The Question is Moot!

Accessibility and Dataviz is not an Either / Or

Drupal GovCon | September 23, 2020

FORUM ONE™

“Regarding accessibility, how do you determine situations in which a data visualization is not feasible?”

— Client Question

Today's Agenda

- Definitions of Visualization & Accessibility
- Barriers to Accessibility in Data Visualization
- Considerations: How to Overcome Barriers
- The Future
- Questions

HELLO!

Tim Shaw

Director of User Experience &
Punster Extraordinaire

HELLO!

Kim Locraft

Design Director & Punster in Training

About Forum One

We've been at this for almost 25 years.

We've partnered with more than 1,000 organizations and government agencies.

We've helped them better reach their mission on over 2,000 projects.

We are experts in digital strategy, creative, technology, data, and user experience.

We did Drupal before it was cool.

We create experiences that make an impact.

Definitions

Data Visualization & Accessibility

QUESTION

What is a data visualization?

Data visualization is the graphic representation of data with a special focus on showing the relationships between data elements.

Source: Wikipedia

QUESTION

What is accessibility?

The practice of making your digital products usable by as many people as possible, including:

- People with disabilities (cognitive, neurological, physical, speech, visual)
- People with different preferences or situational needs

Adapted from Mozilla

Barriers

To Accessibility Of Data Visualizations

“Regarding accessibility, how do you determine situations in which a data visualization is not feasible?”

— Client Question


Why might this be?

Potential Barrier

The word itself

- “Visualization” says a lot.
- *Visualis* (Latin): "of sight"

12 million

People in the US over 40 have a **vision impairment**

1 million

People in the US over 40 are **blind**

Source: CDC

Potential Barrier

Static images of graphics

Beautiful & attention grabbing way to quickly communicate information.

If you can see it, that is.

Potential Barrier

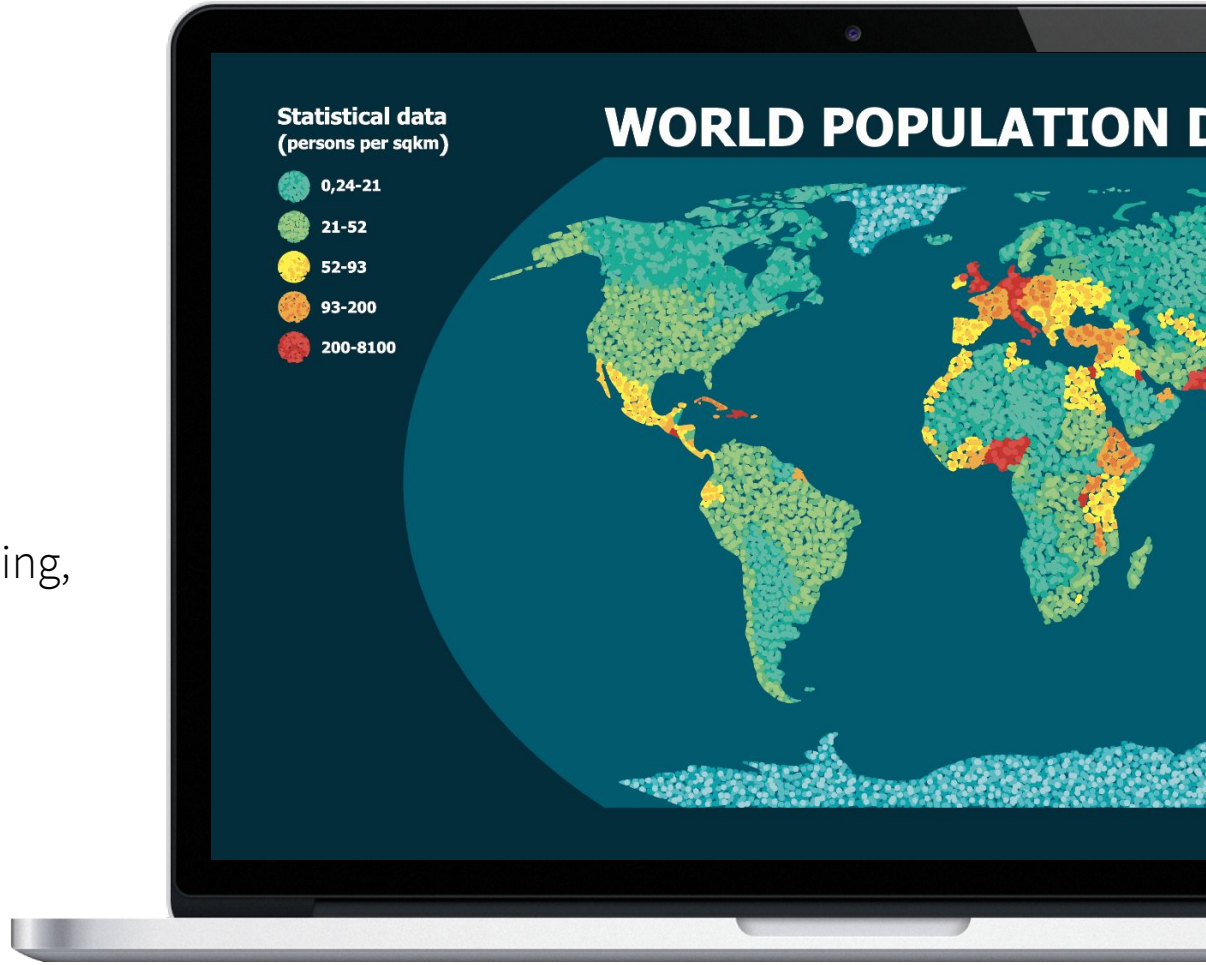
Interactive code

Highly engaging and able to tell more complex stories or facilitate deeper exploration, but requires additional considerations.

