MICHIGAN STATE UNIVERSITY | Usability/Accessibility Research and Consulting

To: Robert Van Rennes, Big Ten Academic Alliance
From: Graham L. Pierce, MSU Usability/Accessibility Research and Consulting
Subject: JSTOR High-Level Accessibility Evaluation
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MSU Usability/Accessibility Research and Consulting (MSU UARC) conducted a high-level accessibility evaluation of JSTOR to evaluate its conformance with WCAG 2.0 AA Criteria. This evaluation did not include all functionality or content of the site or all WCAG 2.0 AA Criteria.

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

Critically, PDF documents cannot be effectively used by screen reader users. PDF files are untagged, and contain no text that can be used by assistive technologies when displayed in Adobe Acrobat/Reader, and while the PDF readers in Firefox and Chrome do allow users to access the document text, it is unstructured (e.g., headings are not used to organize content). Additionally, alternative text is not provided for any images in PDFs. As a result, individuals with visual impairments and other disabilities cannot effectively use PDF documents provided by the system.

Keyboard users, including screen reader users, will have difficulties when attempting to use the JSTOR website. Many interactive elements lack a sufficiently visible focus indicator, making it difficult or impossible for many keyboard-only users to effectively use them, as they cannot determine when they have reached the correct element. In addition, non-interactive content receives focus, focus order is inappropriate in places, and focus is unexpectedly reset at times. This makes the site difficult to use for users with severe dexterity impairments and users who rely on screen readers (including users with severe visual impairments).

Individuals with visual impairments that rely on screen readers will have additional problems. Some content is not read out by screen readers and some content cannot be accessed via keyboard when a screen reader is in use, rending the content and functionality unavailable to users with severe visual impairments. Many form inputs are not appropriately labeled or do not have programmatically associated instructions, and error messages are not appropriately communicated to assistive technologies, making the inputs difficult or impossible to use for those that rely on screen readers. Dynamic and interactive elements do not correctly announce themselves or provide feedback to screen readers, making them difficult to understand and use. Images throughout the site have incorrect or inappropriate alternative text and images of text are used in place of styled text, further impacting users with visual impairments. Screen reader users will also be frustrated by non-interactive content being identified as "clickable" (and by having "clickable" read out multiple times for a single object), making it difficult to determine what content they can interact with. Some structural information, including headings, is also not appropriately conveyed to screen reader users, making it difficult to understand content organization and to navigate within pages. Finally, some site content interferes with the use of screen readers by blocking access to critical screen reader keyboard controls.

A number of other issues were found that will make it difficult for users with a variety of disabilities from effectively using the system, including insufficient color contrast and color being relied on to convey some information.

To improve access for users with disabilities, UARC recommends a full WCAG 2.0 AA evaluation of JSTOR and that the problems discovered be remediated.

Note: For the purposes of this high-level review, "Apocalypse Soon? Dire Messages Reduce Belief in Global Warming by Contradicting Just-World Beliefs" was used as an example of Journal Article pages, "Encyclopedia of Islands" was used as an example of Book pages, and Chapter 1 of "Encyclopedia of Islands" was used as an example of a PDF.

High-Level Findings

Conformance

- The Cite This Item lightbox (Search Results, Journal Article, and Book pages) captures keystrokes, interfering with screen reader operation (e.g., arrow keys cannot be used to read text, keyboard shortcuts cannot be used to navigate between headings). [WCAG 2.0 CR 5]

Document Structure

- Headings are not consistently used to organize content. [WCAG 2.0 SC 1.3.1]
    - No h1 on Home page.
    - On the Browse by Publisher page, letters are visually styled as headings, but are not coded as headings.
    - On the Search Results page, "Copy Citation" should be an h2 in the Cite This Item lightbox and subheadings under "Refine Results" (e.g., "Content Type:") are not coded as headings.
    - On the Journal Article page, "Item Type", "Date Range", etc. should be h3s and "Psychological Science" should be coded as a heading in the Journal Info lightbox.
- On the Browse by Title page, "0-9" (or the relevant letter) is not an appropriate table column heading for Journal, Book, Research Report, or Pamphlet titles. [WCAG 2.0 SC 2.4.6]
- The table on the Browse by Title page has an empty column. [WCAG 2.0 SC 1.3.1]
- Non-interactive content is incorrectly identified as "clickable" by screen readers (e.g., "Access provided by Michigan State University"). [WCAG 2.0 SC 1.3.1]
- PDFs are not tagged for accessibility (with the exception of JSTOR information on the first page); no document structure information is available to users of assistive technologies (e.g., headings, figures, etc.). [WCAG 2.0 SC 1.3.1]
- PDFs cannot be read by screen readers in Adobe Acrobat (content can be read using the built-in PDF readers in Firefox and Chrome, but documents remain unstructured and untagged). [WCAG 2.0 SC 1.3.1, WCAG 2.0 SC 1.3.2]
- PDFs are not titled. [WCAG 2.0 SC 2.4.2]
- On the Journal Article page, pages in Article View cannot be read by screen readers. [WCAG 2.0 SC 1.3.1, WCAG 2.0 SC 1.3.2]

Keyboard Support

- Focus is not sufficiently visible on a variety of content. [WCAG 2.0 SC 2.4.7]

