, "Logo" is not an appropriate h1 for the page
  - On the Read Online page, the invisible "Table of Content Section" heading should be tagged as an h2, not an h3
  - On the Read Online page, "TABLE OF CONTENTS" should be tagged as an h3, not an h2
  - On the Read Online page, content under "TABLE OF CONTENTS" should not be tagged as programmatic headings
  - On the Read Online page (Accessibility Mode), headings are not tagged in the document
- Headings in the PDF are not tagged. [[WCAG 2.1 SC 1.3.1](#)]
- Lists are not appropriately structured. [[WCAG 2.1 SC 1.3.1](#)]
  - On the Search Results page, lists in the "Refine your search" section should be coded into programmatic lists

- On the Book page, contents in the "Table of Contents" section should be coded into a programmatic list
- On the Book page, contents in the "Book Details" section should be coded into a programmatic list
- On the Read Online page, content under "TABLE OF CONTENTS" should be coded into a programmatic list
- On the Read Online page (Accessibility Mode), random and incoherent text fragments are provided to users (e.g., numbers from table of contents on page vii, text from figure on page 2, "forms of energy individOverview individOverview of Energy Usage 3"). [[WCAG 2.1 SC 1.3.1](#), [WCAG 2.1 SC 1.3.2](#)]
- On the Read Online page (Accessibility Mode), document text is incorrectly broken into fragments of paragraphs, sentences, and words, and is therefore not read out correctly by assistive technologies (e.g., "O U R EN ERGY F U T U R E", "U NIVER SIT Y OF CALIFOR NIA PR ESS"). [[WCAG 2.1 SC 1.3.1](#), [WCAG 2.1 SC 1.3.2](#)]
- On the Book page, text in the "Description" and "Book Details" sections that is not visible on screen is incorrectly read out. [[WCAG 2.1 SC 1.3.2](#)]
- On the Book page, an invisible "Reader Reviews" heading is incorrectly read out. [[WCAG 2.1 SC 1.3.2](#)]
- On the Book page, the book title h1 should be read before all content it organizes (i.e., "Read Online" button, etc.). [[WCAG 2.1 SC 1.3.2](#)]
- The language of the PDF is not defined. [[WCAG 2.1 SC 3.1.1](#)]

## Keyboard Support

- On the Search Results page, expanded lists in the "Refine your search" section can be thousands of items long (e.g., the "SUBJECT" list has 2,400 items for a search of "global warming"), forcing keyboard users to make thousands of button presses to navigate through or collapse the list. [[WCAG 2.1 SC 2.1.1](#)]
- On the Book page, the "Show more" link in the Book Details section cannot be activated via keyboard. [[WCAG 2.1 SC 2.1.1](#)]
- On the Read Online page, arrow buttons to expand or collapse sections within the sidebar cannot be activated via keyboard. [[WCAG 2.1 SC 2.1.1](#)]
- On the Read Online page (Accessibility Mode), the sidebar cannot be collapsed via keyboard. [[WCAG 2.1 SC 2.1.1](#)]
- On the Search Results page, the "Show more" and "Show less" links reset focus to the top of the page. [[WCAG 2.1 SC 2.4.3](#)]
- On the Search Results page, "MICHIGAN STATE UNIVERSITY" receives focus, but is not interactive. [[WCAG 2.1 SC 2.4.3](#)]
- On the Book page, "About The Author" and "Tags" receive focus, but are not interactive. [[WCAG 2.1 SC 2.4.3](#)]
- On the Book page, focus incorrectly goes to content in the "Book Details" section that is not on screen when the user advances focus. [[WCAG 2.1 SC 2.4.3](#)]
- Focus is not sufficiently visible for a variety of interactive content. [[WCAG 2.1 SC 2.4.7](#)]
  - "ProQuest Ebook Central" link at start of pages
  - On the Home page, the "Search" button, carousel image links, previous and next arrows in the carousel, and navigation dots in the carousel
  - On the Search Results page, checkboxes
  - On the Book page, the "Read Online" and "Download Book" buttons

- On the Read Online page, the "Zoom..." button and tabs (Book Details, Table of Contents, Annotations, Search within book)
- On the Read Online page, the "Full Download" button in the Book Details sidebar
- On the Advanced Search page, dropdowns, checkboxes, and the "Search" button
- On the Book page, advancing focus unexpectedly causes the visual content of the "Book Details" section to change. [[WCAG 2.1 SC 3.2.1](#)]