Potential Barrier

How color is incorporated

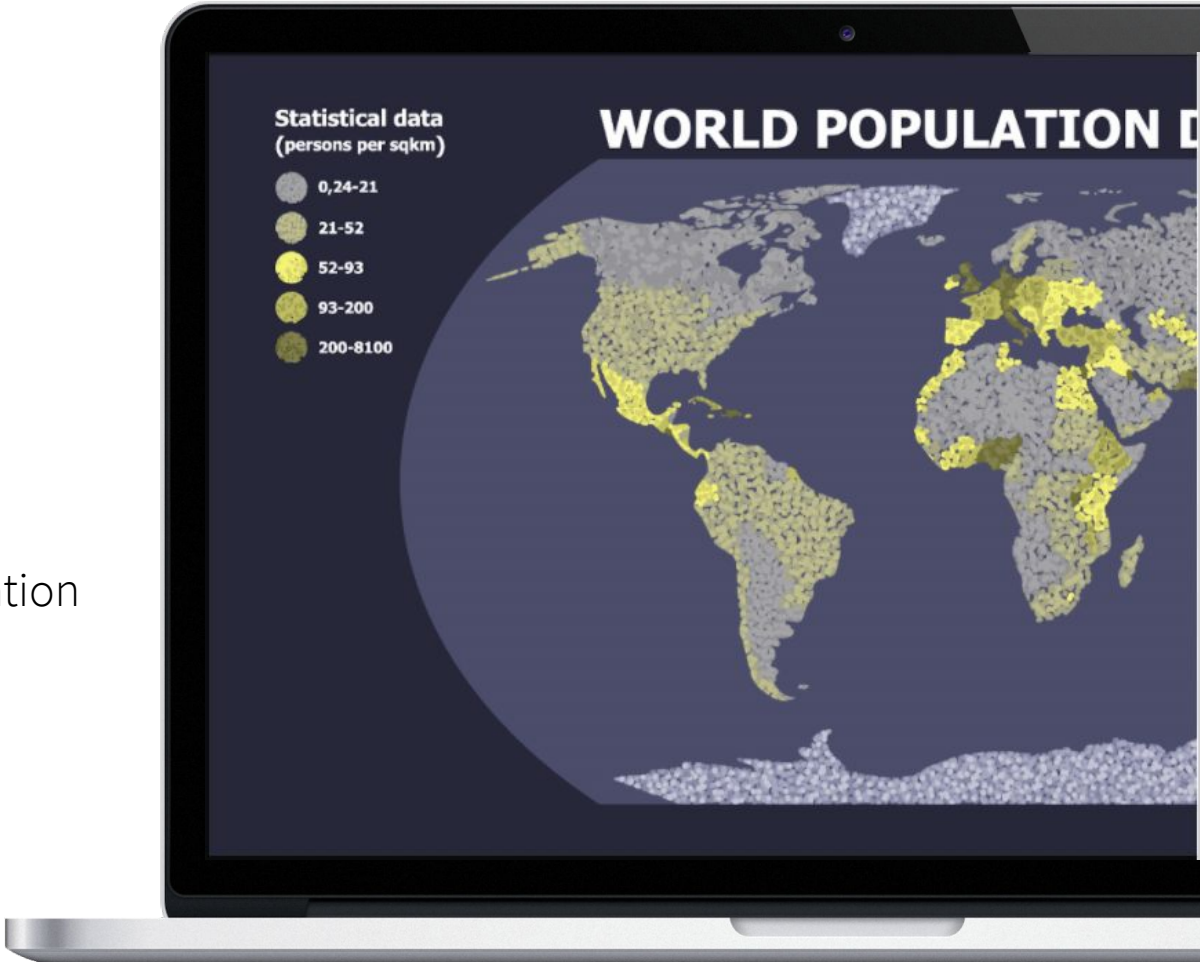
Color is an important tool to communicate emotion, meaning, and improve recall.



Potential Barrier

People perceive color differently.

Which could result in missed information or a misinterpretation of data.



Potential Barrier

Animation & motion

Animation helps tell a data story and can improve learning. But if you're not careful, motion can make people sick.

