

A PRESENTATION FROM
DATA DOZEN
a visual analytics studio

ERIN WALDRON FROM DATA DOZEN · SDP CTE ALUMNI · MARCH 8, 2023

DATA THAT MOVES

OUR 7 MOST COMMON MISTAKES WHEN CREATING INTERACTIVE VISUALIZATIONS



LET'S START HERE

I'm going to tell you something you **already** know.



HERE'S WHAT YOU ALREADY KNOW

Everybody likes to feel like they're understanding what's going on.



HERE'S WHAT YOU ALREADY KNOW

Nobody likes to feel **confused**.



HERE'S WHAT YOU ALREADY KNOW

Everybody likes to feel **confident**.



HERE'S WHAT YOU ALREADY KNOW

Everybody likes to feel **included**.



HERE'S WHAT YOU ALREADY KNOW

Nobody likes to feel frustrated.



HERE'S WHAT YOU ALREADY KNOW

Nobody likes to feel excluded.



EMOTION MATTERS

How our visualizations make our audience feel directly impacts how well our audience can think.

NEGATIVE



FOLKS PULL BACK

excluded
irritated
overwhelmed
intimidated
confused
frustrated

embarrassed
worried
uncertain
distracted
disinterested
lost

included
recognized
calm
confident
supported
empowered

focused
curious
engaged
engrossed
rewarded
learning

POSITIVE



FOLKS LEAN IN

OUR GOAL TODAY

Let's unpack the 7 most common **mistakes** we make when creating interactive visualizations.



OUR GOAL TODAY

Let's unpack the 7 most common mistakes we make when creating **interactive** visualizations.



OUR GOAL FOR TODAY



SLIDES

THEORY

explain the 7 most common mistakes

BREAKOUT DISCUSSION



INTERNET

EXAMPLES

unpack good & bad real world examples

BREAKOUT DISCUSSION



TABLEAU

DEMO

fix these mistakes in a dashboard

OUR GOAL FOR TODAY



CREATORS

OUR MISTAKE

Pinpoint where we go wrong.



AUDIENCE

HOW IT FEELS

Unpack the emotions we cause.



TOOLKIT

BRAINSTORM

Explore different strategies.

DISCLAIMER

I have **personally** made every mistake here (many times).



READY?
Let's **dive** in.



QUESTION

Is anyone else addicted to Wordle?



MISTAKE #1

WE BUILD FOR OUR DEVICES, NOT OUR AUDIENCE'S.



CREATORS

OUR MISTAKE

Pinpoint where we go wrong.

- Interactivity requires a digital device to view
- Creators tend to have better equipment than our audience
- Most of our colleagues and collaborators are creators too



AUDIENCE

HOW IT FEELS

Unpack the emotions we cause.

- Our audience feels irritated and excluded
- Small annoyances might be tolerated for a short time
- A big device mismatch says: *"This wasn't built for you."*



TOOLKIT

BRAINSTORM

Explore different strategies.

- Gather data on your audience's viewing devices
- Leverage automatic or range dashboard sizes
- Think like a web designer and create unique device layouts

"THAT WILL TAKE TOO MUCH TIME!"

If this thought just popped into your head, I'd push you here to ask: "How much time am I willing to invest in a project that is never seen?"

QUESTION

What is your **favorite** functionality in your go-to software tool?
(Drop it in the chat!)



MISTAKE #2

WE SHOW OFF THE TOOL, NOT THE DATA.



CREATORS

OUR MISTAKE

Pinpoint where we go wrong.

- We use *all* the interactive functionality at the same time
- Often this is the stuff we find most interesting and novel
- This is especially common when we're new creators



AUDIENCE

HOW IT FEELS

Unpack the emotions we cause.

- Our audience feels overwhelmed & intimidated
- A ton of interactivity says: *"Watch out! This thing's alive!"*
- Which has the subtext of *"Watch out! You can break this!"*



TOOLKIT

BRAINSTORM

Explore different strategies.

- Movement is nearly impossible for us to ignore.
- Build the dashboard without any interactivity at all.
- Then only add in the truly necessary functionalities.
- (Inspired by Cole Nussbaumer Knaflic's grayscale strategy.)

QUESTION

How do you get information out of a book?



MISTAKE #3

WE ASSUME EVERYONE KNOWS HOW TO READ INTERACTIVE VISUALIZATIONS.



CREATORS

OUR MISTAKE

Pinpoint where we go wrong.

- We assume by now everyone gets interactive dashboards
- The functionalities are very similar from tool to tool
- This is the cognitive bias “The Curse of Knowledge”



AUDIENCE

HOW IT FEELS

Unpack the emotions we cause.

- Our audience feels confused and frustrated.
- Tech savvy folks: “*Arg! This thing is so poorly built!*”
- Not tech savvy folks: “*What’s wrong with me! I never understand technology!*”



TOOLKIT

BRAINSTORM

Explore different strategies.

- Give directions *and* describe what’s going to happen.
- Prime folks with an interactive tutorial, a Tableau playground
- Demo the functionality in super short video

QUESTION

When's the last time you **broke** something technical?



MISTAKE #4

WE DON'T HIGHLIGHT AN OBVIOUS UNDO BUTTON.



CREATORS

OUR MISTAKE

Pinpoint where we go wrong.

- We assume folks know how to get back to the beginning.
- We know folks can't actually break the underlying work.



AUDIENCE

HOW IT FEELS

Unpack the emotions we cause.

- Our audience feels embarrassed and worried.
- Folks click once and say: *"Oh crap. What did I just do? I've broken the whole thing."*
- And then they walk away.



TOOLKIT

BRAINSTORM

Explore different strategies.

- Explicitly say "You can't break this dashboard."
- Remove dead ends and undocumented interactivity.
- Add return directions.

QUESTION

What **app** do you use most on your phone?



MISTAKE #5

WE'RE INCONSISTENT WHEN CONSISTENCY MATTERS MOST.



CREATORS

OUR MISTAKE

Pinpoint where we go wrong.

- Interactive vizzes usually carry a heavier cognitive load
- We're sloppy when it comes to encoding UX scaffolding
- We treat each dashboard as a standalone product, not one item in a suite of products



AUDIENCE

HOW IT FEELS

Unpack the emotions we cause.

- Our audience feels uncertain and unconfident
- Their hypotheses keep being wrong: *"I thought this button would be here like the last dashboard, but it's not."*



TOOLKIT

BRAINSTORM

Explore different strategies.

