TABLEAU CONFERENCE
Welcome
Create and Publish Accessible Dashboards In Tableau

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Agenda

Accessibility Basics
Web Accessibility Standards
Creating Accessible Dashboards
Case Study
Demo
Accessibility Basics
Accessibility Basics

Accessibility is the usability of a system by people with disabilities

Each type of disability requires a different type of accommodation in the system

Different degrees of impairment require different levels of accommodation

Assistive technologies (AT) are mechanisms for making computer systems accessible
Assistive Technologies—Limited Movement

Keyless Keyboard

Sip and Puff Switch
Assistive Technologies—Vision Impairments

Refreshable Braille Display

Screen Reader Software
Vision Impairments

Vision impairments exist on a wide scale.

Some impairments are very common (red-green colorblindness in males); others are quite rare.

But wait, isn’t Tableau a visual product?
SAT Performance of Admitted Students

This dashboard evaluates SAT performance over time. Scroll through the years to see how student performance has changed.

Select college:
- Administrative Group
- College of Business
- College of Arts and Sciences
- College of Engineering
- College of Communication
- College of Music
- College of Dentistry
- College of Public Affairs
- College of Visual Arts & Design
- Graduate School

% of students within SAT decile by college (click college name to highlight)

Number of Students by Score and Gender

Select gender:
- Men
- Women

Select Academic Year:
- 2003

Number of Students

SAT Total Score
Simulation of Visual Impairments
– Complete Blindness
Vision Impairments and Tableau

Our mission is to help people see and understand data.

Tableau leverages our most powerful sense, vision, to help us understand data.

Accessible Tableau content will help more people with vision impairments benefit from Tableau and provide access to the same information to everyone.
Accessibility Laws and Regulations

Rehabilitation Act of 1973 (USA) – Section 508

Americans with Disabilities Act (USA)

Equality Act 2010 (UK)

Mandate 376 (European Union) – EN 301 549
Why Care About Accessibility?

- You care about helping people with disabilities
- You want to reach the largest possible audience
- Many accessibility practices are also good usability practices
- Your organization may have its own requirements
- It may be the law
Web Accessibility Standards
Web Content Accessibility Guidelines (WCAG)

Developed by the World Wide Web Consortium (W3C)

Recommendations for making Web content more accessible

Establish technical standards for how web content and Assistive Technologies (AT) interact

Section 508 adopted the WCAG for web content beginning January 2018
WCAG 2.0 Principles and Guidelines

Perceivable
Information and user interface components must be presentable to users in ways they can perceive

Operable
User interface components and navigation must be operable
WCAG 2.0 Principles and Guidelines

Understandable
Information and the operation of user interface must be understandable

Robust
Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies
WCAG 2.0 Levels

A
Minimum standard for accessibility

AA
Most important level to target
Satisfies current laws

AAA
Most stringent level of accessibility
Not broadly used as it imposes significant design constraints
Creating Accessible Dashboards
Accessibility is a Design Choice
You Cannot Make Any Arbitrary Dashboard Accessible
Use Only Accessible Dashboard Elements

Workbook Tabs
Dashboard Titles
Views, specifically:
  Title
  View Data Window
  Captions (when visible)
List and Dropdown List Filters
Categorical Legends
Text Objects
Web Page Objects
Image Objects*
Button Objects*
Toolbar

* New in Tableau 2018.3
Publish Dashboard and Embed in Accessible Web Page

<script type='text/javascript' src='https://10az.online.tableau.com/javascripts/api/viz_v1.js'></script>

<div class='tableauPlaceholder' style='width: 1350px; height: 997px;'></div>
WCAG 2.0 Level AA Guidelines for Tableau Authors

Perceivable
  1.1 Text Alternatives
  1.3 Adaptable
  1.4 Distinguishable

Operable
  2.4 Navigable

Understandable
  3.3 Input Assistance
Guideline 1.1 Text Alternatives

1.1.1 Non-text Content
All non-text content that is presented to the user has a text alternative that serves the equivalent purposes

