HOW TO BUILD INCLUSIVE DATA EXPERIENCES

(Advice and reflection for open-source communities)

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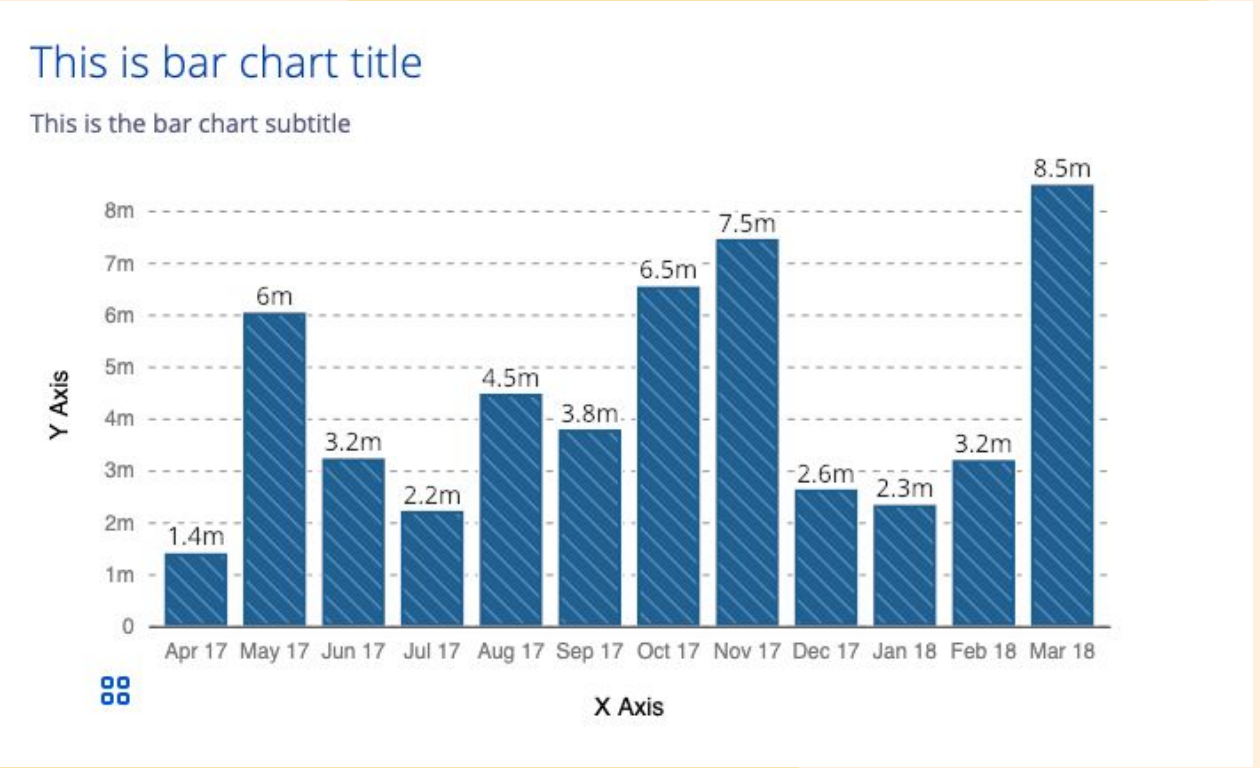
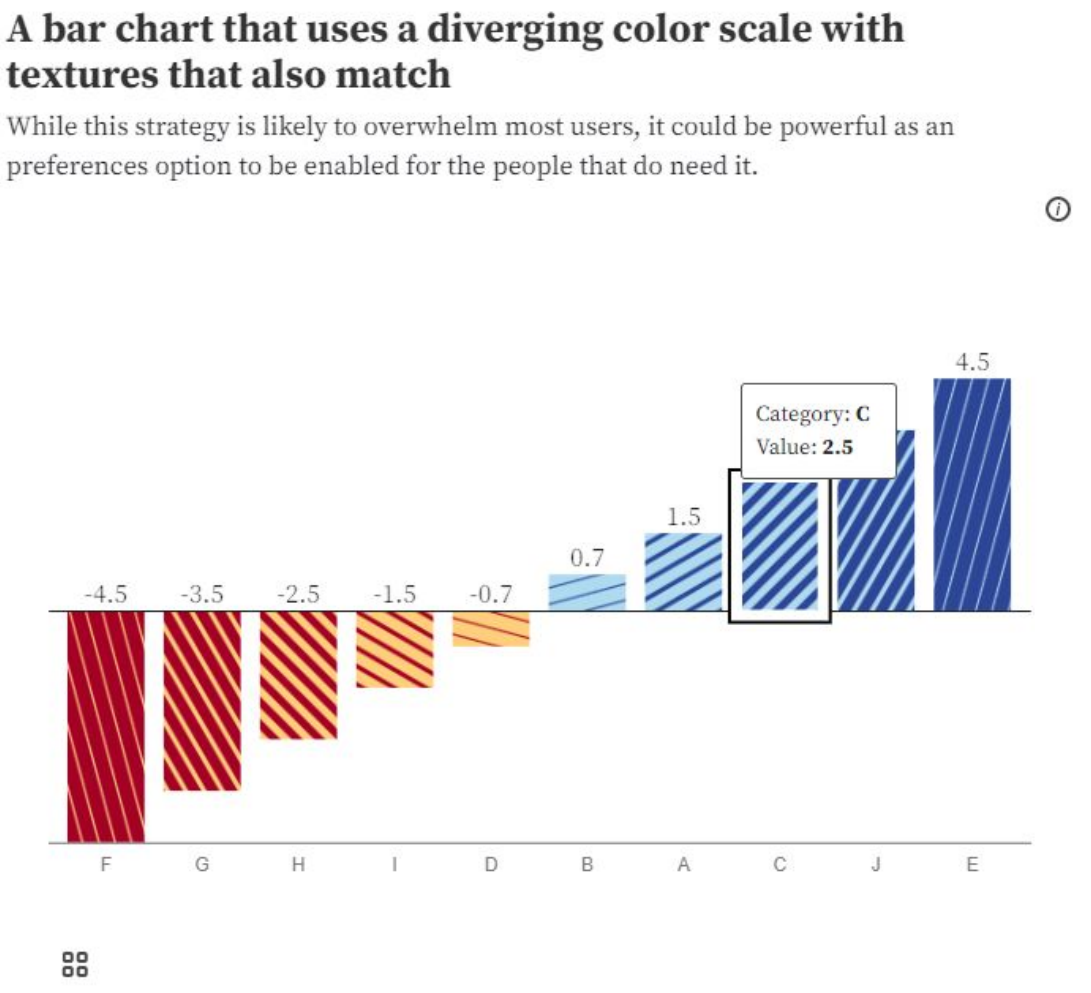
WHAT DO I DO?