Potential Barrier

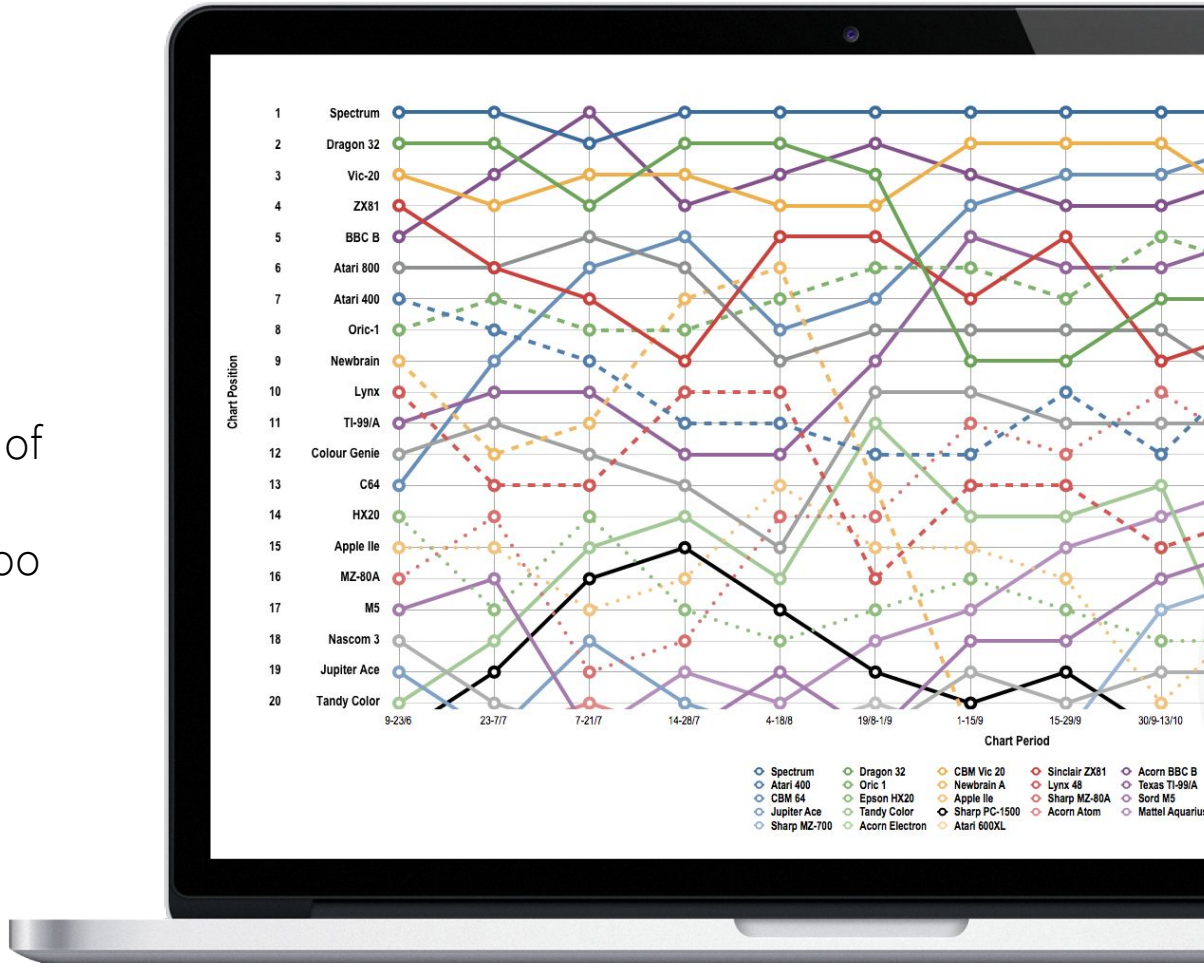
Animation & motion

Animation helps tell a data story and can improve learning. But if you’re not careful, motion can make people sick.

Potential Barrier

Complex visuals

Complex visuals provide tons of information. But they risk making your audience work too hard to find the point.



Source: junkcharts

Considerations

How to Overcome Barriers

CONSIDERATION

Consider accessibility from the beginning.

“Tacked on at the end” means a bad experience for all.

The more inclusive the process, the more accessible the outcome.

CONSIDERATION

Keep it simple

Less is more. Show what matters most. Focus your efforts.

CONSIDERATIONS

Make the Data Itself Available

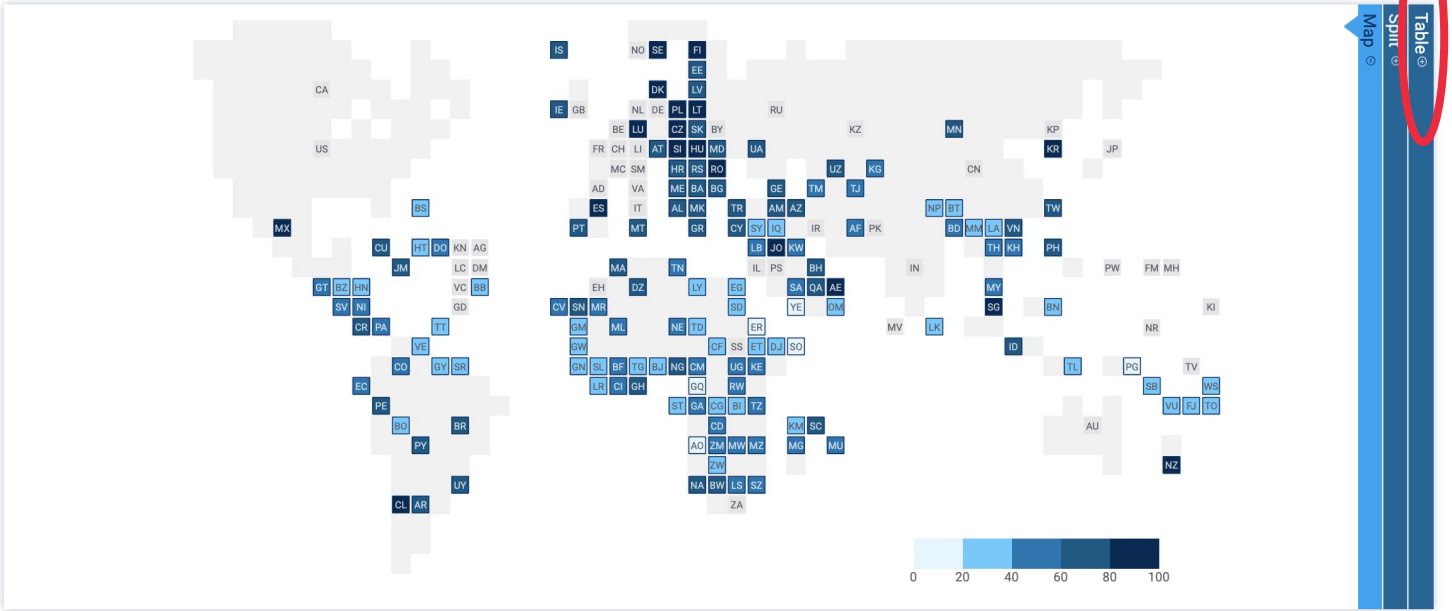
View results by goal: **Secure Materials** | **Support Global Efforts** | **Protect Facilities** | **Prevent Dirty Bomb**