- Lean into your organization's style guides.
- Build Tableau templates to create consistent experiences.

"I DON'T WANT TO KNOW WHO BUILT IT."

I'm currently working with a client whose main focus is standardization. Their audience shouldn't feel a quality or style different depending on which team member built the dashboard.

QUESTION

When's the last time you decided
to sit down and read the **encyclopedia**?



QUESTION

When's the last time you accidentally
went down a wikipedia rabbit hole?



MISTAKE #6

WE DON'T PROVIDE A HOOK INTO THE CONTENT.



CREATORS

OUR MISTAKE

Pinpoint where we go wrong.

- We assume the amount of information we're providing will ensure a good experience.
- We think the data vault we've opened up is inherently exciting (that's probably why we have these jobs!)



AUDIENCE

HOW IT FEELS

Unpack the emotions we cause.

- Our audience feels disinterested and lost
- We say *"You have access to all of it!"* and they hear *"Go look for a needle in this haystack!"*
- Our audience has every right to ask the question: *"Why should I care?"*



TOOLKIT

BRAINSTORM

Explore different strategies.

- Curate paths within your exploratory dashboards
- Annotate a sample path
- Literally say "start here"
- Embed incentives/open loops
- Help folks find themselves

QUESTION

How do you put together **IKEA** furniture?



QUESTION

How do you put together **IKEA** furniture?
Do you read the instructions?



QUESTION

How do you put together **IKEA** furniture?

Do you read the instructions? Or just grab the allen wrench?



TIME FOR SOME HONESTY.

Here's how we **imagine** folks read our visualizations.



IMAGINED PATH

IMAGINED PATH

Vaccination rates by county social vulnerability

IMAGINED PATH

Vaccination rates by county social vulnerability

Share of total population fully vaccinated. Circles sized by county population.

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Share of total population fully vaccinated. Circles sized by county population.

<20% 25% 30% 35% 40% 45% 50% 55% 60% 65% 70% 75% >80%

IMAGINED PATH

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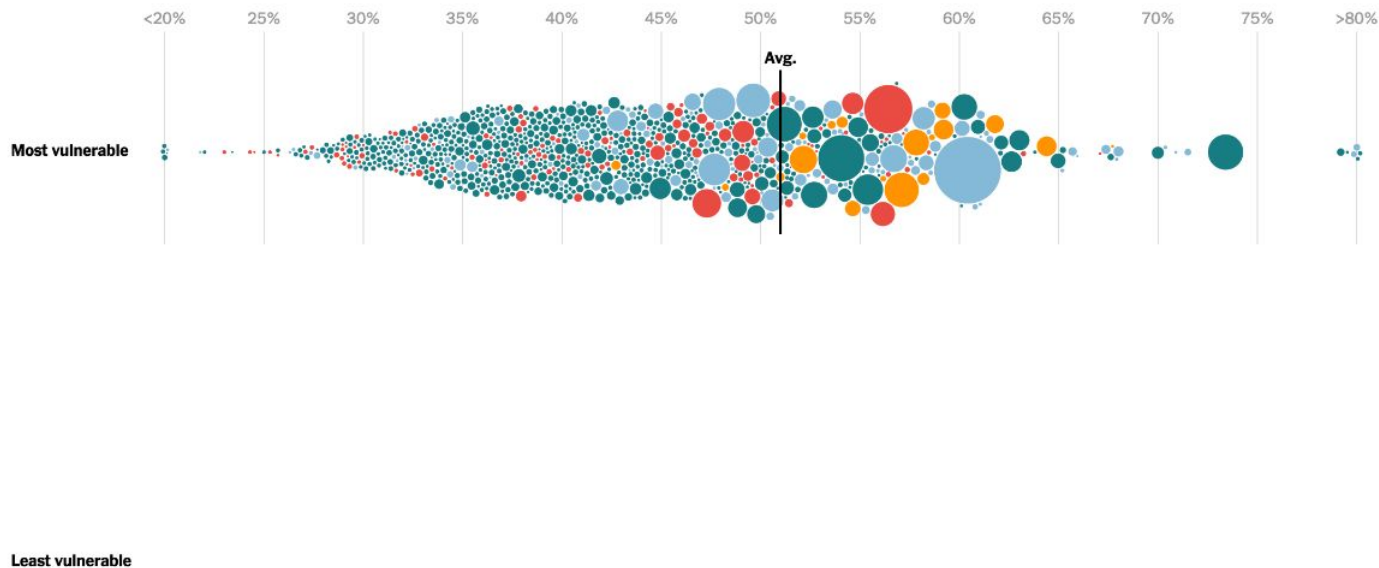
Most vulnerable

Least vulnerable

IMAGINED PATH

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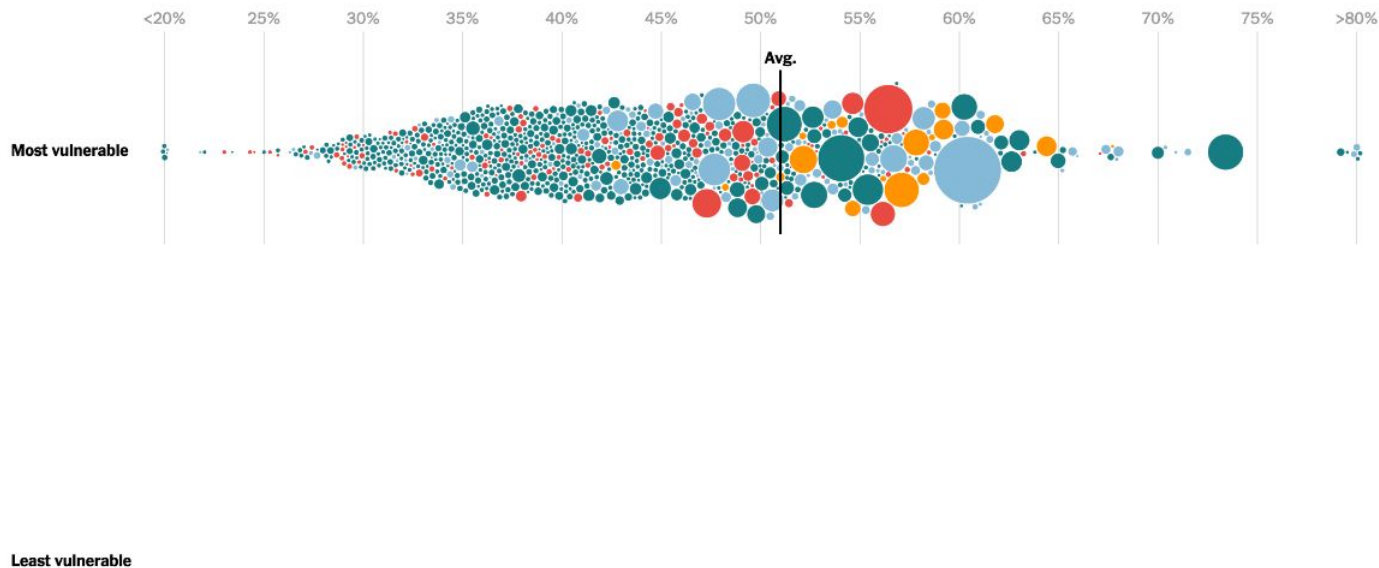


IMAGINED PATH

Vaccination rates by county social vulnerability

Share of total population fully vaccinated. Circles sized by county population.

