DASHBOARDING + POWER BI

DATA STEWARDS TRAINING #4 (WOOT!)

November 17, 2017

MY GOALS FOR THE TRAINING
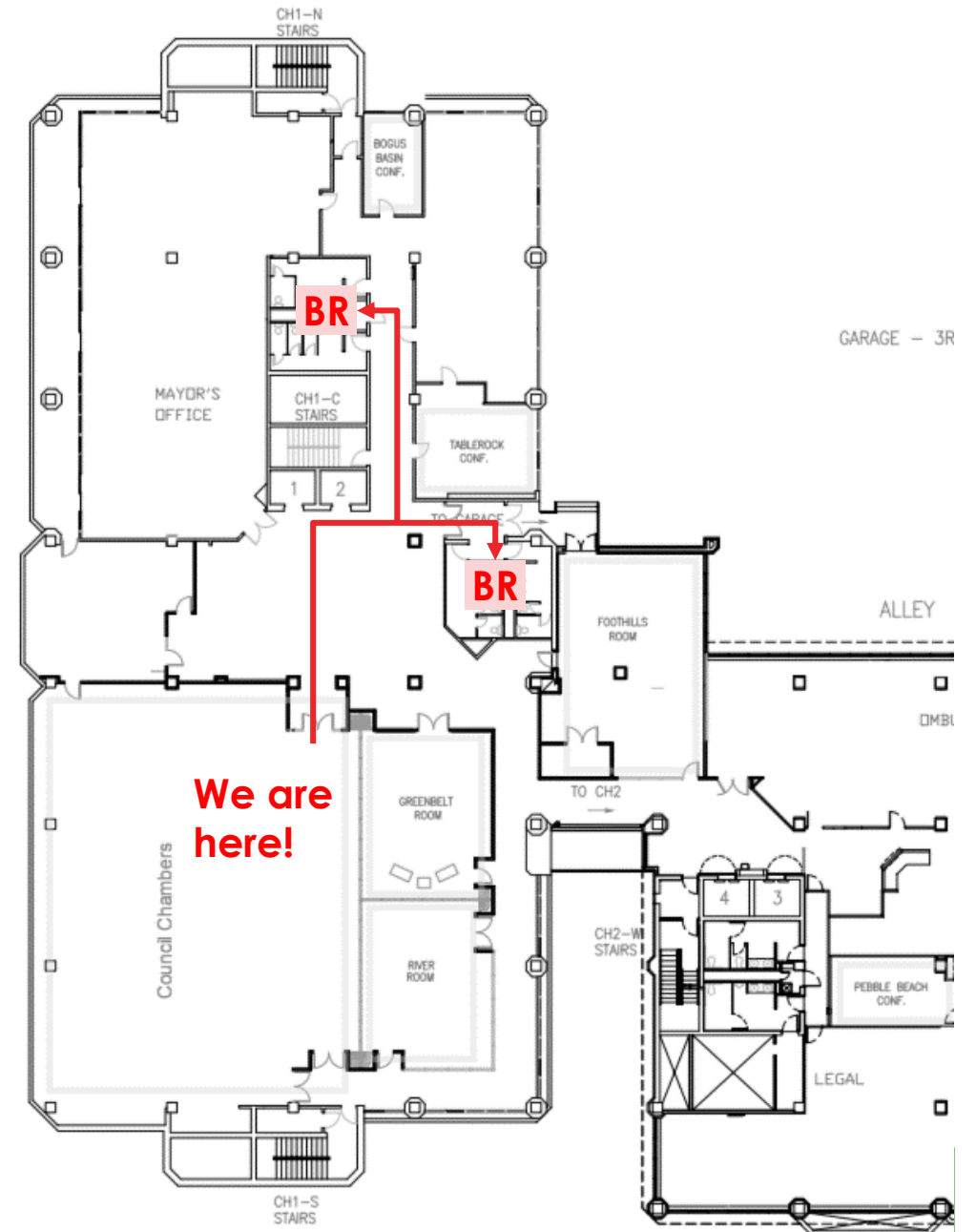
- Understand what a dashboard is and how to use it

- Introduction to Power BI

- Have fun!

- Note: Practice makes better ☺

BOISE
CITY OF TREES

PLAN FOR THE DAY

- Context Setting
  - What is a dashboard?
  - Dashboard types and features

- Dashboarding Principles and Tips

- Power BI

HOUSEKEEPING

- Feel free to stand and/or grab a snack

- Feel free to ask questions at any time (but I might not answer)

- Breaks are good!