View results for categories and indicators in Support Global Efforts

OVERALL SCORE

Index year

2020



View results by goal: **Secure Materials** | **Support Global Efforts** | **Protect Facilities** | **Prevent Dirty Bomb**

View results for categories and indicators in Support Global Efforts: OVERALL SCORE

Index year: 2020

Map | Split | Table

2020 Rank	Country	Score	Change from: 2018	Change from: 2012	
1 (tied)	 New Zealand	98	0	0	More
1 (tied)	 Sweden	98	1	1	More
3	 Finland	95	-2	-2	More
4 (tied)	 Denmark	92	3	3	More
4 (tied)	 South Korea	92	1	1	More
6 (tied)	 Hungary	90	-1	-1	More

“I prefer the visualness of the graph… the table is very easy to read and pull the information out from… I find graphs to be a lot more… useful in terms of… getting a first look at it and getting a sense of what’s going on.”

— Middle school math teacher

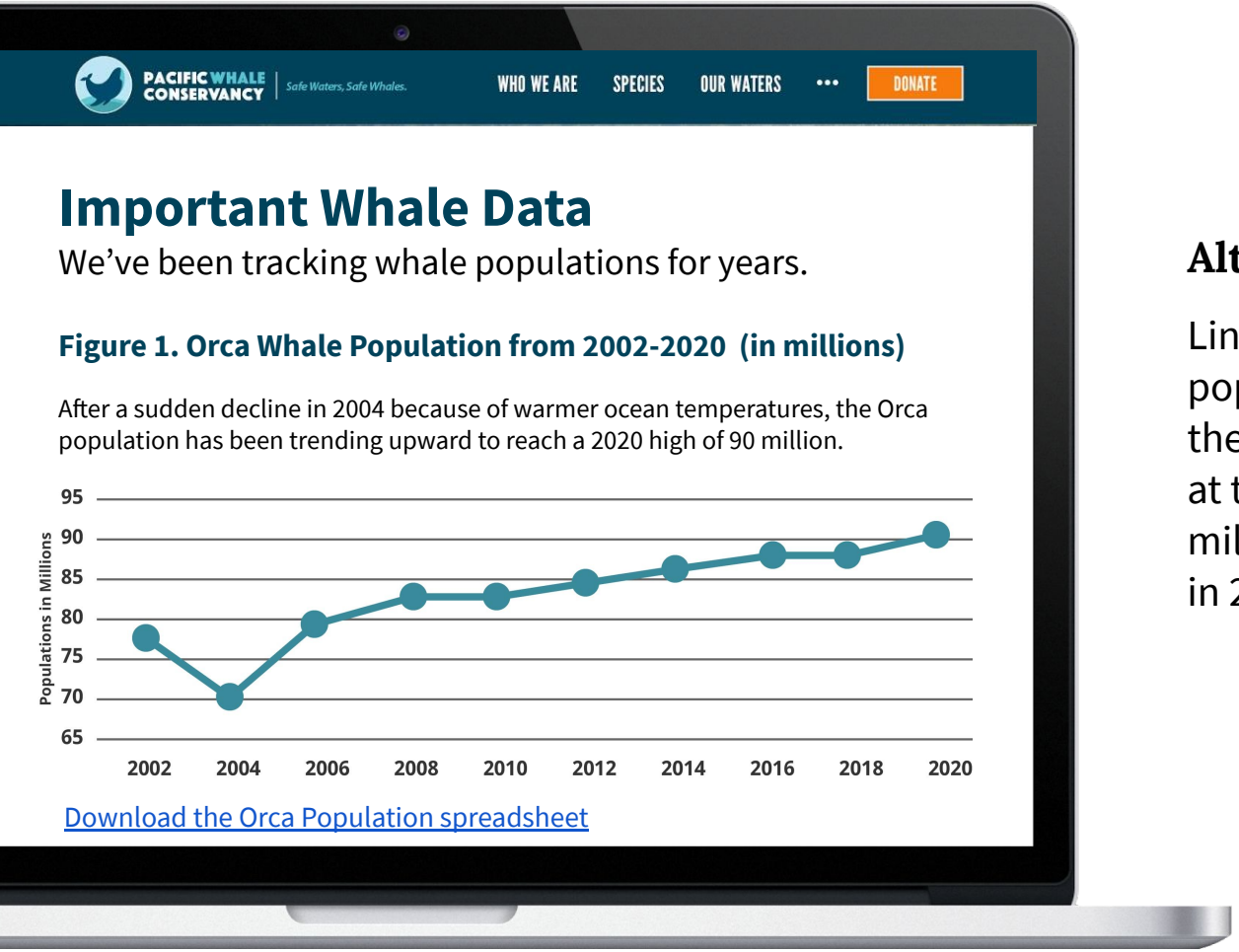
“It depends on what information I am looking for. I am partial to a table - I think that just organizes information in a way that ***I*** can synthesize it... but I feel like you get more information out of the graph.”

