ACCESSIBLE DATA VISUALIZATION FOR NON-PROGRAMMERS

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The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect.

Tim Berners-Lee
To enable persons with disabilities to live independently and participate fully in all aspects of life, States Parties shall take appropriate measures to ensure to persons with disabilities access, on an equal basis with others... to information and communications, including information and communications technologies and systems.

UN Convention on the Rights of Persons with Disabilities
Who are talking about?
Who are we leaving out?

- 15% - global
- 12.6% - United States
- 11% - U.S. undergraduates
Designing for accessibility benefits everyone
Applicable laws & requirements in the U.S.

- In the United States
  - Americans with Disabilities Act (ADA)
  - Rehabilitation Act of 1973
    - Section 504
    - Section 508
Applicable laws & requirements in higher education

• In higher education
  • Departments of Justice & Education
    • Dear Colleague (2010)
    • Universities charged with planning for accessible technology tools, services, and information
  • “Accessible”
    • W3C Web Content Accessibility Guidelines (WCAG), 2.0 A/AA/AAA
Applicable laws & requirements around the world

• World laws
Standards and guidelines

• Most commonly used:
  • WCAG 2.0 A/AA/AAA
    • Perceivable
    • Operable
    • Understandable
    • Robust
  • Section 508
More about POUR

• Perceivable
  • Available through sight hearing or touch

• Operable
  • Compatible with keyboard or mouse

• Understandable
  • User-friendly, easy to comprehend

• Robust
  • Works across browsers and devices, follows standards
Today’s focus

• Content and structure
• Text equivalents
• Color
• Data tables
• Hyperlinks
Content and structure

• Use simple language
• Use empty (white) space to improve readability
The dude map: How Americans refer to their bros

Quartz | Data: Twitter, Grieve, Guo
Choosing the

Are Film Sequels Profitable?
Box Office Stats For Major Film Franchises

Select Movie Franchise:
(All)

Click to Highlight Average:
Estimated Budget
Profit

Original
Sequel
2nd Sequel
3rd Sequel
4th Sequel
5th Sequel
6th Sequel

Combined Bar Length = Avg. U.S. Gross

$0M $50M $100M $150M $200M
Black Friday
Now Bigger than Thanksgiving

'Black Friday' & 'Thanksgiving': Comparing Search Term Popularity

Since 2008, 'Black Friday' has been a more popular search term than 'Thanksgiving.'
Content and structure

• Use headings and lists correctly
Accessible Library Marketing and Communications

The case for accessibility
Who are we leaving out?
Designing for accessibility benefits everyone
Mobile
Usability
SEO
<h2>Social Media Accessibility</h2>
<h3>The case for accessibility</h3>
<h4>Who are we leaving out?</h4>
<h4>Designing for accessibility benefits everyone</h4>
<ul>
  <li>Overlap with mobile device users</li>
  <li>Accessible sites generally more usable</li>
  <li>Findability and SEO</li>
</ul>
Text equivalents

- Alternative text
- Contextual descriptions
Text equivalents: document example
Text equivalents: document example
Text equivalents: web example (visual editor)
Text equivalents: web example (text editor)

<img src="chrysanthemum.jpg" alt="close-up of orange chrysanthemum">
Text equivalents: chart/graph example
## Text equivalents: table example

<table>
<thead>
<tr>
<th>Product</th>
<th>Qtr 1</th>
<th>Qtr 2</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chocolade</td>
<td>$744.60</td>
<td>$162.56</td>
<td>$907.16</td>
</tr>
<tr>
<td>Gummibärchen</td>
<td>$5,079.60</td>
<td>$1,249.20</td>
<td>$6,328.80</td>
</tr>
<tr>
<td>Scottish Longbreads</td>
<td>$1,267.50</td>
<td>$1,062.50</td>
<td>$2,330.00</td>
</tr>
<tr>
<td>Sir Rodney's Scones</td>
<td>$1,418.00</td>
<td>$756.00</td>
<td>$2,174.00</td>
</tr>
<tr>
<td>Tarte au sucre</td>
<td>$4,728.00</td>
<td>$4,547.92</td>
<td>$9,275.92</td>
</tr>
<tr>
<td>Chocolate Biscuits</td>
<td>$943.89</td>
<td>$349.60</td>
<td>$1,293.49</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$14,181.59</strong></td>
<td><strong>$8,127.78</strong></td>
<td><strong>$22,309.37</strong></td>
</tr>
</tbody>
</table>
Text equivalents: meaningful alt text