- So are activities!

- Bathroom locations

CONTEXT SETTING

WHAT IS A DASHBOARD? | TYPES AND FEATURES

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WHAT IS A DASHBOARD?

LASTING ENVIRONMENTS | INNOVATIVE ENTERPRISES | VIBRANT COMMUNITIES

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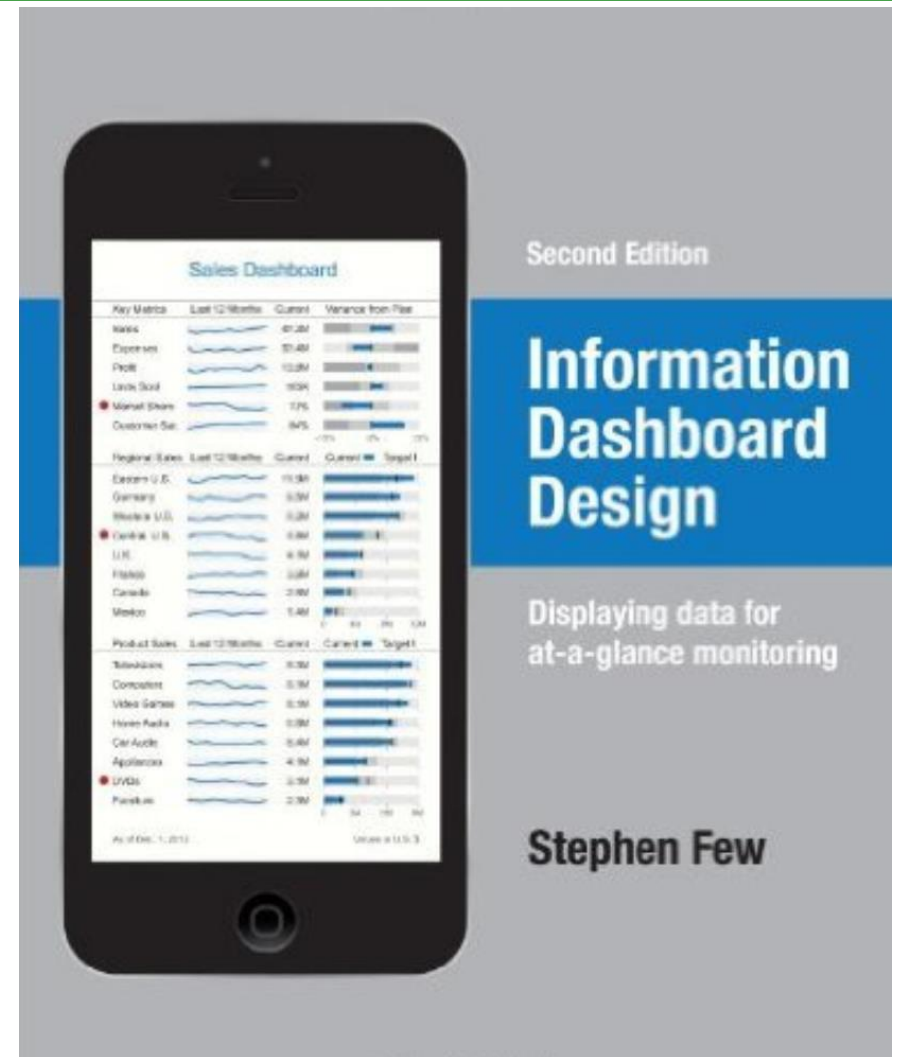
WHAT IS A DASHBOARD?

"A visual display
of the most important information needed
to achieve one or more objectives
…consolidated on a single computer screen
so it can be monitored at a glance."

--Stephen Few

WHAT IS A DASHBOARD?

Good dashboards
provide the right information
to the right person (or people)
at the right time
in a digestible format.