— Middle school principal

CONSIDERATIONS

Contextualize and humanize the data

Tell the story. Mix text with visuals. Provide thoughtful explanations.



Alt Text

Line graph tracking Orca populations from the year 2002 to the year 2020. Populations were at their lowest in 2004 with 70 million Orcas. And at their highest in 2020 with 90 million Orcas.

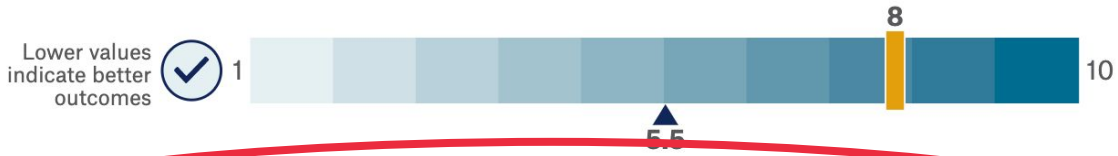
City Health DASHBOARD

Little Rock, AR : COVID Local Risk Index in 2

City Overview | Metric Detail | Demographic Detail | Compare Cities | Compare Metrics | T

Select minimum and maximum values for data display: ? ○ Dashboard-City min/max ● Little R

City Value for COVID Local Risk Index in Little Rock, AR



City or census tract val

Present when value is b than Dashboard-City Average

Little Rock had an overall COVID Local Risk Index rank of **8**, compared to an average of **5.5** across 500 Dashboard cities.

Ma

Recent usability test

7 of the 14 participants - half - used the text, as opposed to the graph, to find meaning at some point.