- o Search buttons (magnifying glass icons) on any page.
- o Tiles below search on the Home page (e.g., "Need Access to JSTOR?").
- o Tabs (e.g., "Journals" and "Books" on the Browse by Title page; "Article" and "Thumbnails" on the Journal Article page).
- o "Sort By" dropdown and "- See less" link (under "Subject" section in sidebar, when expanded) on the Basic Search page.
- o "Add Field +" button on the Advanced Search page.
- o Sustainability and Security tabs/slide-outs on the Journal Article page.
- o Blue buttons (e.g., "Download PDF" and "Export Selected Citations" on Basic Search page; "Download PDF" and "Add to My Lists" on Journal Article page; "Cite this Items" and "Book Info" on Book page).
- The "Advanced Search" and "Browse" dropdowns in the page header and "Select Language" dropdown in the page footer cannot be opened or operated via keyboard when a screen reader is in use. [WCAG 2.0 SC 2.1.1]
- Focus goes to non-interactive content (e.g., "Access provided by Michigan State University"). [WCAG 2.0 SC 2.4.3]
- On the Browse by Title page, switching tabs unexpectedly resets focus to top of page. [WCAG 2.0 SC 2.4.3]
- On the Journal Article page, focus incorrectly goes to the Sustainability and Security Studies links when the content is hidden/collapsed, and focus incorrectly goes to the Sustainability link before the Sustainability expander and the Security Studies link before the Security expander. [WCAG 2.0 SC 2.4.3]
- Keyboard-only users cannot skip past the alphabet links on the Browse by Title or Browse by Publisher pages. [WCAG 2.0 SC 2.1.1]

Forms and Data Submission

- Instructions for formatting inputs are not programmatically associated with inputs (e.g., "(yyyy or yyyy/mm or yyyy/mm/dd)" for Publication Date on the Search Results page and "yyyy or yyyy/mm or yyyy/mm/dd" for Date Range on the Advanced Search page). [WCAG 2.0 SC 3.3.2]
- The first search text input on the Advanced Search page is not programmatically labeled. [WCAG 2.0 SC 3.3.2]
- Labels for Boolean and Fields dropdowns on the Advanced Search page do not indicate which text input fields they are associated with. [WCAG 2.0 SC 3.3.2]
- Checkboxes under "Item Type" on the Advanced Search page are not programmatically associated with grouping labels. [WCAG 2.0 SC 3.3.2]
- Inputs are not programmatically associated with grouping labels on the Search Results page (e.g., "Books" should be associated with "Content Type"). [WCAG 2.0 SC 3.3.2]
- Error messages are not programmatically associated with inputs (e.g., date inputs on the Search Results and Advanced Search pages). [WCAG 2.0 SC 3.3.1]
- Items beneath checkboxes are not programmatically associated with checkboxes in the Journal Filter list on the Advanced Search page (e.g., "Black American Literature Forum 1976 - 1991" is not associated with "African American Review 1992 - 2013" checkbox). [WCAG 2.0 SC 3.3.2]

Images

- Twitter and Facebook icons in footer lack alternative text. [WCAG 2.0 SC 1.1.1]

- On Home page, tiles below search (e.g., "Need Access To JSTOR?") are images of text, instead of styled text. [WCAG 2.0 SC 1.4.5]
- On Home page, alternative text for tiles below search are incomplete (e.g., "Select an access plan that fits your needs. Plans start at $9.99. Get started" is not included in alternative text). [WCAG 2.0 SC 1.1.1]
- On Browse By Subject page, thumbnails for Security Studies and Sustainability are decorative, and should have null alternative text (alt=""). [WCAG 2.0 SC 1.1.1]
- On Book page, "None" is not appropriate alternative text for the University of California Press logo and "Open Access ebooks now available on JSTOR" graphic lacks alternative text. [WCAG 2.0 SC 1.1.1]
- Alternative text is not provided for images in PDFs. [WCAG 2.0 SC 1.1.1]

Color and Visual Characteristics
- Light grey text on white background ("Search JSTOR" on all pages), blue text on light blue (selected item in dropdowns), and white text on light blue (selected item in search dropdowns on Advanced Search page) have insufficient contrast. [WCAG 2.0 SC 1.4.3]
- Color is the only visual means to see which fields have errors on the Advanced Search page (yellow box around input). [WCAG 2.0 SC 1.4.1]

Custom Elements and Dynamic Content
- Advanced Search and Browse dropdowns (all pages), tabs on the Browse by Title page, and buttons on the Search Results page (e.g., "Download PDF") are incorrectly coded as links. [WCAG 2.0 SC 4.1.2]
- Custom expanders and slide-outs (e.g., "+ See more"/"- See less" on Search Results, buttons to expand/collapse Journal Filters on Advanced Search, slide-outs for Sustainability and Security on Journal Article page) do not have roles or values provided (i.e., screen reader users are not informed that they expand/collapse and whether they are expanded/collapsed), and screen reader users are not informed when they expand/collapse. [WCAG 2.0 SC 4.1.2]
- Screen reader users are not informed when fields are added (via the "Add Field +" button) on the Advanced Search page. [WCAG 2.0 SC 4.1.2]
- On the Search Results and Book pages, inactive buttons (e.g., "Export Selected Citations" and "Update Results") do not receive focus, and are therefore not read out by screen readers, preventing screen reader users from knowing that they exist (they cannot be made active until content later in the focus order is modified). [WCAG 2.0 SC 4.1.2]
- On the Home page, the number of results appears automatically when the user enters text into the search field, but screen reader users are not notified. [WCAG 2.0 SC 4.1.2]