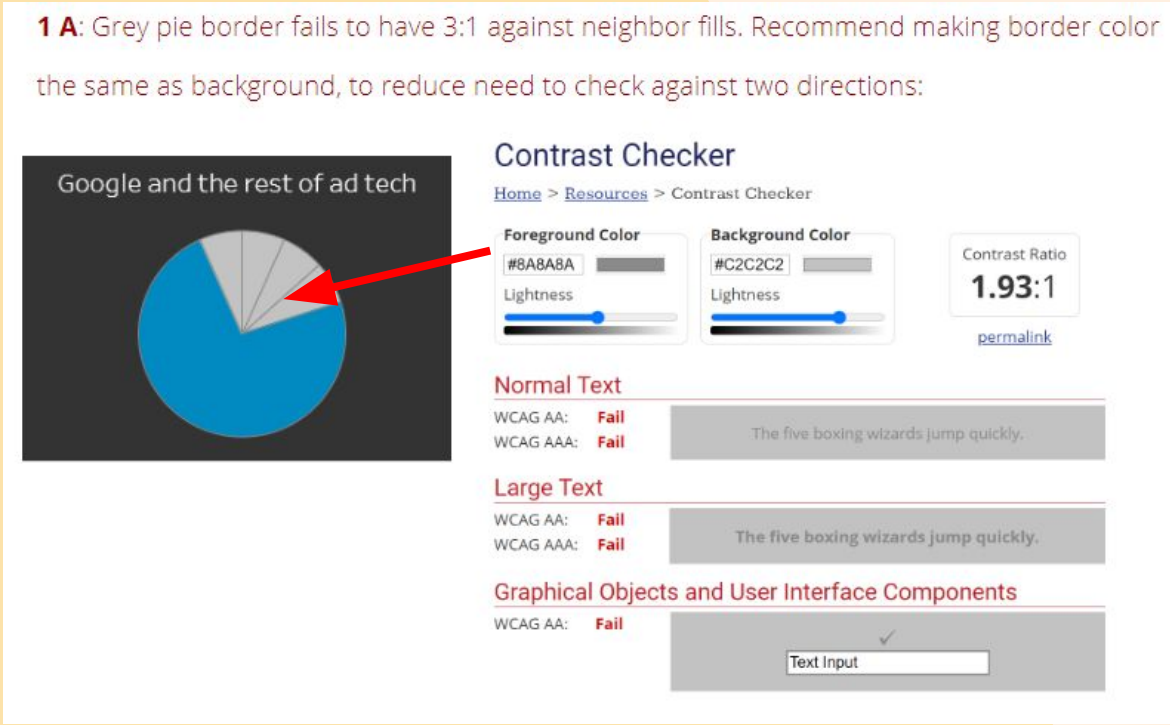
- I am researching data interaction and accessibility at Carnegie Mellon.
- I organize DataVizA11y and do industry consultations in partnership with Fizz Studio.
- I was previously a Staff Data Experience Engineer on Visa's DX Team.
- I authored Chartability, a community-driven effort to establish heuristics for evaluating the accessibility of data experiences.



www.github.com/visa/visa-chart-components

MY PASSION: ACCESSIBLE DATA EXPERIENCES





BEFORE WE BEGIN.

If you post screenshots of this talk or slides around on Twitter or wherever (and please do), remember:

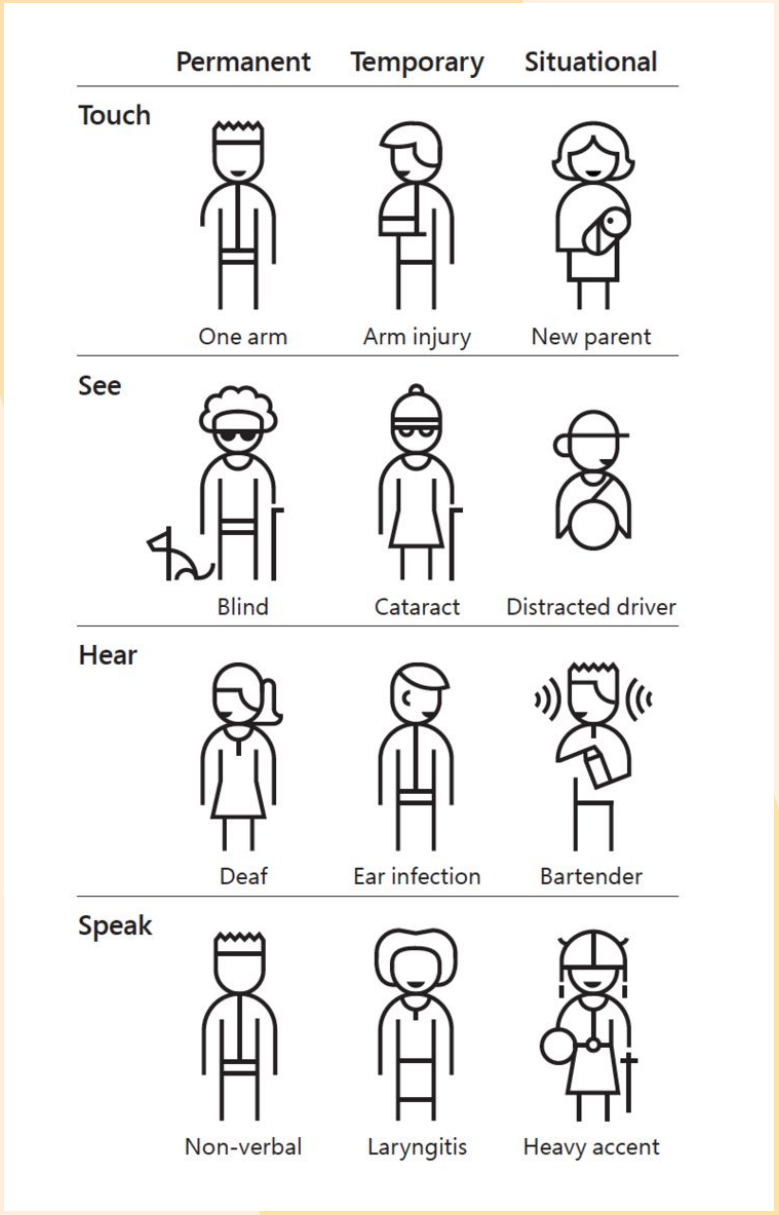
Add alt text to your post!