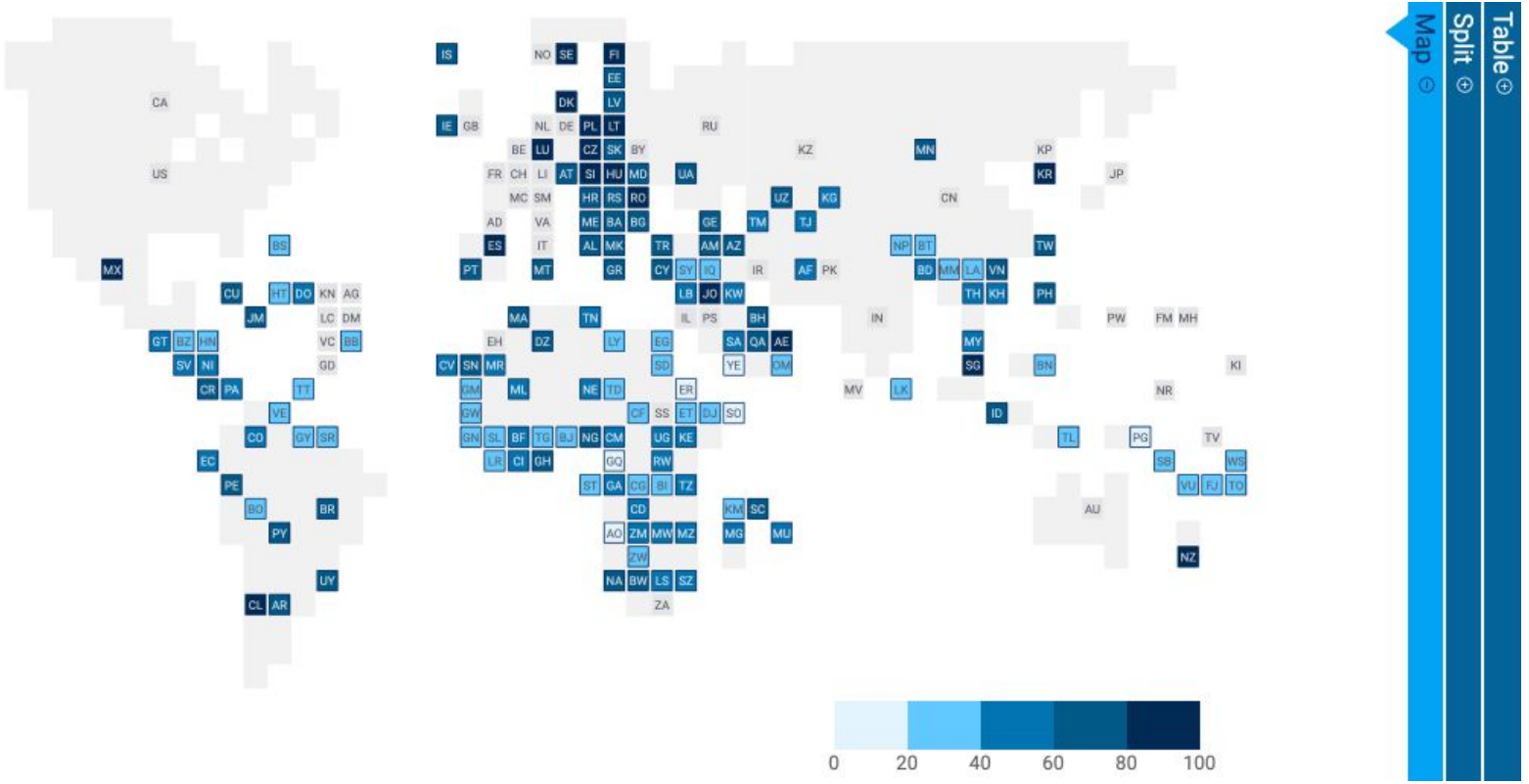
CONSIDERATIONS

Design & UX

Accessibility is about good user experience.
No matter how you experience information.

Quick Tips for Designers

- **Color:** Use color as a strategic tool. But be sure to consider color contrast and don't use color alone to indicate meaning.
- **Hierarchy:** Guide audiences through the design in a meaningful way.
- **Target areas:** Design larger target areas so items are easier to select.
- **Labels:** Use labels and legends so people don't have to guess at meaning .
- **Consistency:** Maintaining consistency in your design and layout improves learning and ability to navigate date.



Table
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60
80
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Table of Contents

		2018 Score	2018 Compared to 2014	2018 Compared to 1994[1]
Overall average score		263	4 pts ↓	4 pts ↑
U.S. history themes	Democracy	265	4 pts ↓	9 pts ↑
	Culture	263	6 pts ↓	◆
	Technology	256	4 pts ↓	2 pts ↓
	World Role	266	4 pts ↓	8 pts ↑

↑ Score increase in 2018 ↓ Score decrease in 2018 ◆ No significant change in 2018

[1] Accommodations not permitted.