Best Practices
• Use View Data page to get underlying data in a crosstab
• Provide textual description of visualization content in captions. Even default Captions can be useful
• Add alt-text to any Image Objects (new in 2018.3 and available only in Web-editing currently)
• Add tooltip text to any Button Objects (new in 2018.3)
Guideline 1.1 Text Alternatives

Third-Party Options

• Use Tableau Magic DataTables Extension to display data in accessible table
• Use Natural Language Generation (NLG) Extensions to display textual narratives describing the data
**Guideline 1.1 Text Alternatives**

**TableauMagic DataTables Extension** by Toan Hoang renders underlying data for a visualization in an accessible table.

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-Category</th>
<th>Profit</th>
<th>Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furniture</td>
<td>Tables</td>
<td>$-17,725.48</td>
<td>$206,965.53</td>
</tr>
<tr>
<td>Furniture</td>
<td>Furnishings</td>
<td>$13,059.14</td>
<td>$91,705.16</td>
</tr>
<tr>
<td>Furniture</td>
<td>Chairs</td>
<td>$26,590.17</td>
<td>$328,449.10</td>
</tr>
<tr>
<td>Furniture</td>
<td>Bookcases</td>
<td>$-3,472.56</td>
<td>$114,880.00</td>
</tr>
<tr>
<td>Office Supplies</td>
<td>Supplies</td>
<td>$-1,189.10</td>
<td>$46,673.54</td>
</tr>
<tr>
<td>Office Supplies</td>
<td>Storage</td>
<td>$21,278.83</td>
<td>$223,843.61</td>
</tr>
<tr>
<td>Office Supplies</td>
<td>Paper</td>
<td>$34,053.57</td>
<td>$78,479.21</td>
</tr>
<tr>
<td>Office Supplies</td>
<td>Labels</td>
<td>$5,546.25</td>
<td>$12,486.31</td>
</tr>
<tr>
<td>Office Supplies</td>
<td>Fasteners</td>
<td>$949.52</td>
<td>$3,024.28</td>
</tr>
<tr>
<td>Office Supplies</td>
<td>Envelopes</td>
<td>$6,964.18</td>
<td>$16,476.40</td>
</tr>
</tbody>
</table>

Showing 1 to 10 of 17 entries
Guideline 1.1 Text Alternatives

Natural Language Generation (NLG) tools can produce data-driven textual narratives for visualizations.

Several NLG vendors have Tableau integrations.
Guideline 1.3 Adaptable

1.3.1 Information and Relationships

Information, structure, and relationships conveyed through presentation can be programmatically determined or are available in text.

1.3.3 Sensory Characteristics

Instructions provided for understanding and operating content do not rely solely on sensory characteristics of components such as shape, size, visual location, orientation, or sound.

Best Practices

- Provide text explaining how various components of a visualization relate.
- Keep instructions simple, clear, textual, and refer to controls by label.
Guideline 1.4 Distinguishable

1.4.1 Use of Color
Color is not used as the only visual means of conveying information, indicating an action, prompting a response, or distinguishing a visual element

Best Practices
• Use color blind color palette for marks
• Ensure that there are ways to distinguish marks other than color: Add shapes to line marks, use begin/end caps or labels
Guideline 1.4 Distinguishable

1.4.3 Contrast (Minimum)

The visual presentation of text and images of text has a contrast ratio of at least 4.5:1 (large text 3:1)

Best Practices

• Use contrast analyzer tools to choose text colors and backgrounds with sufficient contrast ratios

Accessibility

✓

X
Guideline 2.4 Navigable

2.4.3 Focus Order
If a Web page can be navigated sequentially and the navigation sequences affect meaning or operation, focusable components receive focus in an order that preserves meaning and operability.