WHAT IS ACCESSIBILITY (A11Y)?

1. The qualities that make an experience open or usable to all.
2. The knowledge and skills to break down barriers specifically for people with disabilities.

ACCESSIBILITY IS MULTI-DIMENSIONAL

Some disabilities are permanent. Others are temporary or situational.



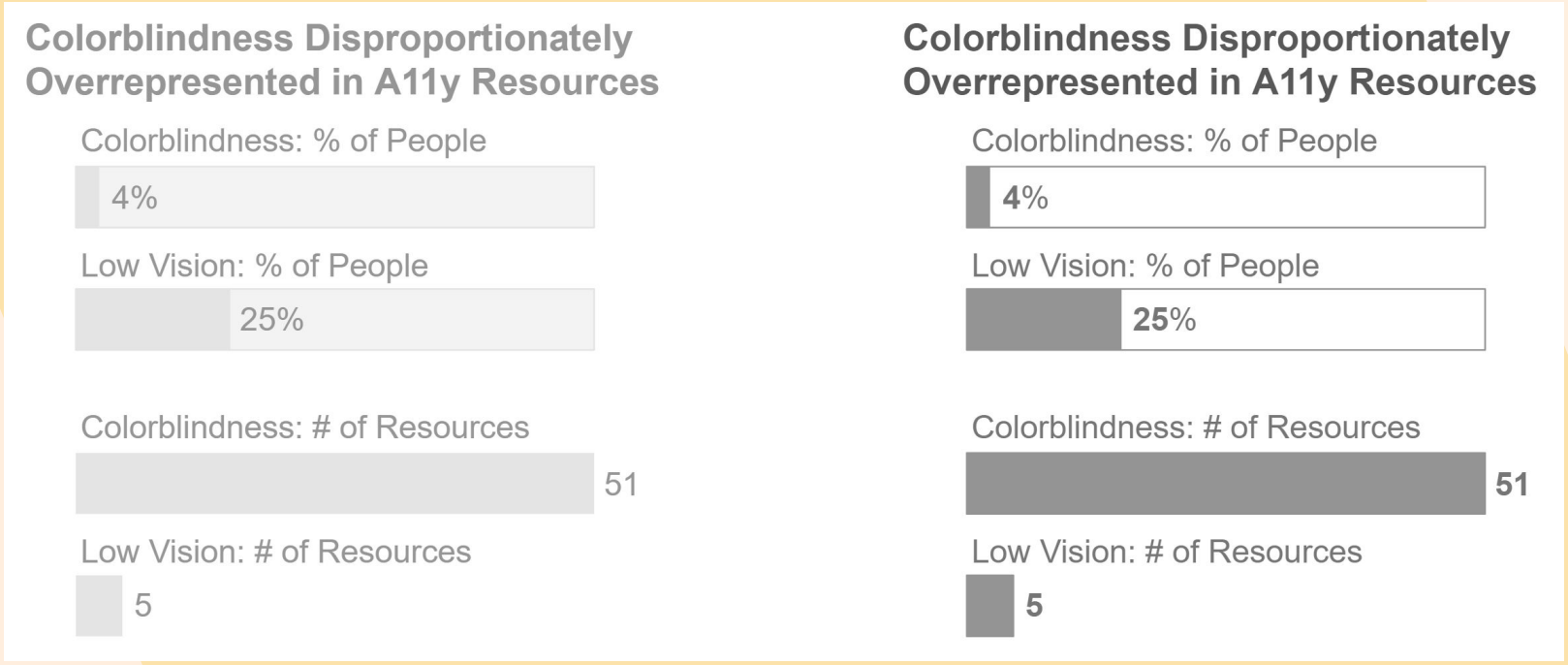
Source: https://www.microsoft.com/design

We have all already experienced a disabling limitation at some point in our lives – even if just temporarily or situationally.

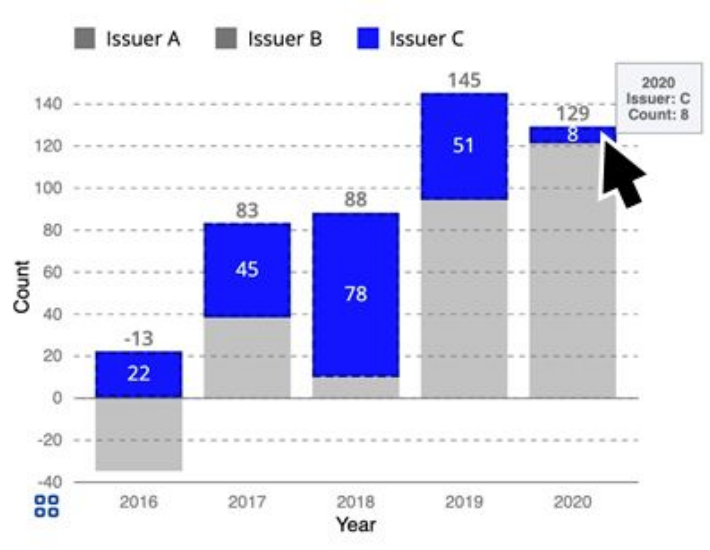
Accessibility is personal for all of us.

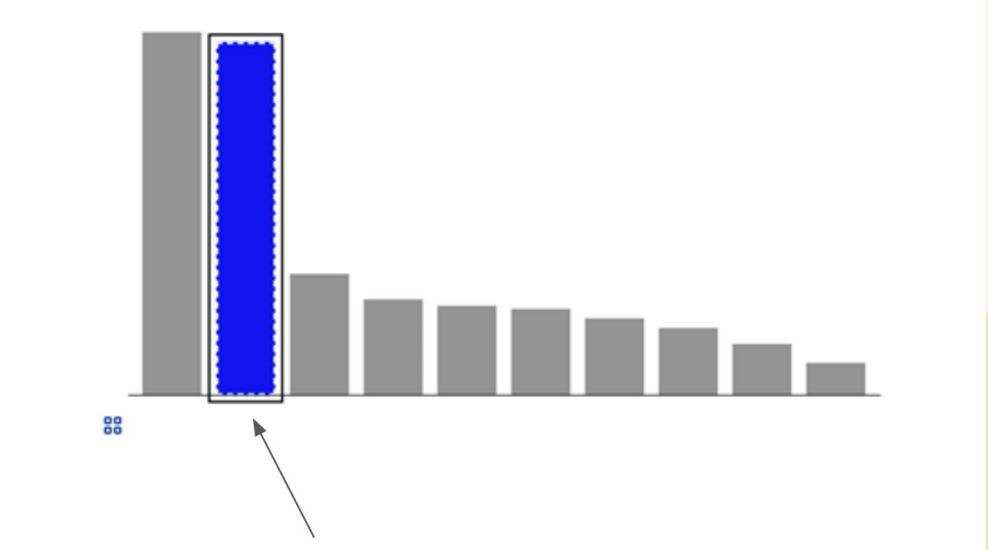
And in tension:
The specific barriers that people who live with disabilities face cannot be substituted by our experiences.