SELECT A STUDENT GROUP

Hispanic

SELECT A STUDENT GROUP TYPE

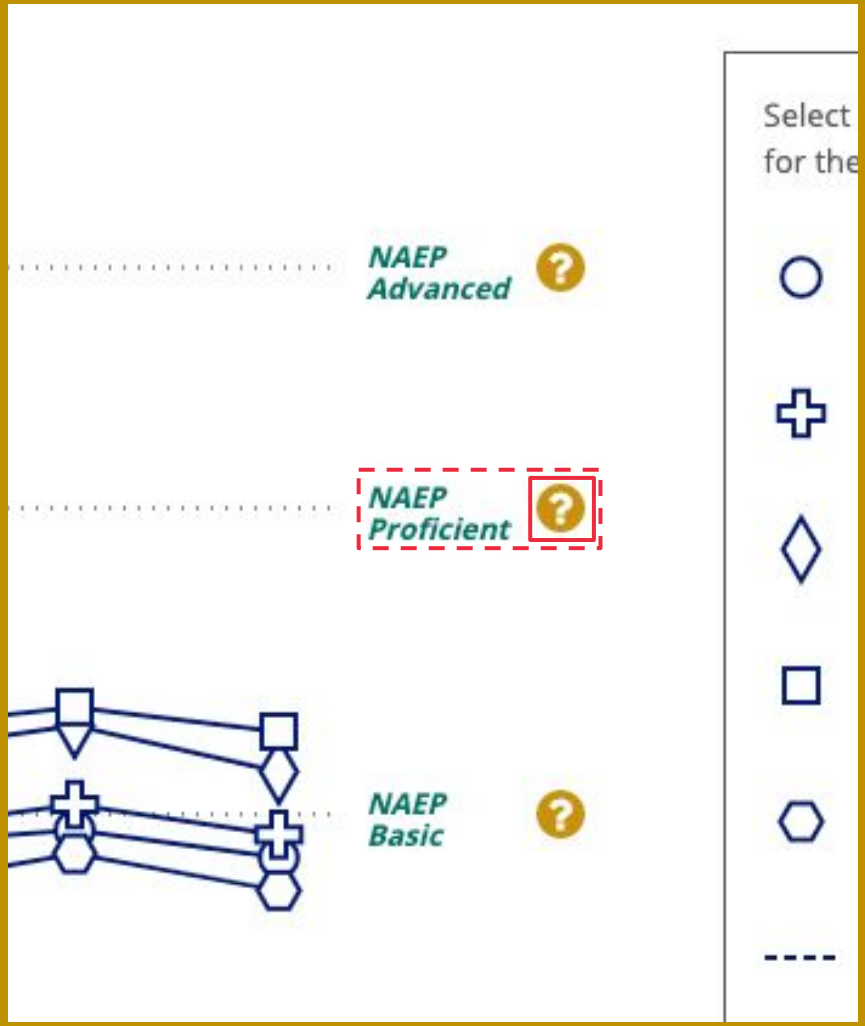
Parental education level

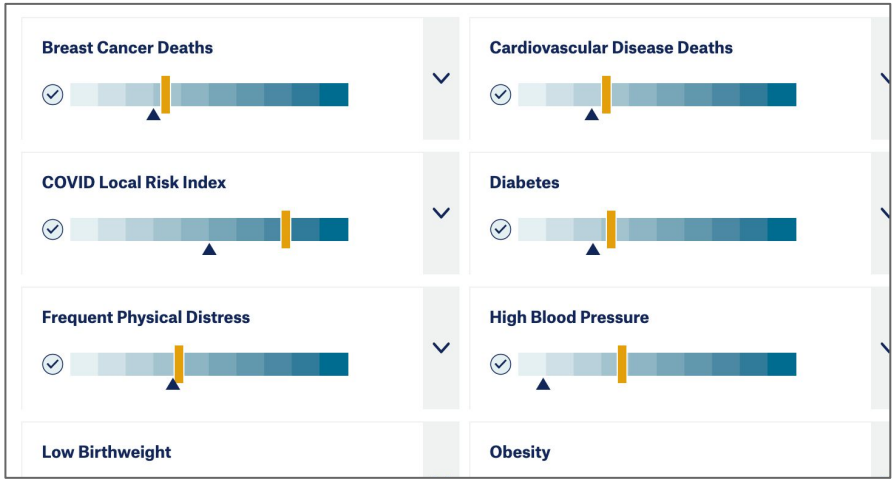
FIGURE | Trend in eighth-grade NAEP U.S. history average scores for Hispanic students, by highest level of parental education

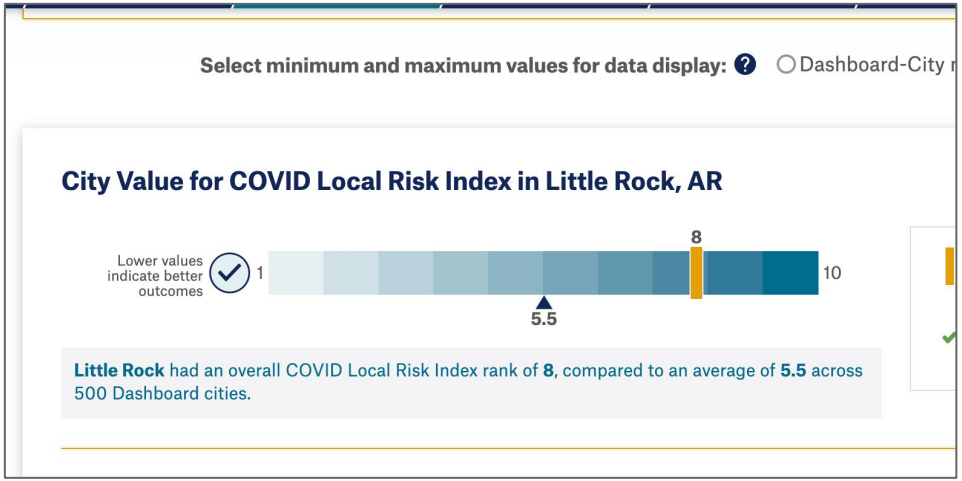
DISPLAY AS **GRAPH** | TABLE

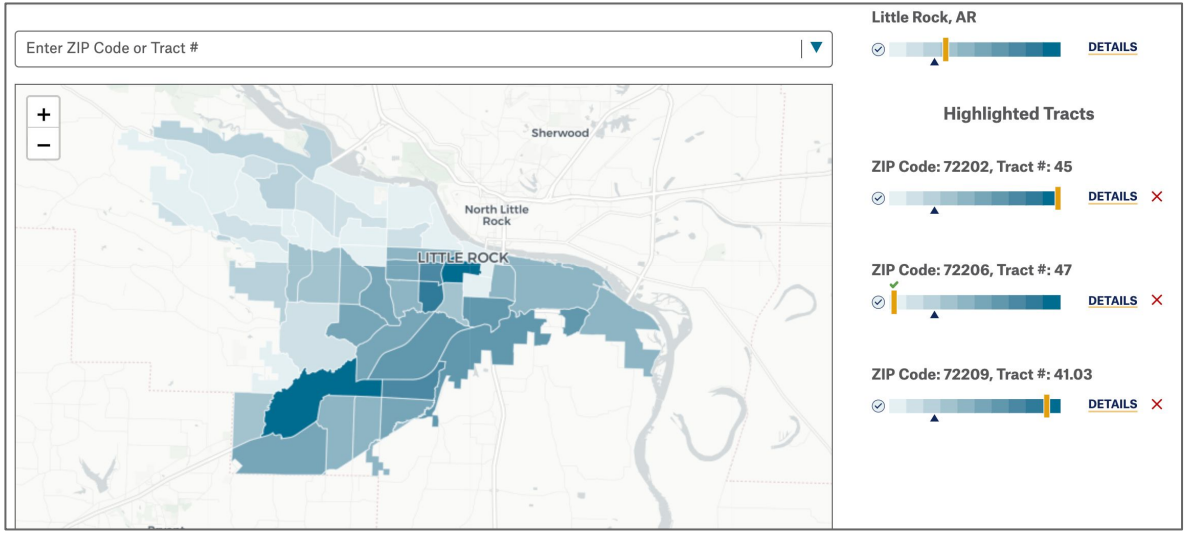
Select a shape to see details for the data series.