2.4.6 Headings and Labels
Headings and labels describe topic or purpose.

Best Practices
- Set sensible focus order for dashboard zones
- Ensure that visualizations, filters, and legends have titles that are clear and self explanatory
Guideline 2.4 Navigable

Dashboard Focus Order
Default focus order is set by the order in which you place zones in a dashboard.

Setting Focus Order
Instructions for setting focus order by editing the Workbook XML are in the following Tableau Community Forums topic:

How can I set the focus order of the view and objects in a dashboard?
Guideline 3.3 Input Assistance

3.3.2 Labels or Instructions
Labels or instructions are provided when content requires user input

Best Practices
• Label interactive elements (filters, legends) in a way that describes their purpose.
• Provide instructions for using content in text zone on dashboard
• Add Image Object with link to Keyboard Navigation topic in Tableau Online Help
Case Study
1. Marks are distinguishable only by color
2. Contrast ratio for text is too low in some cases
3. Insufficient or missing descriptions, instructions, and captions
4. Keyboard focus order is confusing
SAT Performance of Admitted Students

% of students within SAT decide by college (click college name to highlight)

Select colleges:
- Administrative Group
- College of Business
- College of Arts and Sciences
- College of Engineering
- College of Communication
- College of Music
- College of Dentistry
- College of Public Affairs
- College of Visual Arts & Design
- Graduate School

Number of Students by Score and Gender

Select gender:
- Men
- Women

Select Academic Year:
- 2008
SAT Performance of Admitted Students

The SAT Performance of Admitted Students dashboard uses two graphs to show SAT score data for students admitted to a hypothetical university. The first is a line graph showing Percentage of Students by SAT Decile. Each line in the graph shows the data for a different Academic Division. The second is a histogram showing Number of Students by SAT Score.

Use the Select Academic Year, Select Gender, and Select Academic Division controls to filter the data in the two graphs.

When either the Percentage of Students by SAT Decile or Number of Students by SAT Score graph has key focus, press Ctrl+HSH+F11 or F10 to open the View Data window to view the underlying data for the graph in a table. Close the View Data window to return to the dashboard. If you filter the data after opening the View Data window, you must close and reopen the View Data to view the filtered data.

Use the Shape Legend for Percentage of Students by SAT Decile and Color Legend for Percentage of Students by SAT Decile to highlight data in the Percentage of Students by SAT Decile graph. Use the Shape Legend for Number of Students by SAT Score and Color Legend for Number of Students by SAT Score legend to highlight data in the Number of Students by SAT Score graph.

Percentage of Students by SAT Decile

Number of Students by SAT Score
1. Used text color that meets minimum contrast guideline

The SAT Performance of Admitted Students dashboard uses two graphs to show SAT score data for students admitted to a hypothetical university. The first is a line graph showing Percentage of Students by SAT Decile. Each line in the graph shows the data for a different Academic Division. The second is a histogram showing Number of Students by SAT Score. Use the Select Academic Year, Select Gender, and Select Academic Division controls to filter the data in these two graphs.

When selecting the Percentage of Students by SAT Decile or Number of Students by SAT Score graph has key focus, press Ctrl+Shift+F to open the View Data window to view the underlying data for the graph in a table. Close the View Data window to return to the dashboard. If you filter the data after opening the View Data window, you must close and reopen the View Data to view the filtered data.

Use the Shape Legend for Percentage of Students by SAT Decile and Color Legend for Percentage of Students by SAT Decile to highlight data in the Percentage of Students by SAT Decile graph. Use the Shape Legend for Number of Students by SAT Score and Color Legend for Number of Students by SAT Score to highlight data in the Number of Students by SAT Score graph.
2. Set alt-text for Image Object

- **Percentage of Students by SAT Decile**
  - A graph showing the percentage of students by SAT Decile. Each line in the graph represents a different academic division.