--Me

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ANATOMY OF A DASHBOARD

Dashboard Title

Viz Titles

Instructions

Filters/Slicers

Not shown here:
- DB description

Source

THE HOUSING MARKET ROLLERCOASTER

THE BIG PICTURE
MEDIAN HOUSE VALUE EVOLUTION

2001-2005: THE BUBBLE
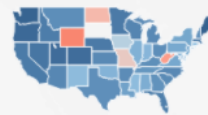
2006-2011: THE CRISIS

2012-NOW: THE RECOVERY

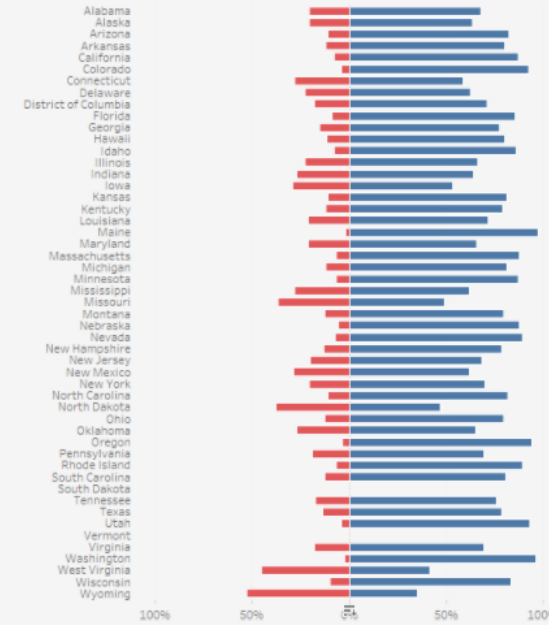**STATE BY STATE TIMELINE - August 2017**

August 2017

% House Increasing in value
0%   100%

© OpenStreetMap contributors

% HOUSE INCREASING OR DECREASING IN VALUE

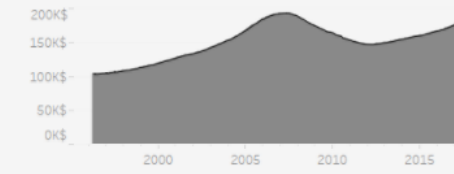**WHAT ABOUT YOU?**
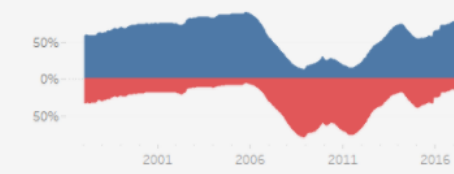Click on a bar to see the house to sell

State   City, State
(All)   (All)

MEDIAN HOUSE VALUE EVOLUTION

% HOUSE INCREASING OR DECREASING IN VALUE

CURRENT MEDIAN HOUSE VALUE PER CITY
Click on a bar to see the house to sell
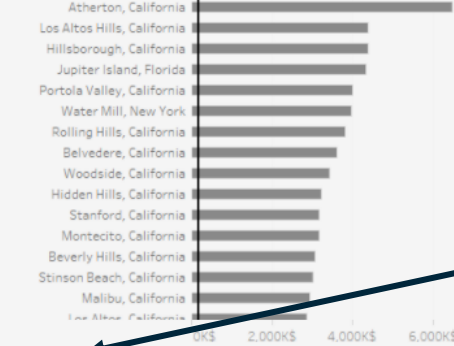
Zillow Home Value Index data provided by Zillow. The results and opinions are those of the author(s) and not reflect the position of Zillow Group.