## Navigation

- On the Search Results and Advanced Search pages, page title does not identify the unique page. [[WCAG 2.1 SC 2.4.2](#)]
- On the Book and Read Online pages, page title does not include the book name. [[WCAG 2.1 SC 2.4.2](#)]
- In the PDF, "someTitle" is not an appropriate document title and the title is not available to screen readers (Document Properties not set to show Document Title in Initial View). [[WCAG 2.1 SC 2.4.2](#)]

## Forms and Data Submission

- On the Search Results page, legend and heading tags (in the "Refine your search" section) should not be provided separately - heading tags should be placed inside legend tags when both are needed so that screen readers don't receive redundant content. [[WCAG 2.1 SC 2.4.6](#)]
- On the Search Results page, numbers to the right of the visual "Refine your search" labels are not included in programmatic labels (e.g., "35572" next to "English"). [[WCAG 2.1 SC 2.4.6](#)]
- On the Search Results page, "Refine your search" is inappropriately read out after every label in the "Refine your search" section. [[WCAG 2.1 SC 2.4.6](#)]
- On the Advanced Search page, the PDF checkbox is not programmatically labeled. [[WCAG 2.1 SC 3.3.2](#)]

## Images

- A variety of images do not have appropriate alternative text. [[WCAG 2.1 SC 1.1.1](#)]
  - ProQuest image in footer
  - On the Home page, the graphic under "Trusted Content" is decorative and should have a null alt attribute
  - On the Search Results and Read Online pages, the Chapter Download button (alternative text makes no mention of "PDF", despite "PDF" being visually present in the image)
  - On the Search Results page, book cover thumbnails in the Chapter Results tab are decorative and should have null alt attributes
  - On the Read Online page, close ("x") button in the sidebar
- Images in the PDF lack alternative text. [[WCAG 2.1 SC 1.1.1](#)]
- On the Book page, "Enrichment by Syndetics Unbound" is an image of text, instead of styled text. [[WCAG 2.1 SC 1.4.5](#)]

## Color and Visual Characteristics

- On the Search Results page, color is the only means to differentiate search term highlighting. [[WCAG 2.1 SC 1.4.1](#)]
- Blue text on multicolored background (e.g., "Advanced Search" and "Browse Subjects" links on the Home page) and dark grey text on grey (e.g., selected filter categories ["PUB YEAR", "LANGUAGE"], page number links when focused on the Search Results page) have insufficient contrast. [[WCAG 2.1 SC 1.4.3](#)]
- On the Home page, grey carousel navigation dots on white background have insufficient contrast. [[WCAG 2.1 SC 1.4.11](#)]