Uncorrected or uncorrectable moderate-severe visual impairment (“low vision”) affects ~**28% of people globally**

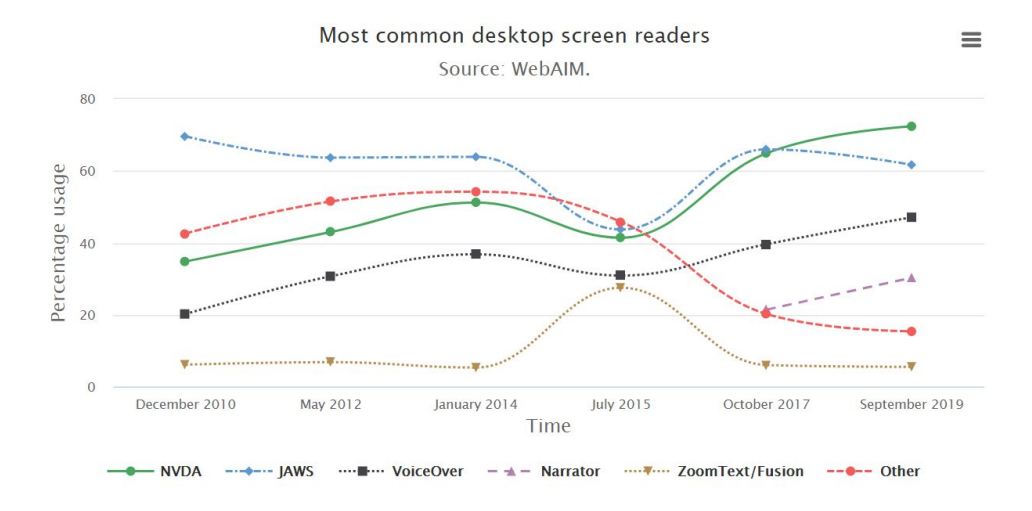


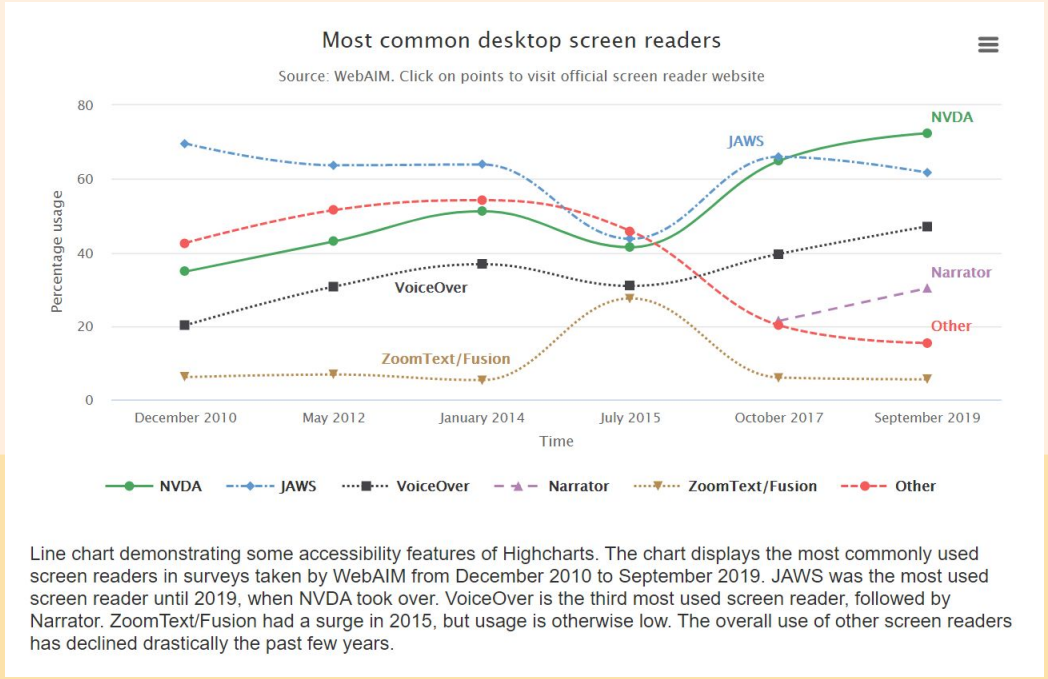
Motor impairment and functional disability (**13-15%**)





Cognitive and attention impairment (**11-13%**)





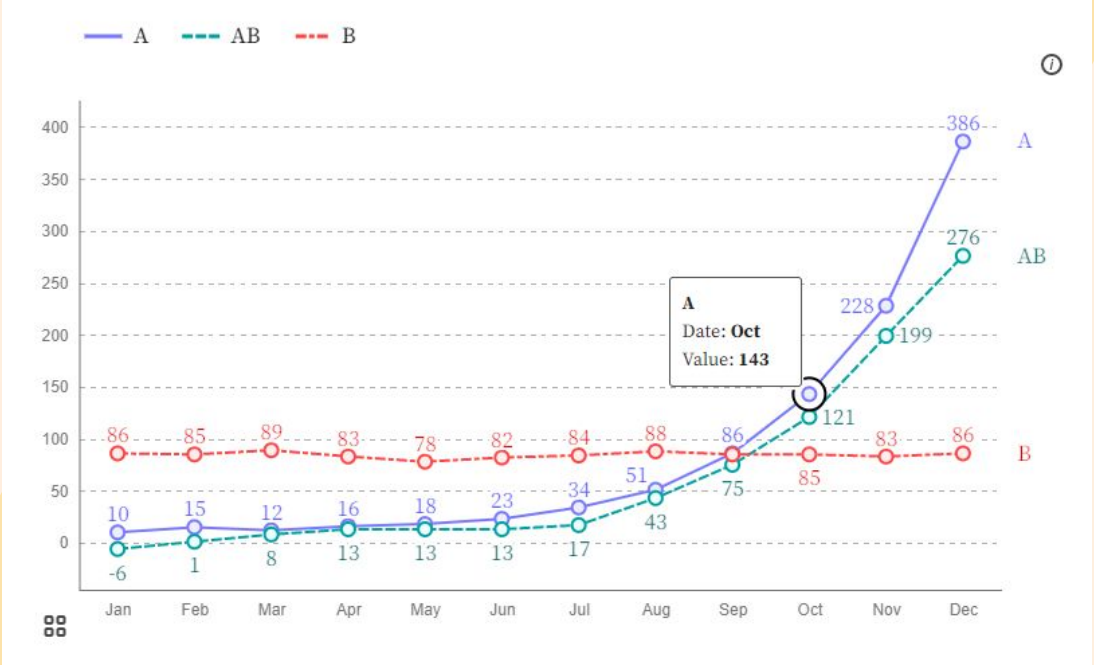
Line chart demonstrating some accessibility features of Highcharts. The chart displays the most commonly used screen readers in surveys taken by WebAIM from December 2010 to September 2019. JAWS was the most used screen reader until 2019, when NVDA took over. VoiceOver is the third most used screen reader, followed by Narrator. ZoomText/Fusion had a surge in 2015, but usage is otherwise low. The overall use of other screen readers has declined drastically the past few years.