+tableau

SOME CHARACTERISTICS

- Interactive and dynamic

LASTING ENVIRONMENTS | INNOVATIVE ENTERPRISES | VIBRANT COMMUNITIES
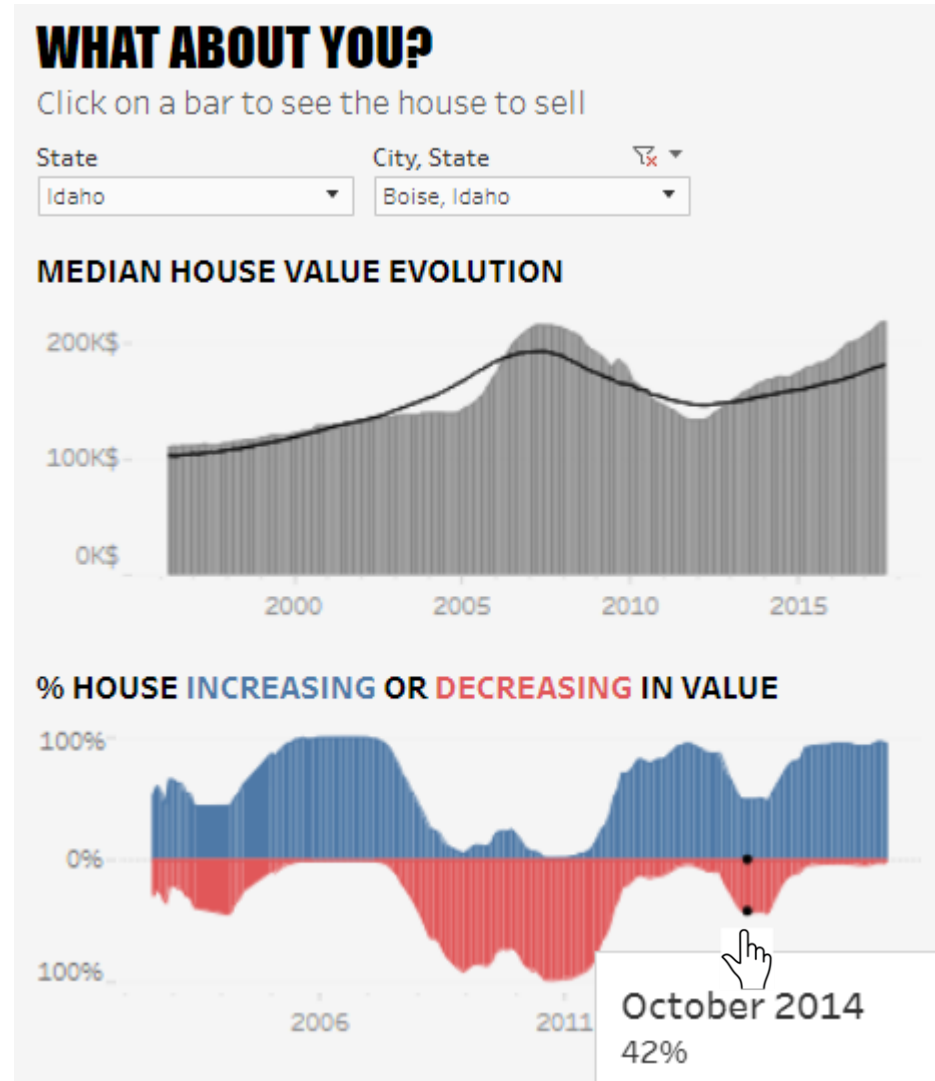
SOME CHARACTERISTICS

- Interactive and dynamic

- Automated

SOME CHARACTERISTICS

- Interactive and dynamic

- Automated

- Multiple data vizzes…usually

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DASHBOARD OR NOT?

Sales Overview YTD - Total
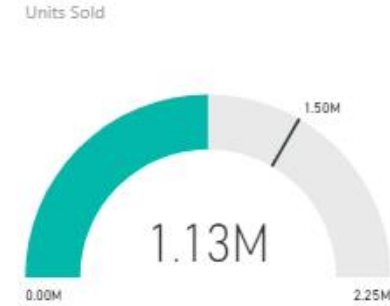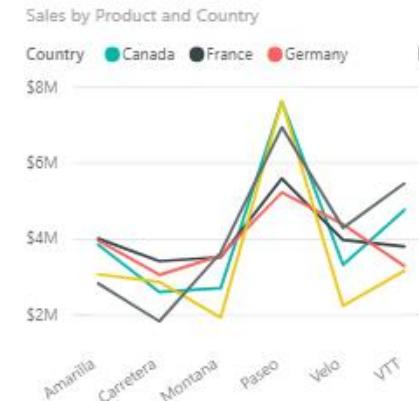
DASHBOARD OR NOT?

Where people living in Idaho **were born**:

New! ⟳ Switch to Diaspora Out of Idaho

28%

Born in Idaho 47%

10% Born in Utah

ILLINOIS

Born in Missouri

Born in California 12%

KANSAS

NEBRASKA

Born in Washington

Born in Iowa

OREGON

10% Born in other states in the Midwest

Born in other states

Born in other states in the West

Northeast

Born in other states in the South

16% Born outside the U.S.