- Picture of a student
- A postgraduate engineering student working in the new electron mimicroscope lab
Text equivalents

- Contextual descriptions
Color

• Don’t use color alone to convey meaning
Designing for color-blindness
Images: WebAIM
Designing for color-blindness
Designing for color-blindness

Trello’s solution for allowing colorblind users to distinguish labels
Designing for color-blindness
Designing for Color Blindness

Before

Cubehelix

% of County Residents with Diabetes

3.20

17.00

After

Cubehelix

% of County Residents with Diabetes

3.20

17.00
Color

• Provide sufficient color contrast
The dude map: How Americans refer to their bros

Quartz | Data: Twitter, Grieve, Guo
Color contrast example

be someone’s sunshine when their skies are grey.

Foreground color
HEX 808185
RGB 128.129.133

Background color
HEX B0B0B0
RGB 176.176.176
WebAIM Color Contrast Checker

Color Contrast Checker

Foreground color: #808185
Background color: #b0b0b0

Contrast Ratio: 1.79:1

Normal Text

WCAG AA: Fail
WCAG AAA: Fail
Sample: I am normal text

Large Text

WCAG AA: Fail
WCAG AAA: Fail
Sample: I am large text
be someone's sunshine when their skies are grey.
Data tables

• Use appropriate markup
Data tables: simple vs. complex

Simple Table (More Accessible)

Top 2008 Presidential Candidates by Party
(num) = Primary Delegate Count

<table>
<thead>
<tr>
<th></th>
<th>Democratic</th>
<th>Republican</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Hilary Rodham Clinton</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>John Edwards</td>
<td></td>
</tr>
</tbody>
</table>

Complex Table (Less Accessible)

Top Presidential Candidates 2008

<table>
<thead>
<tr>
<th></th>
<th>Democratic</th>
<th>Republican</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Del</td>
<td>Name</td>
</tr>
<tr>
<td>Barak Obama</td>
<td>1828.5</td>
<td>Hilary Rodham Clinton</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mitt Romney</td>
</tr>
</tbody>
</table>
**Examples of Table Headers**

### Color Names in Multiple Languages

<table>
<thead>
<tr>
<th>Color</th>
<th>Spanish</th>
<th>French</th>
<th>Irish</th>
<th>Welsh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>negro</td>
<td>noir</td>
<td>dubh</td>
<td>du</td>
</tr>
<tr>
<td>White</td>
<td>blanco</td>
<td>blanc</td>
<td>bán</td>
<td>gwyn</td>
</tr>
<tr>
<td>Red</td>
<td>rojo</td>
<td>rouge</td>
<td>ruadh</td>
<td>coch</td>
</tr>
<tr>
<td>Blue</td>
<td>azul</td>
<td>bleu</td>
<td>gorm</td>
<td>glas</td>
</tr>
<tr>
<td>Green</td>
<td>verde</td>
<td>vert</td>
<td>glas</td>
<td>gwyrrd</td>
</tr>
<tr>
<td>Yellow</td>
<td>amarillo</td>
<td>jaune</td>
<td>buí</td>
<td>melyn</td>
</tr>
</tbody>
</table>

**Note:** Gray cells with bold, centered text are headers.

### In Screen Readers

Because this table contains TH tags with the proper SCOPE definitions, some screen readers will read the second row of the table as follows.

- *black*, *Spanish*: negro
- *black*, *French*: noir
- *black*, *Irish*: dubh
- *black*, *Welsh*: du
Data tables: on the web

- Identify all data table headers using the `<th>` element.
- Provide an appropriate scope attribute: `<th scope="col">` for column headers or `<th scope="row">` for row headers.
- If appropriate, add a table `<caption>` for the data table.
Likenesses Within the Reach of All