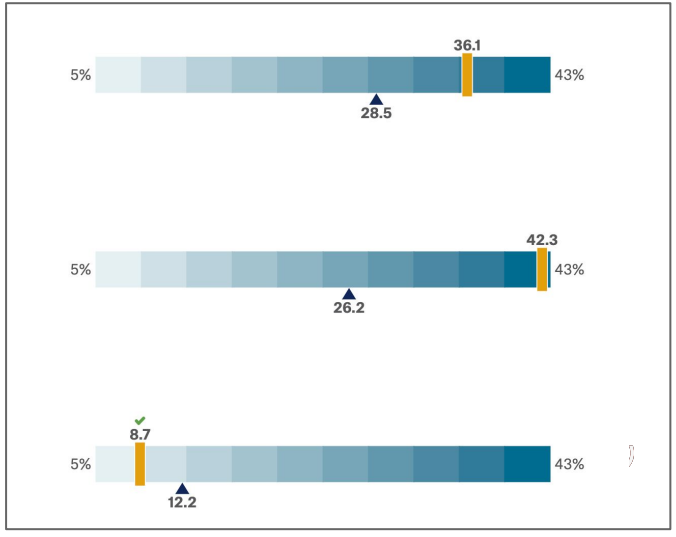
- Did not finish high school
- Graduated from high school
- Some education after high school
- Graduated from college
- Unknown
- Accommodations not permitted
- Accommodations permitted
- * Significantly different ($p < .05$) from 2018.


NAEP Advanced
NAEP Proficient
NAEP Basic
Select
for the


Breast Cancer Deaths
Cardiovascular Disease Deaths
COVID Local Risk Index
Diabetes
Frequent Physical Distress
High Blood Pressure
Low Birthweight
Obesity


Select minimum and maximum values for data display:
Dashboard-City
City Value for COVID Local Risk Index in Little Rock, AR
Lower values indicate better outcomes
1
8
10
5.5
Little Rock had an overall COVID Local Risk Index rank of 8, compared to an average of 5.5 across 500 Dashboard cities.

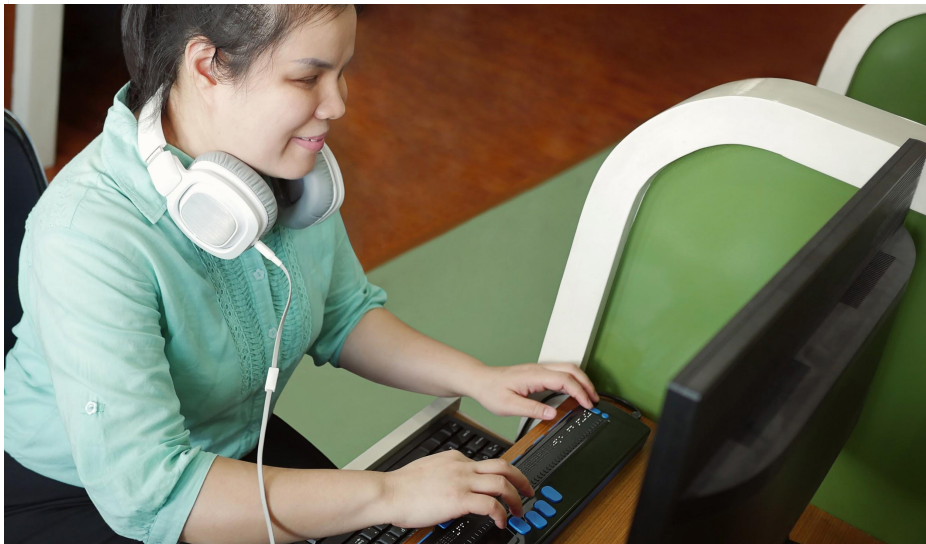

Enter ZIP Code or Tract #
Sherwood
North Little Rock
LITTLE ROCK
Little Rock, AR
DETAILS
Highlighted Tracts
ZIP Code: 72202, Tract #: 45
DETAILS
ZIP Code: 72206, Tract #: 47
DETAILS
ZIP Code: 72209, Tract #: 41.03
DETAILS


5%
36.1
43%
28.5
5%
42.3
43%
26.2
5%
8.7
43%
12.2

CONSIDERATIONS

Development: Build for inclusion

Inclusion inspires innovation



Christopher Hills. Check out his videos on youtube.

Quick Tips for Developers

- Always start with semantic markup (html). Use ARIA to further define interactions and labelling when markup falls short. (www.w3.org)
- Use libraries and tools that have accessibility considerations built-in, like Highcharts or SaS.
- Use SVGs. Add markup directly within the image itself.
- Ensure intuitive keyboard focus & no keyboard traps.
- Plan for reduce motion or stop animation.
- Include people with disabilities in the testing & solution process.

The Future

How Else Can We “Show” Our Data?

Emerging Capability

Data sonification

Can we tell the story in a data set using different volumes / pitches / styles of sound?

Data sonification lets you literally hear income inequality

The more inclusive the process, the more accessible the outcome.

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Kim Locraft

Design Director

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Resources mentioned during the Q&A

- WebAIM's color contrast checker
- Color Oracle Plugin
- Design for Accessibility posters
- Inclusive Design Principles
- Washington Post article on sonogram imaging
- Sonification: The Music of Data
- Demo by Doug Shepers: A demonstration of an experimental screenreader, which allows blind users to explore charts and other data visualizations. (This gives you a sense of what is possible).

Thank you!