Region ● Midwest ● Northeast ● South ● West

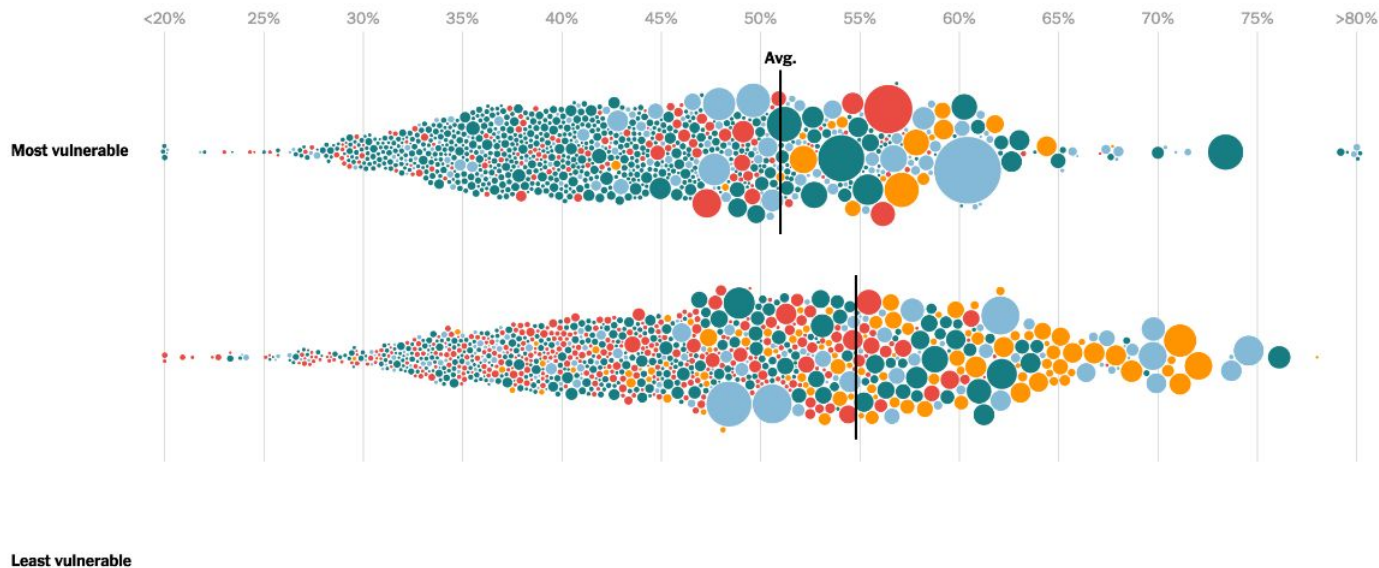


IMAGINED PATH

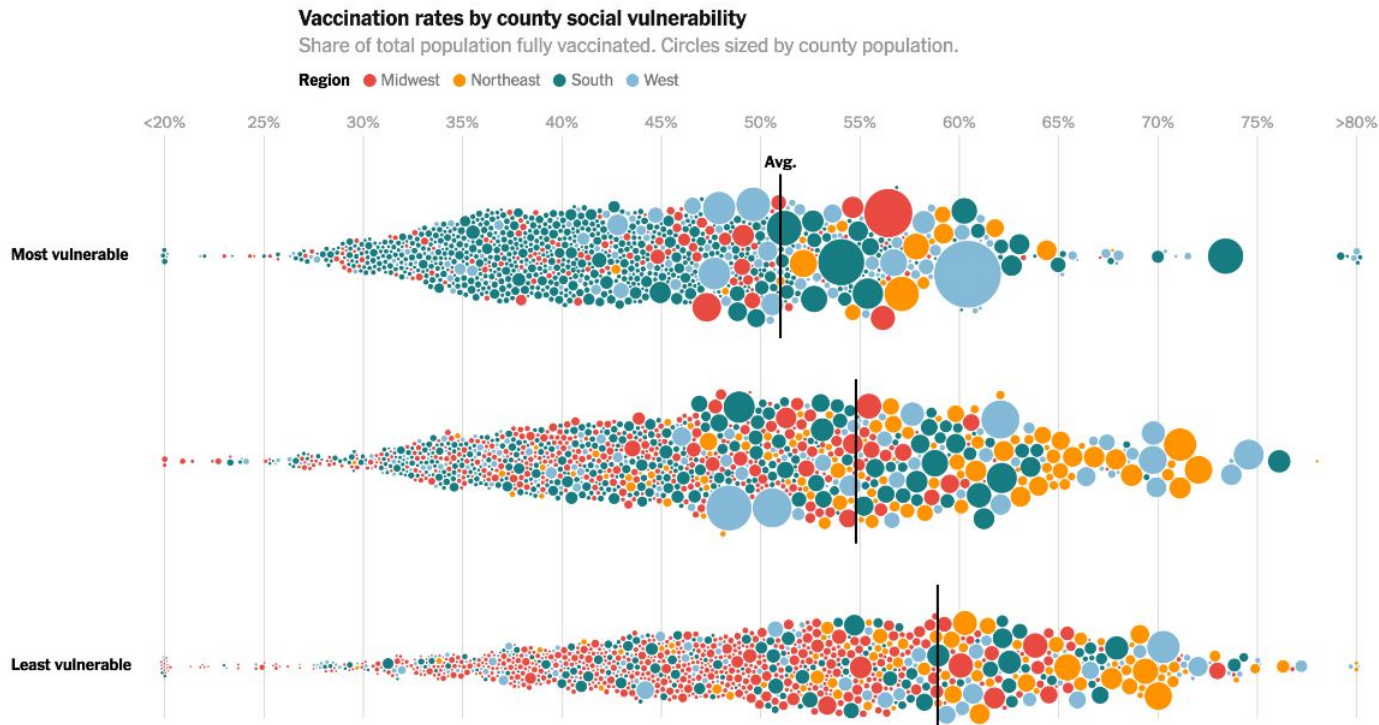
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IMAGINED PATH