- **Number of Students by SAT Score**
  - A histogram showing the number of students by SAT score. The x-axis represents SAT score, and the y-axis represents the number of students. The color legend indicates the gender of the students.
3. Added Image Object with link to keyboard navigation help and alt-text

- Percentage of Students by SAT Decile
- Number of Students by SAT Score
4. Added descriptive text and instructions for dashboard
5. Added descriptive captions for charts

Percentage of Students by SAT Decile

500 600 700 800 900 1000
Number of Students by SAT Score

Shape Legend for Percentage of Students by SAT Decile
- Arts and Sciences
- Business
- Communication
- Dentistry
- Education
- Engineering
- Business School
- Grad School
- Arts

Color Legend for Percentage of Students by SAT Decile
- Blue squares: female students
- Orange circles: male students

Shape Legend for Number of Students by SAT Score
- Female
- Male

Color Legend for Number of Students by SAT Score
- Blue squares: female students
- Orange circles: male students

Reference line displays the average SAT Score.
6. Added tooltip text to Button Objects

Percentage of Students by SAT Decile

Number of Students by SAT Score
7. Used accessible filters

Percentage of Students by SAT Decile

Number of Students by SAT Score

Shape Legend for Percentage of Students by SAT Decile
- Arts and Sciences
- Business
- Communication
- Dentistry
- Education
- Engineering
- Graduate School
- Music
- Public Affairs
- Visual Arts & Design

Color Legend for Percentage of Students by SAT Decile
- Arts and Sciences
- Business
- Communication
- Dentistry
- Education
- Engineering
- Graduate School
- Music
- Public Affairs
- Visual Arts & Design

Shape Legend for Number of Students by SAT Score
- Female
- Male

Color Legend for Number of Students by SAT Score
- Female
- Male
8. Titles for filters indicate function. Instructions refer to filters by name.
9. Titles for legends reference associated charts
10. Used shape marks encoded with color
11. Used Color Blind color palette for all marks
SAT Performance of Admitted Students

The SAT Performance of Admitted Students dashboard uses two graphs to show SAT score data for students admitted to a hypothetical university. The first is a line graph showing Percentage of Students by SAT Decile. Each line in the graph shows the data for a different Academic Division. The second is a histogram showing Number of Students by SAT Score.

Use the Select Academic Year, Select Gender, and Select Academic Division controls to filter the data in these two graphs.

When either the Percentage of Students by SAT Decile or Number of Students by SAT Score graph has key focus, press Ctrl+H to open the View Data window to view the underlying data for the graph in a table. Close the View Data window to return to the dashboard. If you filter the data after opening the View Data window, you must close and re-open the View Data to view the filtered data.

Use the Shape Legend for Percentage of Students by SAT Decile and Color Legend for Percentage of Students by SAT Decile to highlight data in the Percentage of Students by SAT Decile graph. Use the Shape Legend for Number of Students by SAT Score and Color Legend for Number of Students by SAT Score in the Number of Students by SAT Score graph to highlight data in the Number of Students by SAT Score graph.

12. Simplified text to remove redundancies

Percentage of Students by SAT Decile is a line graph showing percentage of students within each SAT Decile. SAT Decile is on the x-axis, Percentage of Students is on the y-axis. Each line shows the data for a different academic division.

Number of Students by SAT Score is a histogram showing number of students by SAT score. SAT Score is on the x-axis, Number of Students is on the y-axis. Blue squares represent female students, Orange circles represent male students. The reference line displays the average SAT Score.
13. Set focus order for dashboard zones

SAT Performance of Admitted Students

The SAT Performance of Admitted Students dashboard uses two graphs to show SAT score data for students admitted to a hypothetical university. The first is a line graph showing Percentage of Students by SAT Decile. Each line in the graph shows the data for a different academic division. The second is a histogram showing Number of Students by SAT Score.

Use the Select Academic Year, Select Gender, and Select Academic Division controls to filter the data in the two graphs.