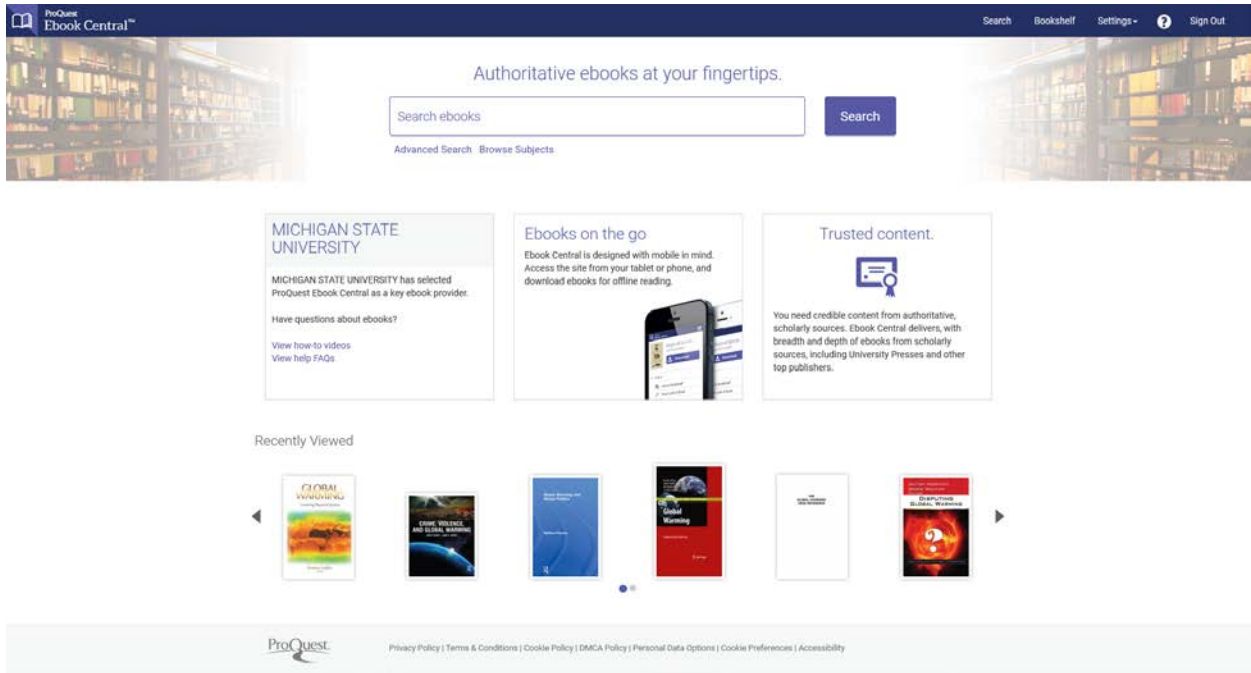
## Custom Elements and Dynamic Content

- Content and functionality (e.g., "Featured Titles" section on the Home page, "Refine your search" section on Search Results page) disappears at some page widths and text sizes. [[WCAG 2.1 SC 1.4.4](#)]
- The value of the Settings menu button is incorrectly identified as "collapsed" when it is expanded, and screen reader users are not notified when closing it. [[WCAG 2.1 SC 4.1.2](#)]
- On the Search Results page, "MICHIGAN STATE UNIVERSITY" is incorrectly identified as a menu. [[WCAG 2.1 SC 1.4.4](#)]
- On the Book page, the heading and contents of the "Description" section are inappropriately read out on the "Show more" link. [[WCAG 2.1 SC 1.4.4](#)]
- On the Book page, screen reader users are not notified when the "Show Subsections", "Hide Subsections", "(Read more)", and "(less)" links are activated to expand or collapse content. [[WCAG 2.1 SC 1.4.4](#)]
- On the Book page, programmatic names (e.g., "biology") are not provided for tags. [[WCAG 2.1 SC 1.4.4](#)]
- On the Read Online page, name information is not complete for page navigation links (i.e., visible text says "Page Intro of 195" but it is read out by screen readers only as "Go to page"). [[WCAG 2.1 SC 1.4.4](#)]
- On the Read Online page, screen reader users are not notified when opening contents via the sidebar or when bookmarks are added. [[WCAG 2.1 SC 1.4.4](#)]
- On the Advanced Search page, "Advanced Search" is visually styled as a tab, but is not provided with appropriate role or value information for a tab (e.g., "tab" and "selected"). [[WCAG 2.1 SC 1.4.4](#)]

Disclaimer: This high-level evaluation was conducted for the Library Accessibility Alliance, and represents a good faith effort conducted within a limited time frame. It should not be assumed to be complete or free from error. No warranties or guarantees are implied. UARC is not responsible for direct, indirect, or incidental damages based on this work; its use or interpretation by any individual, group, or organization; or on conditions beyond our control.

# Home Page Screenshots

## Wide Viewport



# Medium Viewport

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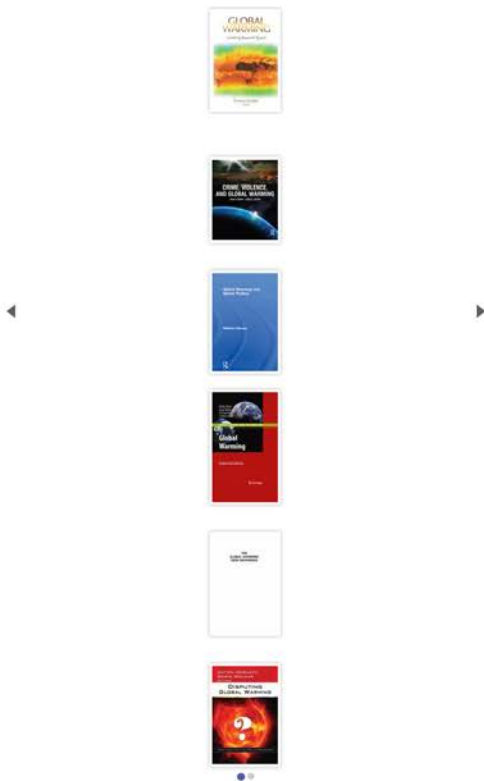


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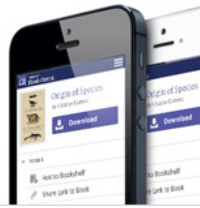
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