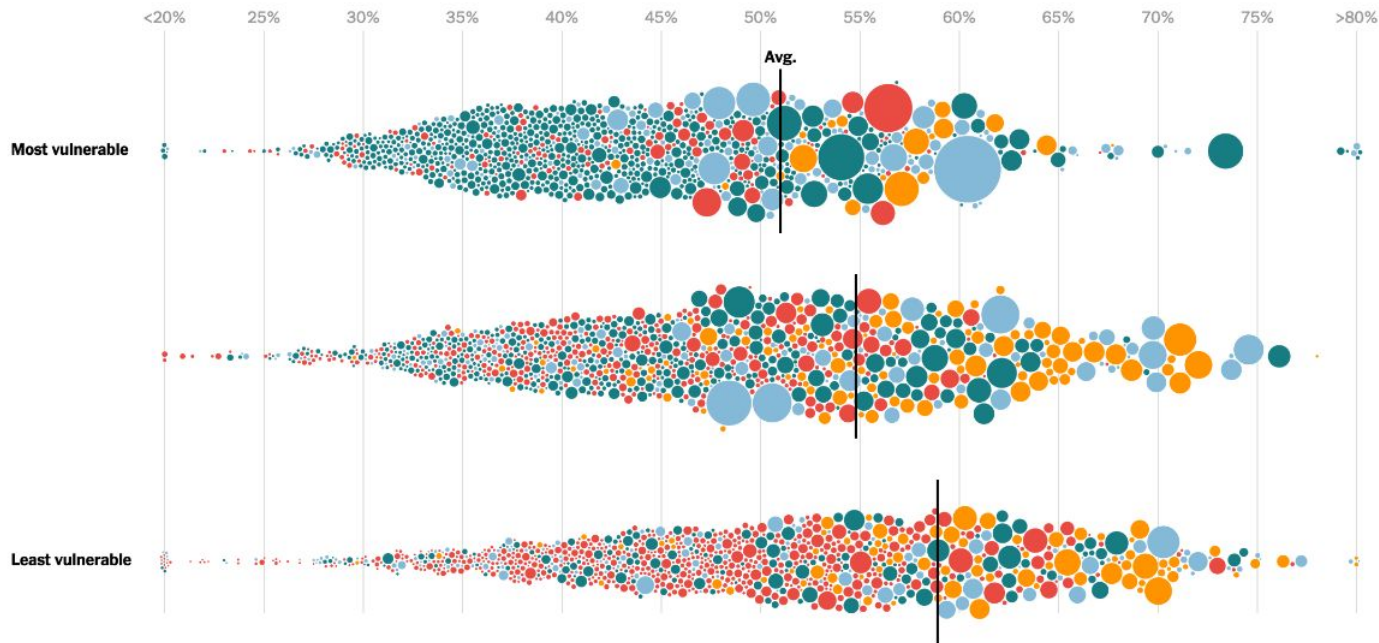


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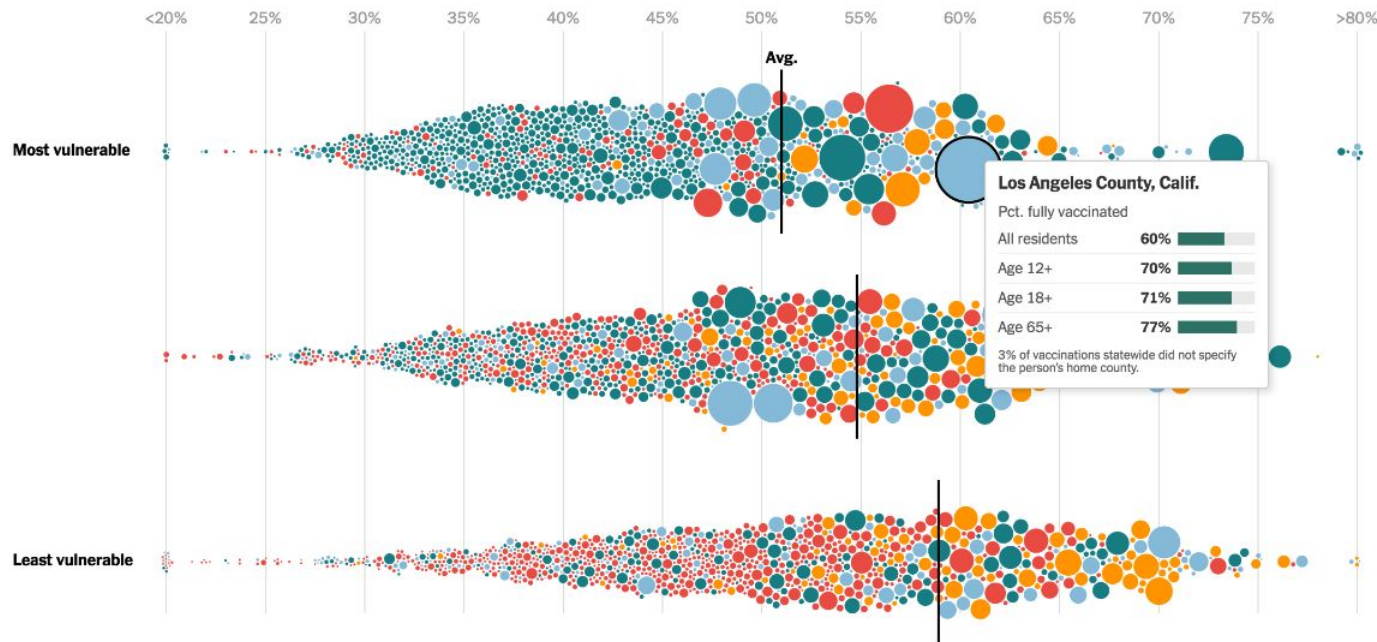
Sources: [Centers for Disease Control and Prevention](#); [Texas Department of State Health Services](#); [Colorado Department of Public Health & Environment](#); [Massachusetts Department of Public Health](#); U.S. Census Bureau | Note: No C.D.C. data available for Hawaii, Texas and some counties. Georgia, Vermont and West Virginia were excluded because more than a quarter of data is missing.