Source: Highcharts example (an accessibility-focused charting library).

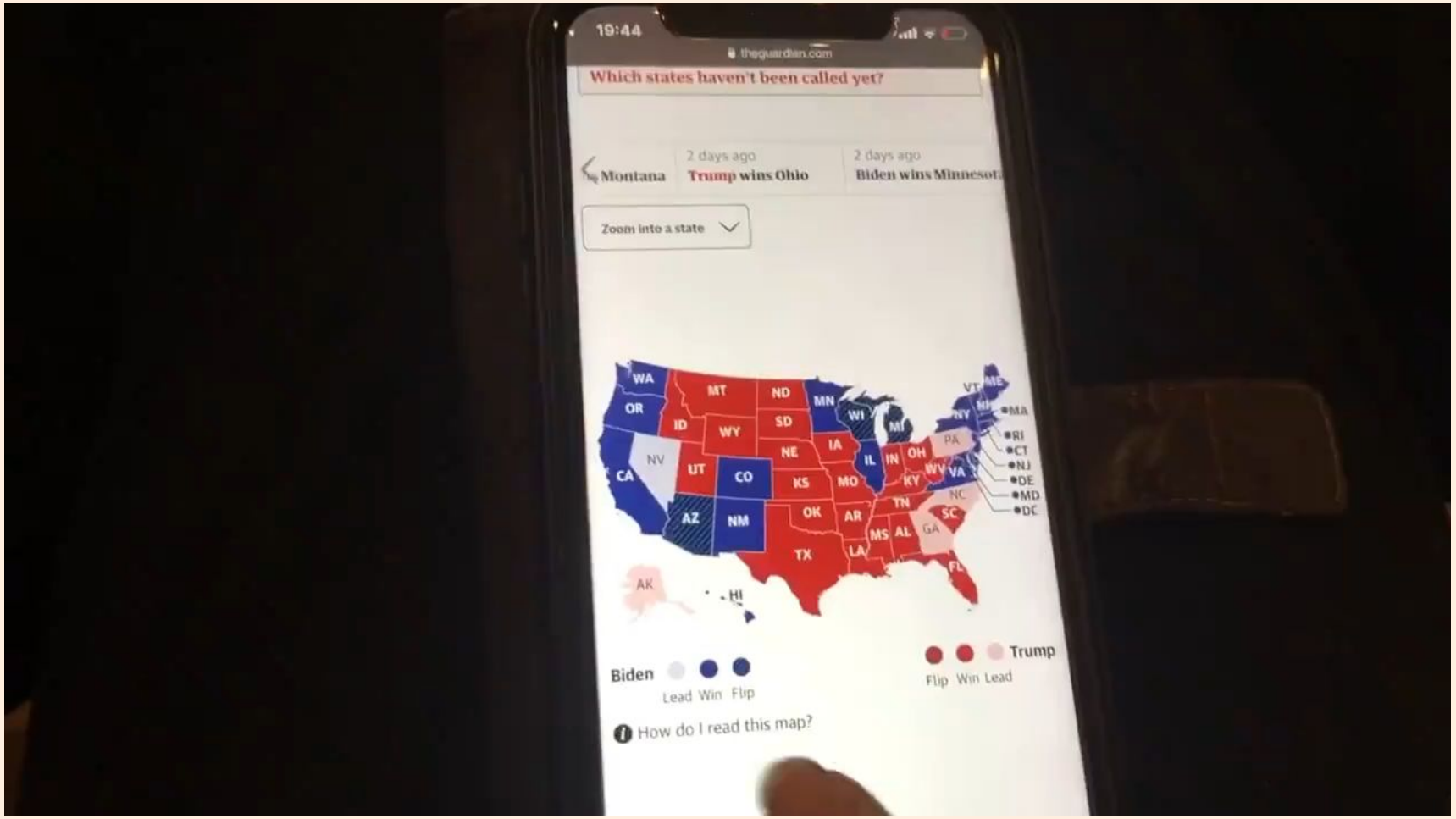
WHAT IS DATA VISUALIZATION?

Data Visualization (also sometimes abbreviated as dataviz or datavis) is presenting data in a structured, symbolic way.

The structure and semantics go beyond the visual however, so we prefer to call these data **experiences** or **representations** .



DATA IS PAINFUL. VISUALIZATION SHOULDN'T BE.



Sarah's video on Twitter

WHY AM I TALKING ABOUT DATA VISUALIZATION AND NOT OTHER DATA STUFF (LIKE NOTEBOOKS)?