When either the Percentage of Students by SAT Decile or Number of Students by SAT Score graph has key focus, press Ctrl+M to open the View Data window to view the underlying data for the graph in a table. Close the View Data window to return to the dashboard. If you filter the data after opening the View Data window, you must close and reopen the View Data window to view the filtered data.

Use the Shape Legend for Percentage of Students by SAT Decile and Color Legend for Percentage of Students by SAT Decile to highlight data in the Percentage of Students by SAT Decile graph. Use the Shape Legend for Number of Students by SAT Score and Color Legend for Number of Students by SAT Score to highlight data in the Number of Students by SAT Score graph.

Select Academic Year
- 2016
- 2017
- 2018

Select Gender
- All
- Female
- Male

Select Academic Division
- Arts and Sciences
- Business
- Communication
- Dentistry
- Education
- Engineering
- Graduate School
- Music
- Public Affairs
- Visual Arts & Design

Shape Legend for Percentage of Students by SAT Decile
- Arts and Sciences
- Business
- Communication
- Dentistry
- Education
- Engineering
- Graduate School
- Music
- Public Affairs
- Visual Arts & Design

Color Legend for Percentage of Students by SAT Decile
- Arts and Sciences
- Business
- Communication
- Dentistry
- Education
- Engineering
- Graduate School
- Music
- Public Affairs
- Visual Arts & Design

Shape Legend for Number of Students by SAT Score
- Female
- Male

Color Legend for Number of Students by SAT Score
- Female
- Male

Percentage of Students by SAT Decile
A line graph showing percentage of students within each SAT decile. SAT Decile is on the x-axis. Percentage of Students is on the y-axis. Each line shows the data for a different academic division.

Number of Students by SAT Score
A histogram showing number of students by SAT score. SAT Score is on the x-axis. Number of Students is on the y-axis. Blue squares represent female students, orange circles represent male students. The reference line displays the average SAT Score.
SAT Performance of Admitted Students

The SAT Performance of Admitted Students dashboard uses two graphs to show SAT score data for students admitted to a hypothetical university. The first is a line graph showing Percentage of Students by SAT Decile. Each line in the graph shows the data for a different Academic Division. The second is a histogram showing Number of Students by SAT Score.

Use the Select Academic Year, Select Gender, and Select Academic Division controls to filter the data in the two graphs.

When either the Percentage of Students by SAT Decile or Number of Students by SAT Score graph has key focus, press Ctrl+H or F5 to open the View Data window to view the underlying data for the graph in a table. Close the View Data window to return to the dashboard. If you filter the data after opening the View Data window, you must close and reopen the View Data to view the filtered data.

Use the Shape Legend for Percentage of Students by SAT Decile and Color Legend for Percentage of Students by SAT Decile to highlight data in the Percentage of Students by SAT Decile graph. Use the Shape Legend for Number of Students by SAT Score and Color Legend for Number of Students by SAT Score legend to highlight data in the Number of Students by SAT Score graph.

Percentage of Students by SAT Decile

Number of Students by SAT Score
Demos
Resources

You can find all of the Tableau resources related to accessibility in the Accessibility FAQ on the Tableau Community Forums
Summary

Accessibility Basics
Web Accessibility Standards
Creating Accessible Dashboards
Case Study
Demo
Create and Publish Accessible Dashboards in Tableau
Tuesday | 10:45am - 11:45am | MCCNO - L3 - 386

Create and Publish Accessible Dashboards in Tableau
Wednesday | 12:00pm - 1:00pm | MCCNO - L2 - 214
Explore a Whole New World with Dashboard Extensions
Tuesday | 2:15pm - 4:45pm | MCCNO - L3 - 356

Explore a Whole New World with Dashboard Extensions
Wednesday | 1:45pm - 4:15pm | MCCNO - L2 - 229
Authoring Navigation and External Resources in Dashboards
Tuesday | 3:45pm - 4:15pm | MCCNO - L1 - Data Village - Story Points Theater 4
Please complete the session survey from the My Evaluations menu in your TC18 app.
Thank you!

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