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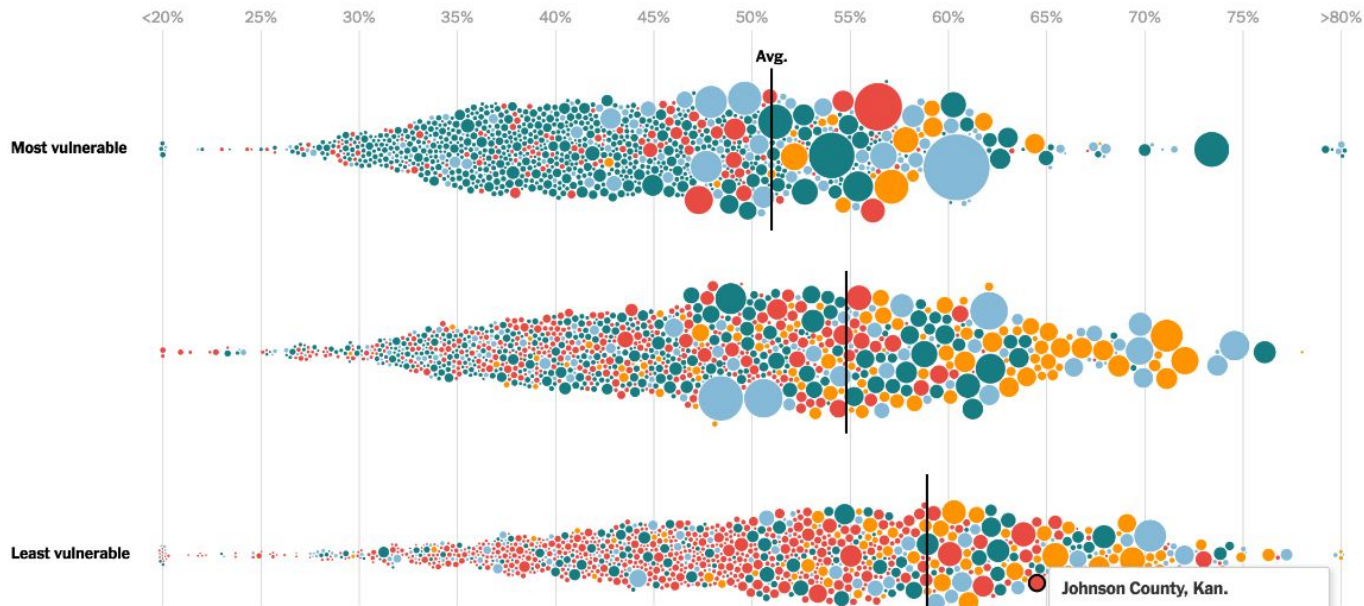
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Johnson County, Kan.

Pct. fully vaccinated

All residents 64%

Age 12+ 76%

Age 18+ 78%

Age 65+ 97%

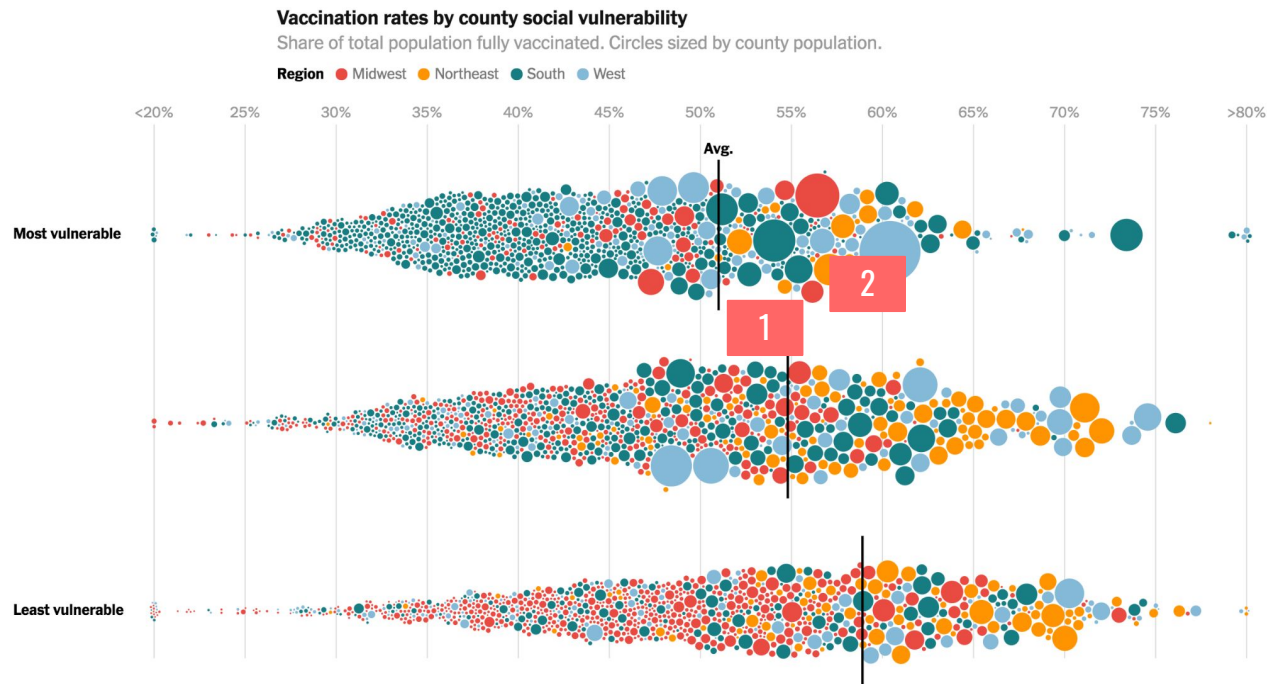
6% of vaccinations statewide did not specify the person's home county.

TIME FOR SOME HONESTY.

Here's how most folks **actually** read our visualizations.