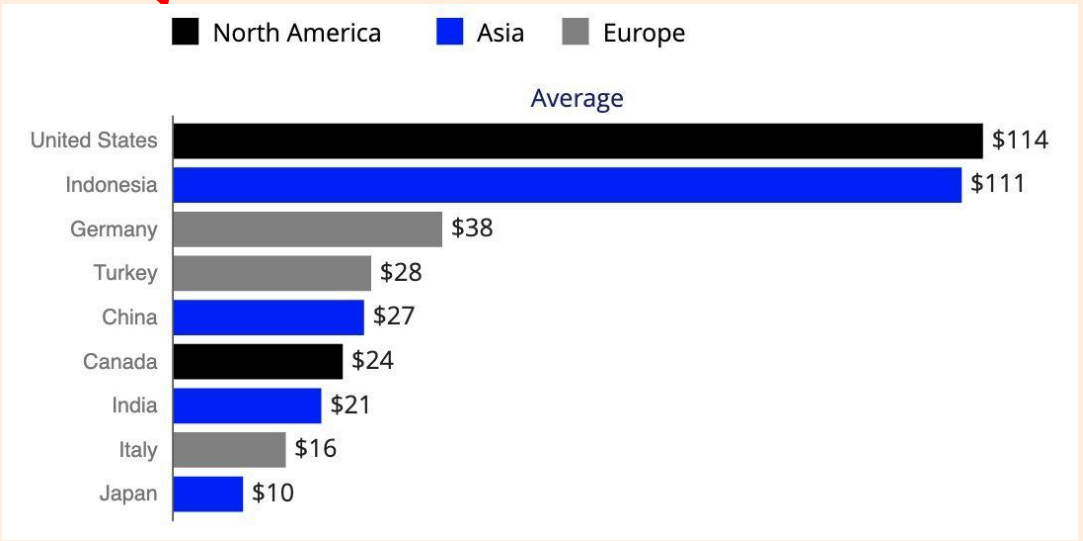
VISUALIZATION IS ALREADY AN ASSISTIVE TECHNOLOGY

Taking data (something hard to understand) and turning it into a representation or experience that is easier to understand is **an assistive act** .

DATA VISUALIZATION IS A HOPEFUL STARTING POINT

Taking data and making it into a chart helps break down cognitive barriers. And if our primary motivation is to break down barriers for understanding data, why not keep going?

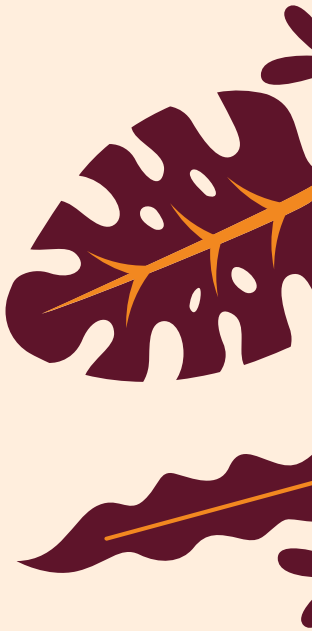
Region	Country	Value
North America	United States	$114
Asia	Indonesia	$111
Europe	Germany	$38
Europe	Turkey	$28
Asia	China	$27
...	...	...



DATA REPRESENTATION AND DATA EXPERIENCES

Visualization is how we talk about just one part of the picture.
Other design that plays a role in visualization:

- Functional
- Semantic
- Structural
- Interactive



And those areas have huge potential for continuing the work of assistive technology.

HOW CAN WE MAKE OPEN-SOURCE DATA WORK MORE ACCESSIBLE?

Let’s discuss!

Suggest something in chat in 1 - 2 sentences. (Intentionally short! That is the exercise.)

WHAT ARE THE 10 BEST STRATEGIES ON THE QUEST FOR ACCESSIBILITY?

Individual :

1. Learn how to evaluate
2. Listen to people with disabilities
3. Pace yourself
4. Look for small wins

Structural :

1. Plan
2. Implement
3. Test
4. Review
5. Maintain
6. Celebrate

NOT ALL ACTION IS SOLVED BY INDIVIDUALS ALONE.

A huge part of open-source work (as well as volunteer work more broadly) is that it is driven by community involvement and can be defeated by structural forces.

STUDY STANDARDS, PRINCIPLES, AND GUIDELINES

Individual :

1. **Learn how to evaluate**
2. Listen to people with disabilities
3. Pace yourself
4. Look for small wins

Grey text fails.
1.81:1

Purple text fails. **2.47:1**

Purple geometry (no border) fails. **2.63:1**

Green text fails. **2.59:1**

Green geometry (with border) fails.
1.98:1

Example chart audited using WCAG 2.1 contrast standards and Chartability.

INVITE PEOPLE *AND* FIND WHERE THEY ARE ALREADY SPEAKING

Individual :