SOUTHERN CARTES-DE-VISITE OF THE A.S. WILLIAMS III AMERICANA COLLECTION

CDVs by State
<table>
<thead>
<tr>
<th>Photographer(s)</th>
<th>Studio</th>
<th>Subject(s)</th>
<th>Description</th>
<th>Location</th>
<th>Created</th>
<th>State</th>
<th>Photo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berkeley, Edmund</td>
<td>E. Berkeley</td>
<td></td>
<td>Caption on back: Wheat Album</td>
<td>Staunton, Virginia</td>
<td>Virginia</td>
<td></td>
<td><a href="http://purl.lib.ua.edu/59544">http://purl.lib.ua.edu/59544</a></td>
</tr>
<tr>
<td>Dean, William</td>
<td>William Dean</td>
<td></td>
<td>Illegible name on front. Caption on front: &quot;Cousin Marie.&quot; Caption on back: Wheat Album</td>
<td>Harrisonburg, Virginia</td>
<td>Virginia</td>
<td></td>
<td><a href="http://purl.lib.ua.edu/59545">http://purl.lib.ua.edu/59545</a></td>
</tr>
<tr>
<td>Hicks, J. R.</td>
<td>Hicks' Art Gallery</td>
<td></td>
<td>Caption on back: Missouri ?</td>
<td>Columbia, California</td>
<td>California</td>
<td></td>
<td><a href="http://purl.lib.ua.edu/59548">http://purl.lib.ua.edu/59548</a></td>
</tr>
<tr>
<td>Pickard's Penny Photographs</td>
<td></td>
<td></td>
<td>Printed on back: Closed on Sundays.</td>
<td>820 Market Street, Chattanooga, Tennessee, 331 Broad Street, Rome, Georgia</td>
<td>Georgia</td>
<td></td>
<td><a href="http://purl.lib.ua.edu/59554">http://purl.lib.ua.edu/59554</a></td>
</tr>
<tr>
<td>Schloss</td>
<td>Schloss</td>
<td>Boyd, Alexander</td>
<td>Same as w0001_2014001_01000014. Photograph of painting or drawing. Caption on back: &quot;Alexander Boyd was my G.G. grandfather. H.L.W.&quot;</td>
<td>54 West 23rd Street, New York, New York</td>
<td>New York</td>
<td></td>
<td><a href="http://purl.lib.ua.edu/59555">http://purl.lib.ua.edu/59555</a></td>
</tr>
<tr>
<td>Schloss</td>
<td>Schloss</td>
<td>Boyd, Alexander</td>
<td>Same as w0001_2014001_01000013. Photograph of painting or drawing. Caption on back: &quot;Boyd was my G.G. grandfather. H.L.W.&quot;</td>
<td>54 West 23rd Street, New York, New York</td>
<td>New York</td>
<td></td>
<td><a href="http://purl.lib.ua.edu/59556">http://purl.lib.ua.edu/59556</a></td>
</tr>
</tbody>
</table>
Hyperlinks

• Link text should provide context
Avoiding “click here”

✗ Register here.
✓ To register, complete the [online registration form](#).
✗ Data Management Plan
✓ Data Management Plan (PDF)
Hyperlinks

• Don’t force links to open in a new window
Don’t force links to open in a new window

✖ <a href="http://www.thelibrary.com" target="_blank">Visit The Library</a>
✔ <a href="http://www.thelibrary.com">Visit The Library</a>

✔ Show online help (opens in new window)
✔ Fundraiser ordering (external site)
Microsoft Office Accessibility Checker

Inspect Document
Before publishing this file, be aware that it contains:
- Document properties, author's name and related dates
- Characters formatted as hidden text

Check for Issues
- Inspect Document: Check the document for hidden properties or personal information.
- Check Accessibility: Check the document for content that people with disabilities might find difficult to read.
- Check Compatibility: Check for features not supported by earlier versions of Word.

Accessibility Checker
Inspection Results
- ERRORS
  - Missing Alt Text: Picture 1

WARNINGS
- Objects not Inline: Picture 1

Additional Information
Why Fix:
Alternate text helps readers understand information presented in pictures and other objects.

How To Fix:
Select and fix each issue listed above to make this document accessible for people with disabilities.
Adobe Acrobat accessibility tools
Welcome!

Accessible University (AU) is a fictional university, and this is its fictional home page. This page is designed to demonstrate a variety of common web design problems that result in visitors with disabilities being unable to access the content or features of a web page. Although the heading at the top of this section of the page suggests that AU may be a welcoming institution, the inaccessible design of this page sends the opposite message.

Bienvenido!

Accesible Universidad (UA) es una universidad ficticia, y esta es su página de ficción. Esta página está diseñada para demostrar una variedad de común de diseño web que se traducen en problemas de los visitantes con discapacidad no poder acceder al contenido o las características de una página web. Aunque el título en la parte superior de esta sección de la página sugiere que AU puede ser una institución de bienvenida, el diseño inaccessible de esta página envía el mensaje opuesto.