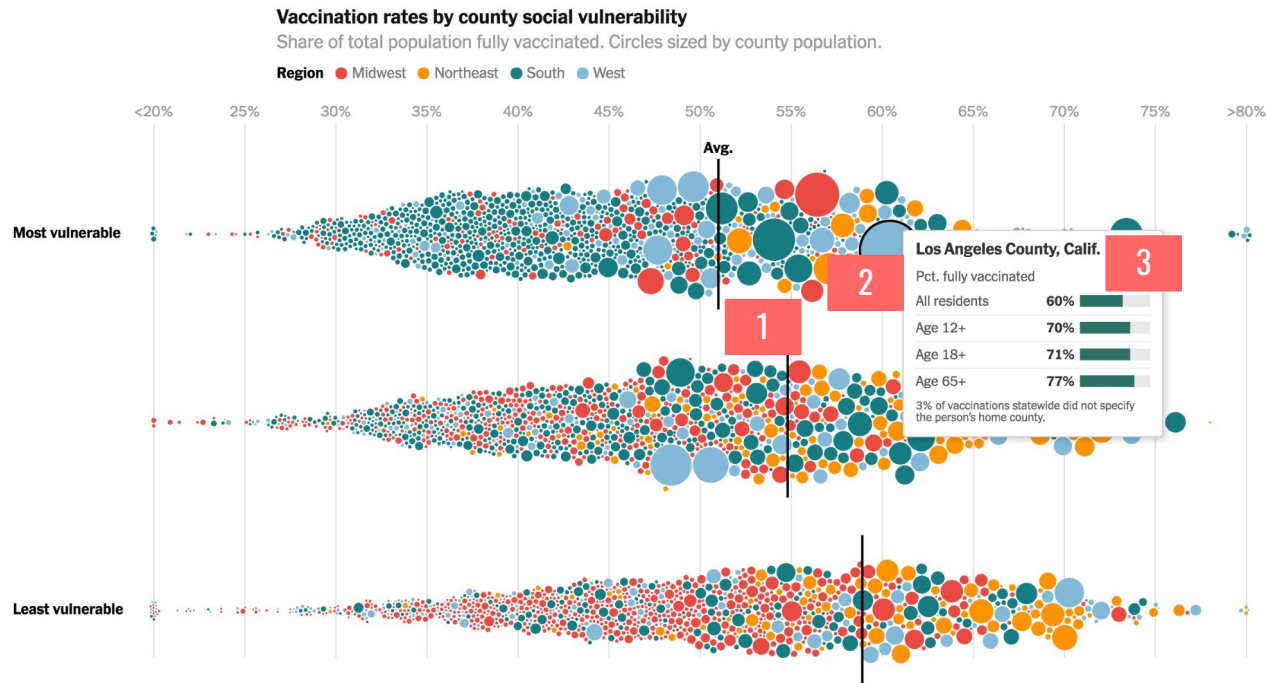


ACTUAL PATH



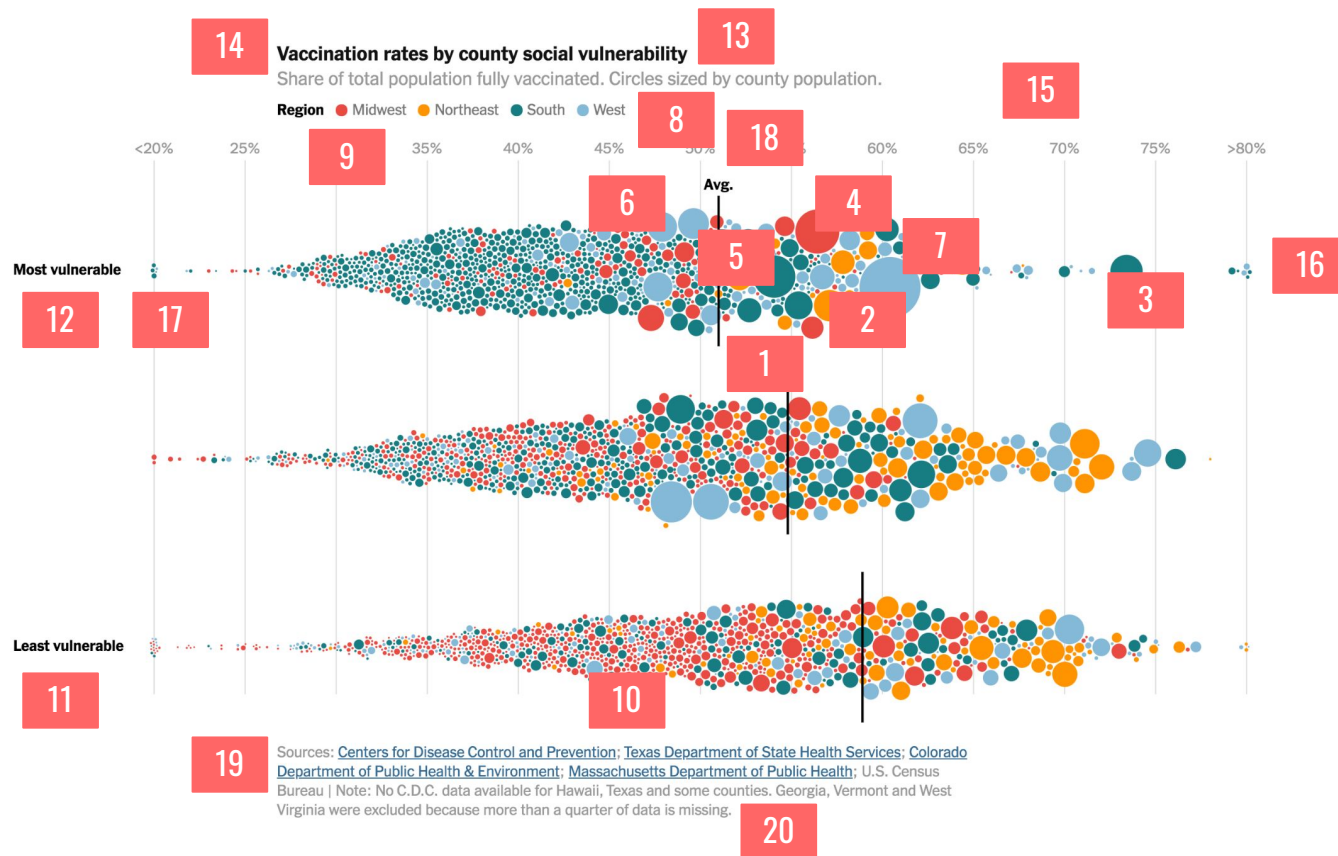
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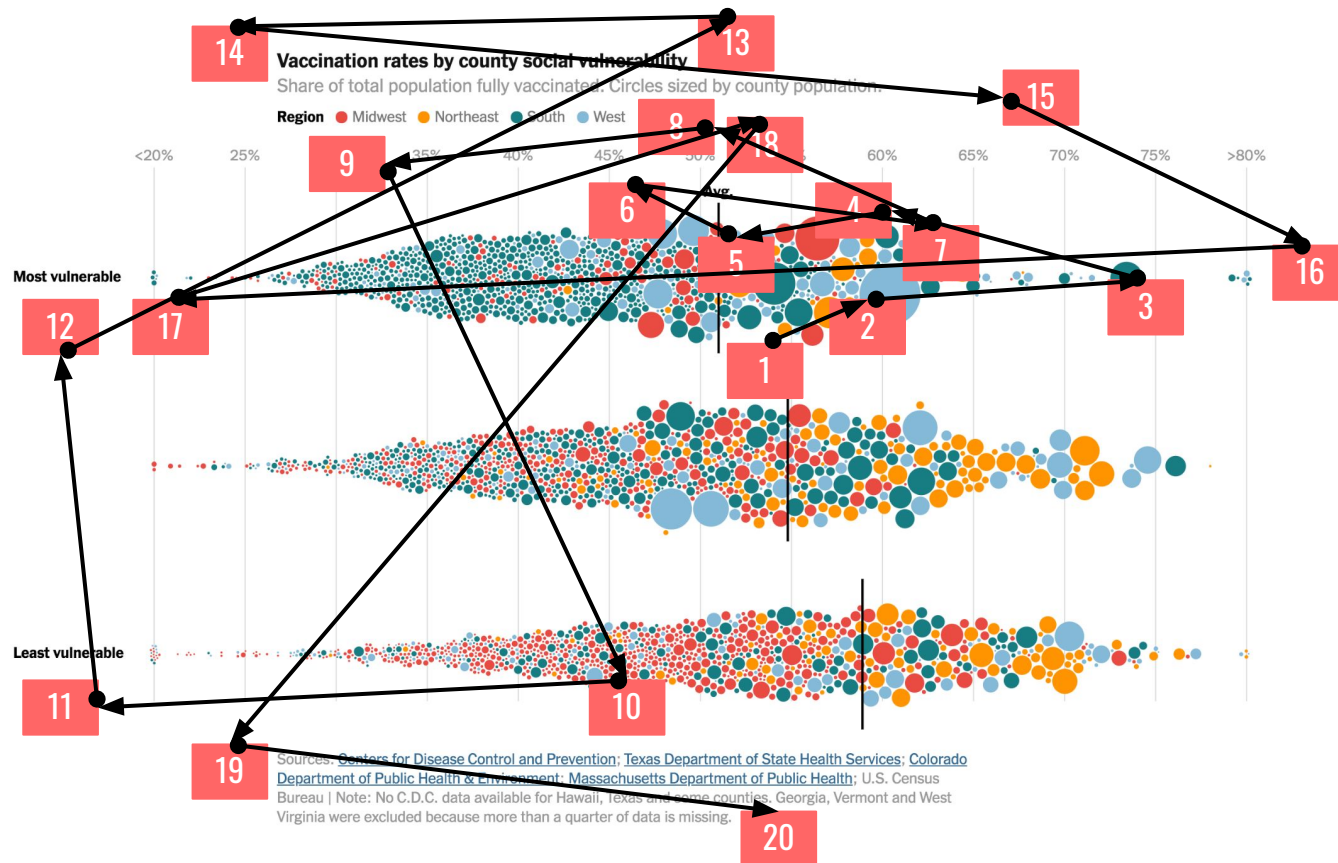