1900　1910　1920　1930　1940　1950　1960　1970　1980　1990　2000　2012

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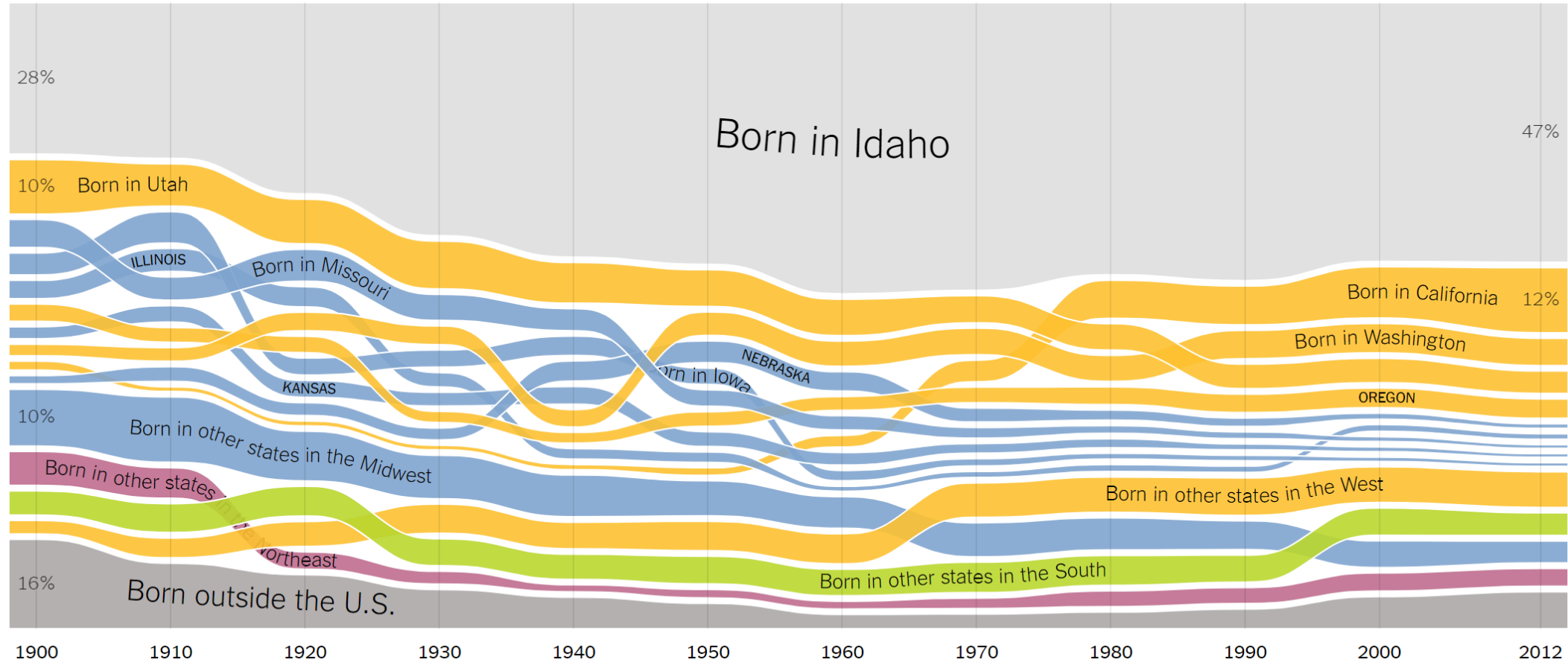
DASHBOARD TYPES

1. Performance Measurement

How are things
going, generally?

DASHBOARD TYPES

DASHBOARD TYPES

DASHBOARD TYPES

1. Performance Measurement

2. Data Analysis or Exploration

How are things going generally?

What is happening and why?

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DASHBOARD TYPES

DASHBOARD TYPES

Are **you** over the hill?
See how many Americans are younger and **older** than **you**

Move slider to select your age

36

You are older than 48.0% of All Americans

Select Gender
- All
- Female
- Male

Americans younger than you   151,884,835

Americans the same age as you   3,957,642

Americans older than you   160,286,362

Population estimates as of 2013. Source: United States Census Bureau https://www.census.gov/programs-surveys/popest.html
Special thanks to Chad Skelton at http://blogs.vancouversun.com/author/chadskeltonvansun/.