1. Learn how to evaluate
2. **Listen to people with disabilities**
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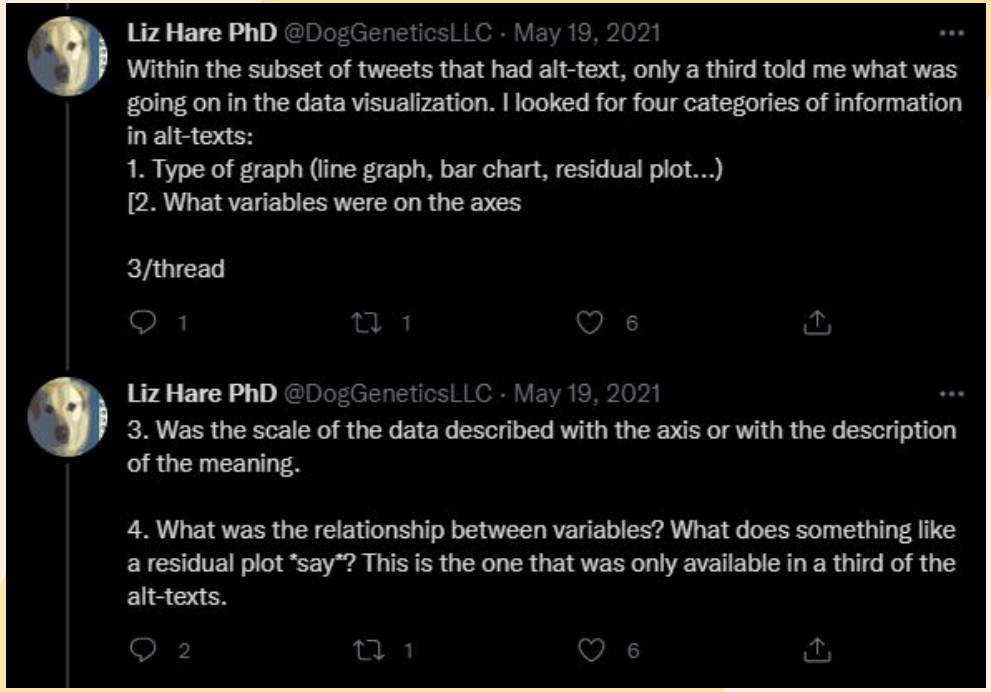
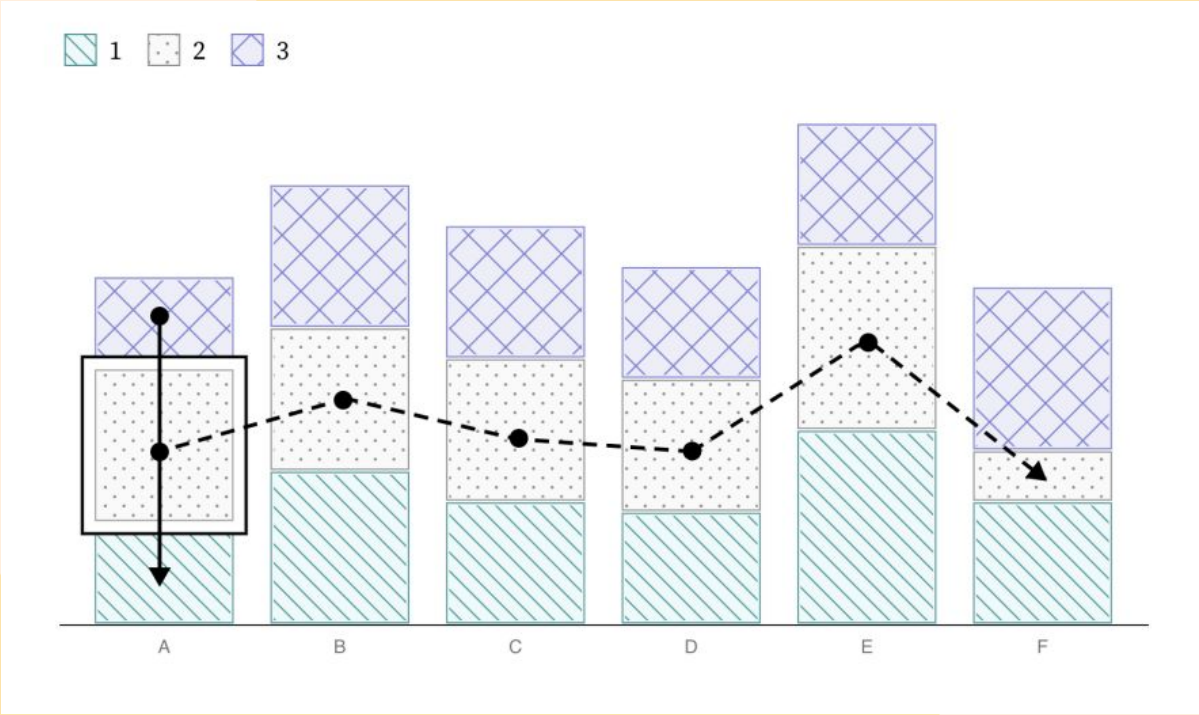


Liz has been an amazing partner and teacher and is really involved on Twitter!

WORK ON 1 NEW SKILL AT A TIME

Individual :

1. Learn how to evaluate
2. Listen to people with disabilities
3. **Pace yourself**
4. Look for small wins



My current deep dive has been interaction paradigms for keyboard and touch access. I'm still learning and studying!

BREAK ISSUES INTO SMALLER, MANAGEABLE PARTS

Individual :

1. Learn how to evaluate
2. Listen to people with disabilities
3. Pace yourself
4. **Look for small wins**

The Task Force on Gay Liberation worked to reclassify homosexuality as a variety of sexual life. Just one piece of the larger battle and a lesson that Community Organizing can teach us. (Photo of the great Barbara Gittings, by Kay Tobin Lahusen and licensed under CC BY-SA 3.0)

WHAT ARE THE 6 BEST STRUCTURAL STRATEGIES FOR ACCESSIBILITY?

Structural :

1. Plan
2. Implement
3. Test
4. Review
5. Maintain
6. Celebrate

Governance and management can be a huge help in open source efforts for accessibility.

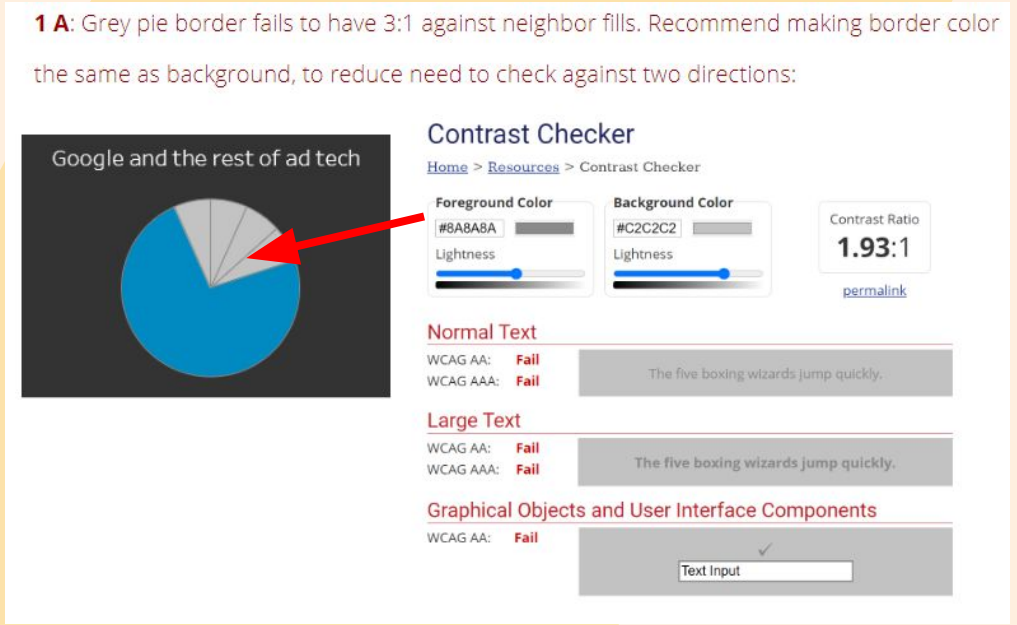
If you are struggling to organize the results of an audit, you may want to consider breaking each finding into the most atomic, manageable pieces and then plan your milestones and priorities.

HOW DO WE KNOW WHETHER SOMETHING IS INACCESSIBLE?

Evaluation !

The practice of evaluating something according to a consistent system of tests and standards is called an audit.

Anyone can learn how to audit! Designers, engineers, managers, analysts, scientists... really, *anyone*.