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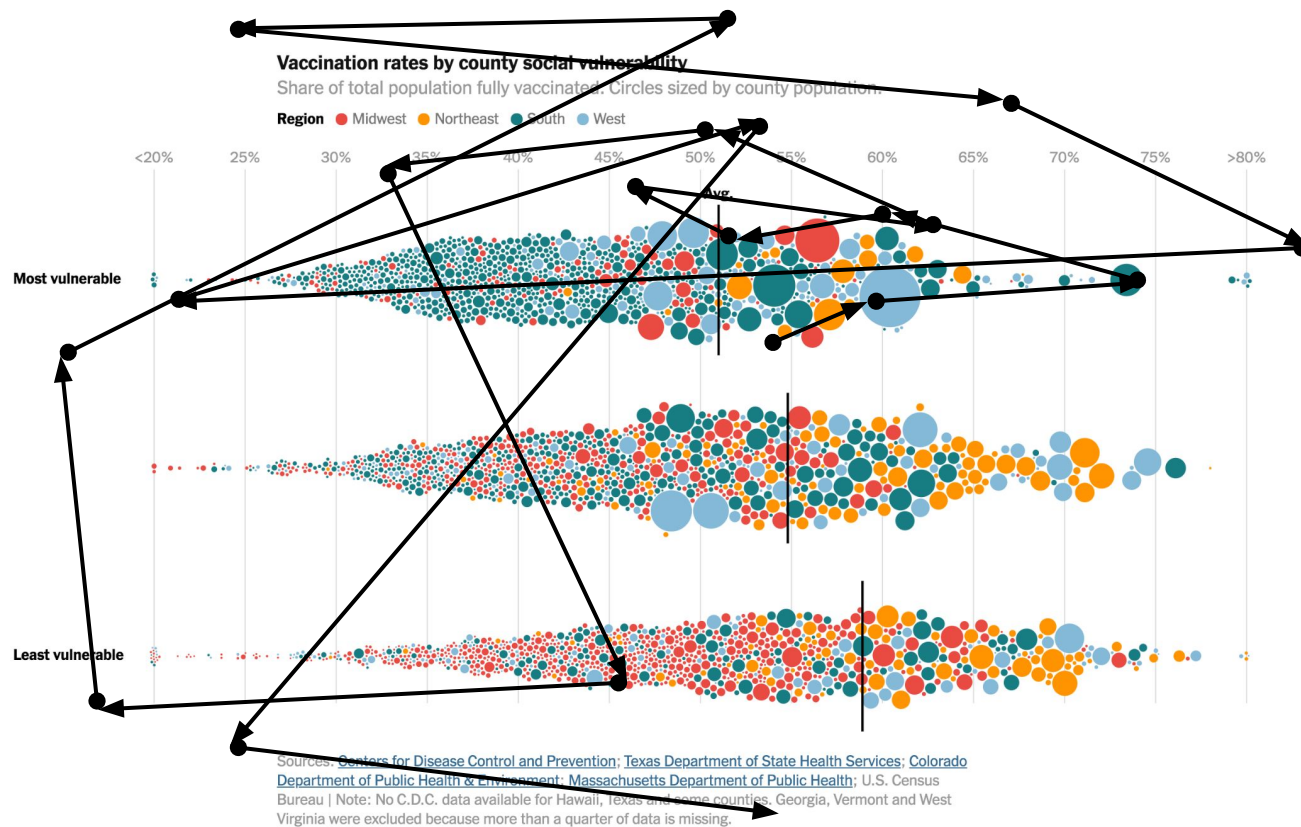
ACTUAL PATH