NTERPRISES | VIBRANT COMMUNITIES

DASHBOARD TYPES
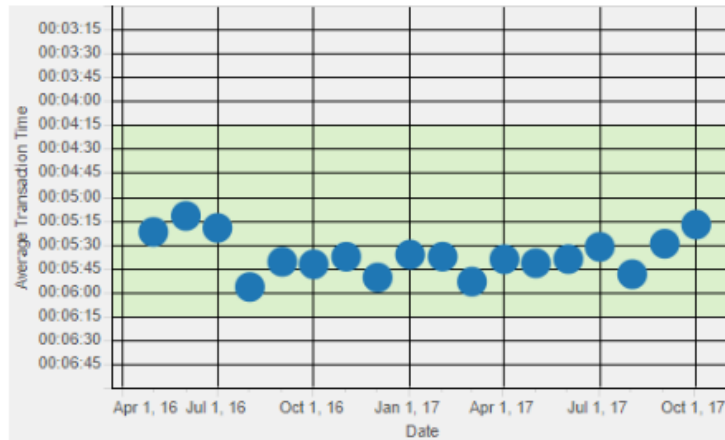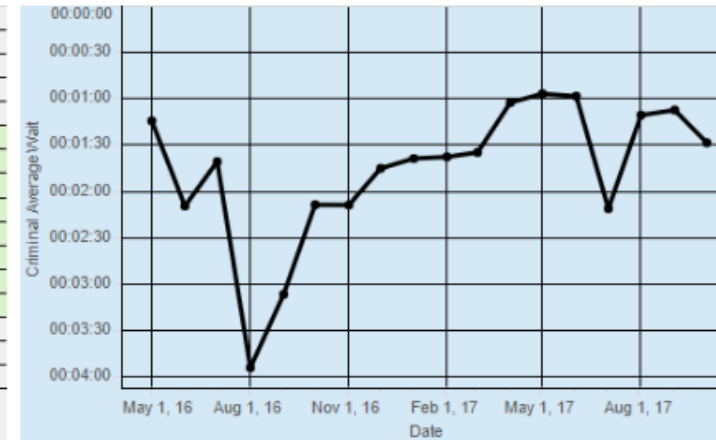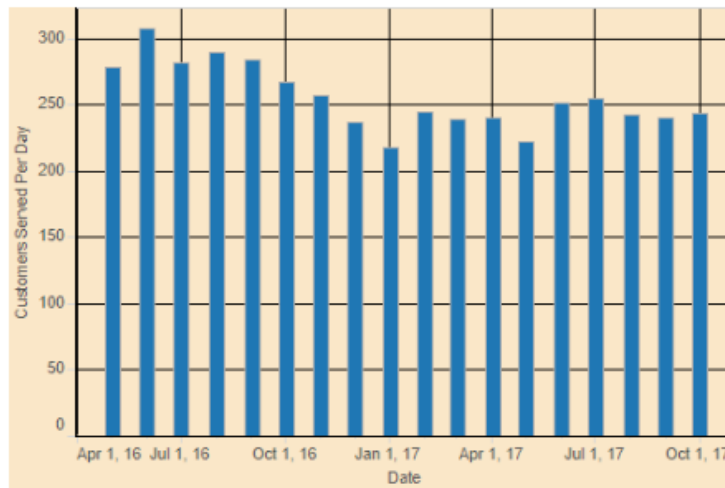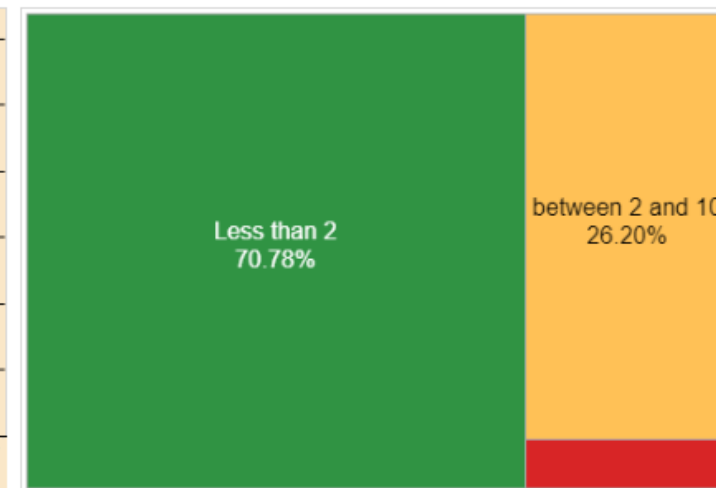
1. Performance Measurement

How are things going generally?

2. Data Analysis or Exploration

Why is happening and why?

3. Situational Awareness

What is going on right this second?

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DASHBOARD TYPES

DASHBOARD TYPES

Other examples:

Fire Asset Map

Clerk Wait Time

Questions?