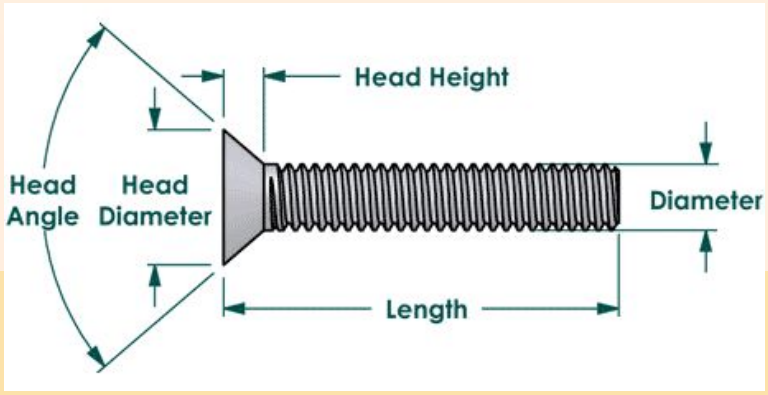


SO, HOW DO YOU LEARN HOW TO EVALUATE?

Ideally: Look to standards.

WHY STANDARDS?

Industrial standards are what separates any given hex code from a Pantone color or a **wood fastener** from a **Philips screw** .



THE STATE OF A11Y STANDARDS: WCAG

Web Content Accessibility Guidelines (or WCAG) is currently adopted in policy in some form or another by governments for 55% of the world's population.

It is the biggest and best set of standards out there.

WCAG homepage and WCAG policy adoption internationally

USING STANDARDS FOR EVALUATION ONLY GOES SO FAR!

The next step is hugely important: **involve folks with disabilities** !

5 WAYS TO MAKE YOUR COLLABORATORS' LIVES EASIER

1. Invite them to discussions

5 WAYS TO MAKE YOUR COLLABORATORS' LIVES EASIER

2. Find *their* communities and join *them*

5 WAYS TO MAKE YOUR COLLABORATORS' LIVES EASIER

3. Write up issues on your repo *with* them or *for* them once you catch something together (Don't just ask them to go and open an issue, be proactive!)

5 WAYS TO MAKE YOUR COLLABORATORS' LIVES EASIER

4. Empower them to help drive design decisions that affect them. (And don't just use them for testing! This can feel one-sided.)

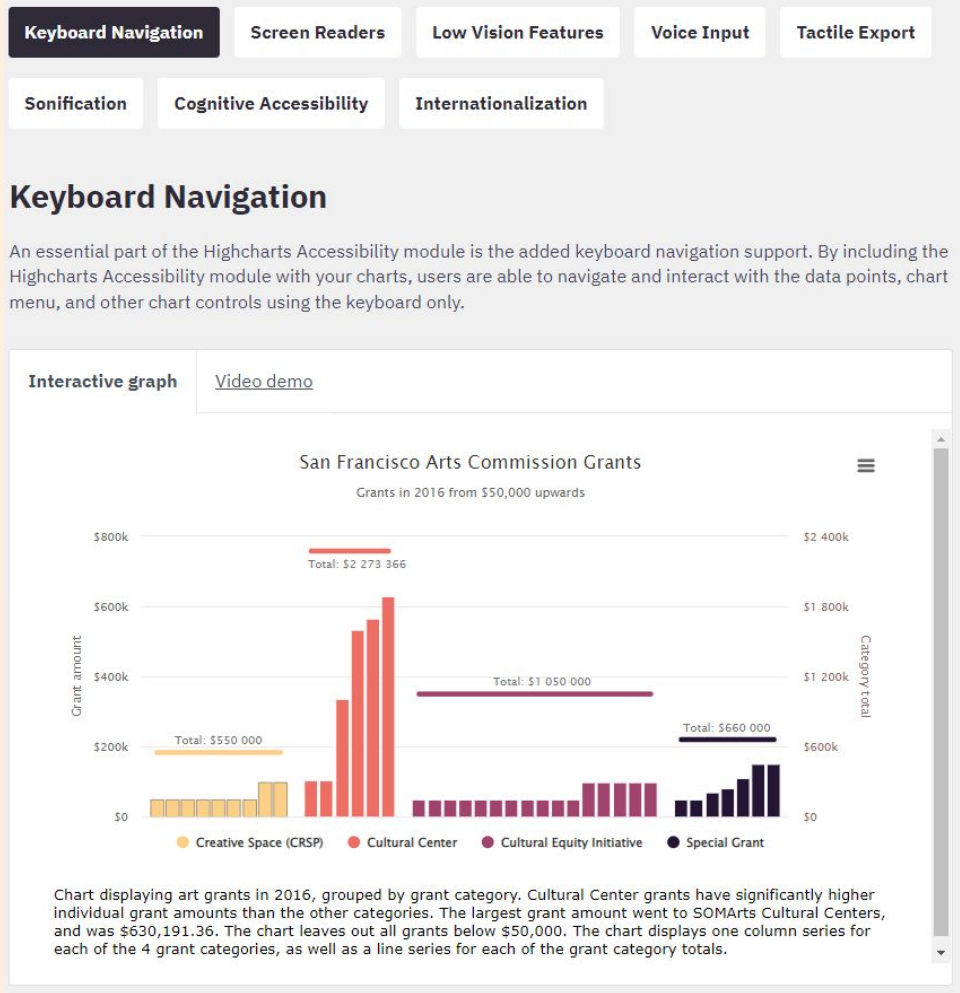
5 WAYS TO MAKE YOUR COLLABORATORS' LIVES EASIER

5. If you're going to pay anyone in this whole process, *pay them for their expertise.* (People with disabilities are often asked to do work for free.)

FINAL ADVICE: “USING WHAT WE ALREADY HAVE”

This is design advice from assistive tech + DIY spaces: using existing materials and technology to solve access problems. Can we repurpose or reconfigure?

(Highcharts and Visa Chart Components both have really robust accessibility options, for example.)



Look at all those considerations that Highcharts has engineered and designed for! What can we learn and use from this?

RESOURCES:

- Follow me on twitter for news about my work (@FrankElavsky).
- About the group I am a part of: github.com/dataviza11y/Why-We-Exist
- Our Group's resources for visualization and accessibility.

- **Highcharts Accessibility** : https://www.highcharts.com/blog/accessibility/
- **Visa Chart Components** : https://developer.visa.com/pages/chart-components
- **Chartability Workbook** : fizz.studio/files/chartability-worksheet
- **Chartability Slides** : fizz.studio/files/chartability-deck
- **Chartability Website** : chartability.fizz.studio/

THANKS

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