ACTUAL PATH



ACTUAL PATH



PINBALL MACHINES

2 Components

- 2.1 Cabinet
- 2.2 Backbox/Head
- 2.3 Lower Cabinet
- 2.4 Playfield
- 2.5 Plunger
- 2.6 Flippers
- 2.7 Bumpers
- 2.8 Kickers and slingshots
- 2.9 Targets
- 2.10 Holes and saucers
- 2.11 Spinners and rollovers
- 2.12 Switches, gates, and stoppers
- 2.13 Ramps
- 2.14 Toys, magnets and captive balls
- 2.15 Backglass



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MISTAKE #7

WE DESIGN A LINEAR PATH THAT NOBODY TAKES.



CREATORS

OUR MISTAKE

Pinpoint where we go wrong.

- We think everyone will move through our work on the same path.
- We assume folks will give our work the attention we think it deserves (or at least read the instructions.)



AUDIENCE

HOW IT FEELS

Unpack the emotions we cause.

- Our audience feels distracted and time crunched
- They're thinking: "*Whoa! Look at that. It moves! Cool. Bye.*"
- Attention is fundamentally scarce these days and folks default to skimming.



TOOLKIT

BRAINSTORM

Explore different strategies.

- Roll out bite-size pieces of information
- Provide just-in-time information (tooltips)
- Book recommendation: "*Nobody Wants to Read Your Sh*t*" by Steven Pressfield

LET'S TALK ABOUT OUR BAD HABITS



Q1

Which of these 7 mistakes do you make most often?

Q2

Which mistakes should be added to this list?

OUR 7 MOST COMMON MISTAKES WHEN CREATING INTERACTIVE VISUALIZATIONS

- 1) We build for our devices, not our audience's.
- 2) We show off the tool, not the data.
- 3) We assume everyone knows how to read interactive vizzes.
- 4) We don't highlight an obvious un-do button
- 5) We're inconsistent when consistency matters most.
- 6) We don't provide a hook into the content.
- 7) We design a linear path that nobody takes.

OUR GOAL FOR TODAY



SLIDES THEORY

explain the 7 most common mistakes

BREAKOUT DISCUSSION



INTERNET EXAMPLES

unpack good & bad real world examples

BREAKOUT DISCUSSION



TABLEAU DEMO

fix these mistakes in a dashboard

TABLEAU DEMO



TABLEAU DEMO CHECKLIST

- 1) We build for our devices, not our audience's.
 - Leverage automatic or range dashboard sizes; fix widths or heights as necessary.
 - Build distinct device layouts, especially for mobile.
- 2) We show off the tool, not the data.
 - Minimize direct viz to viz highlighting and filtering unless absolutely necessary.
 - Turn off legend highlighting unless you explain it and it's additive.
- 3) We assume everyone knows how to read interactive visualizations.
 - Give directions *and* describe what's going to happen. Preface the filters with instructions.
- 4) We don't highlight an obvious un-do button
 - Remove deadends by removing the command buttons in the tooltips.
 - Add return directions by noting that you can click again to release highlighting in Tableau.
 - Let folks know they can't break this and they can always refresh the page.
 - Let folks know they're not alone. "We're here to help!"
- 5) We're inconsistent when consistency matters most.
 - Leverage style guides and organizational branding.
- 6) We don't provide a hook into the content.
 - Hook interest with engaging titles and questions folks want to answer. Engage the journalist mindset.
 - Say start here for new folks.
 - Help folks find themselves in the dashboard. Show highlighters when it makes sense.
- 7) We design a linear path that nobody takes.
 - Leverage "just-in-time" information in the tooltips, like instructions to click or key context.
 - Offer bite size pieces with separate dashboards, or longer dashboards folks can scroll to.

LET'S TALK ABOUT OUR BEST WORK



Q1

What is your best strategy to improve interactive work?

Q2

What tactics keep you most engaged as a reader?

OUR 7 MOST COMMON MISTAKES WHEN CREATING INTERACTIVE VISUALIZATIONS

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HELPFUL RESOURCES

TOOL SPECIFIC GALLERY & DOCUMENTATION LINKS

	TABLEAU	POWER BI	LOOKER	DATA WRAPPER
GALLERY download & replicate	Tableau Public Viz of the Day	Data Stories Gallery	Featured Reports	River Gallery
DOCUMENTATION vocab & explore	Tableau Documentation	Power BI Documentation	Looker Data Studio Documentation	Data Wrapper Documentation

PUBLIC EXAMPLES FROM EDUCATION

SCHOOL DISTRICT PROFILES

- Atlanta Public Schools Office of Research and Evaluation (38 vizzes)
- Albuquerque Public Schools (79)
- Des Moines Public Schools Assessment, Data, and Evaluation (14)
- Maine Department of Education (16)
- Saint Paul Public Schools (14)
- Los Angeles USD (18)
- Anchorage School District (16)
- Kent School District (7)
- Charleston County School District (31)
- Columbia Public Schools (13)
- San Lorenzo Unified School District (53)
- Palo Alto USD (4)

UNIVERSITY INSTITUTIONAL RESEARCH PROFILES

- Cornell (13)
- Rice University (70)
- University of Kansas (27)
- Virginia Commonwealth University (144)
- University of Georgia (120)
- University of Buffalo (53)
- Duke University (4)

HELPFUL RESOURCES

A FEW OF MY PERSONAL FAVORITES

NIGHTINGALE data viz society	PRACTICE communities	BOOKS about dataviz	REFERENCES helpful bookmarks
Article: Cognitive Load as a Guide	Makeover Monday	Data Book Club	Data Visualization Catalogue
Article: Unfair Comparisons	30 Day Chart Challenge (April 2023)	Reading List (with description)	Do No Harm Guide
Outlier Conference (May 3-5, 2023)	List of Dataviz Communities	Reading List (no descriptions)	List of Cognitive Biases

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THANK YOU!

WWW.DATADOZEN.COM/HARVARD-DATA-THAT-MOVES