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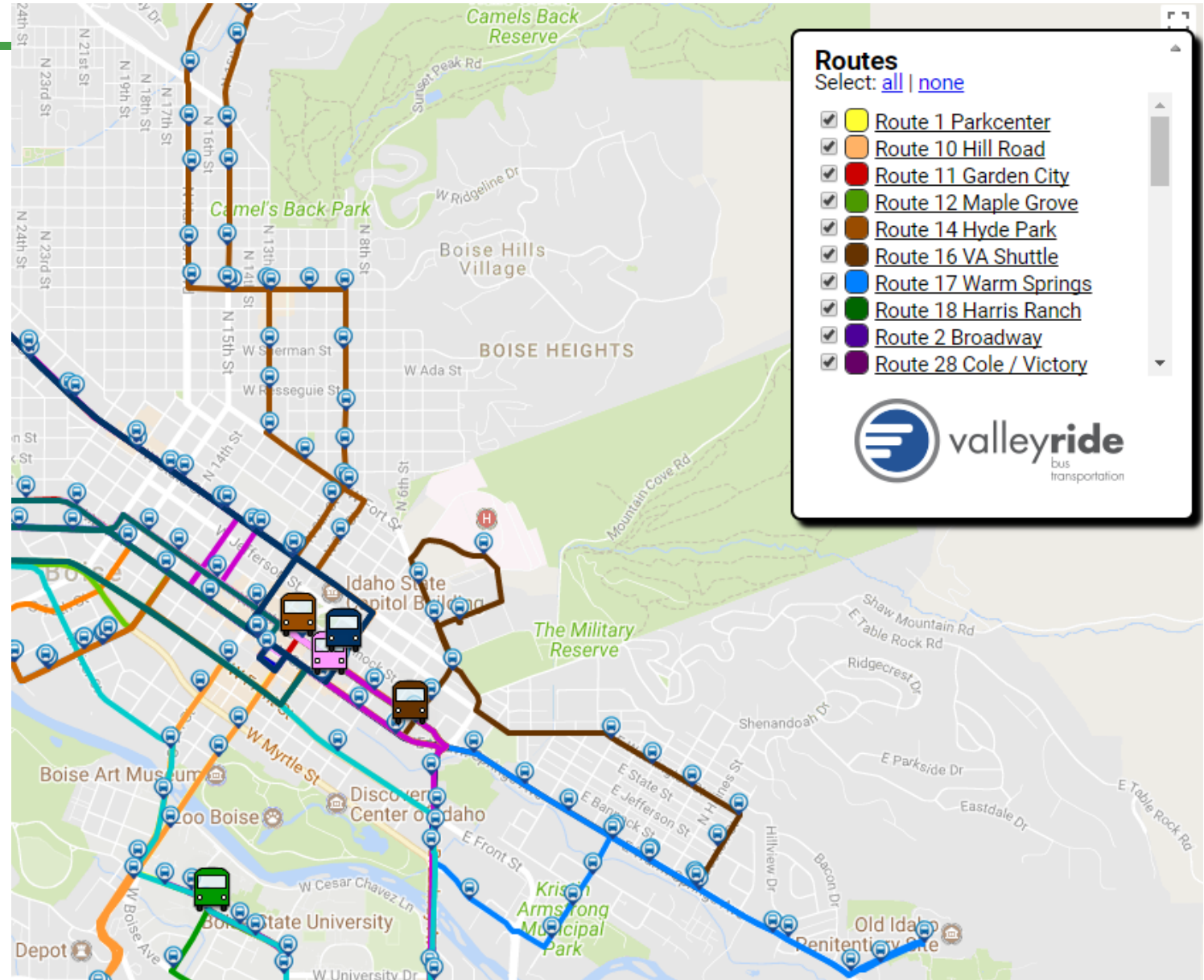
DASHBOARD TYPES
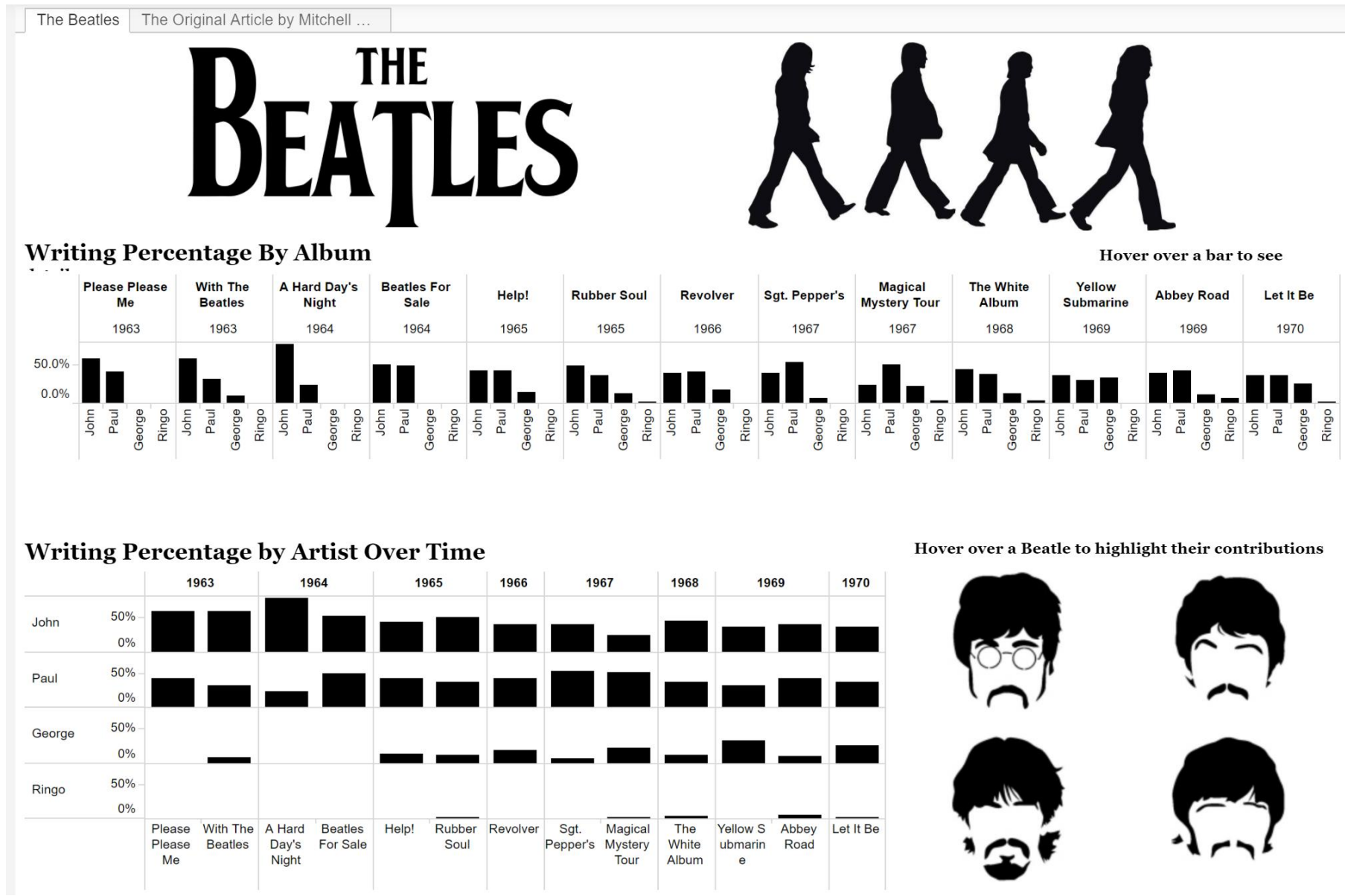
DASHBOARDING PRINCIPLES

DASHBOARDING PRINCIPLES

#1: USE DATA VIZ PRINCIPLES…USUALLY

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USE DATA VIZ PRINCIPLES…USUALLY

Data Viz Principles

1. Know your message

2. Use the right chart

3. Compared to what?

4. Don't mislead

5. Efficiency!

6. Use chart elements for impact

7. It doesn't hurt to be visually appealing (in data viz and life)

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USE DATA VIZ PRINCIPLES...USUALLY

These principles still hold true for dashboarding...

1. Know your message

2. Use the right chart

3. Compared to what?

4. Don't mislead

5. Efficiency!

6. Use chart elements for impact

7. It doesn't hurt to be visually appealing (in data viz and life)

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USE DATA VIZ PRINCIPLES…USUALLY

And these need some tweaking…

1. Know your ~~message~~ objectives (and audience)

2. Use the right chart

3. Compared to what?

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USE DATA VIZ PRINCIPLES…USUALLY

And these need some tweaking…

1. Know your ~~message~~ objectives (and audience)

2. Use the right chart

3. Compared to what?

4. Don't mislead

5. Efficiency!

6. Use ~~chart~~ DB elements ~~for impact~~ to create a user-friendly tool

7. It doesn't hurt to be visually appealing (in data viz and life)

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USE DATA VIZ PRINCIPLES…USUALLY

Remember: The key point could change!

Trump continues to dominate both news coverage and Google searches

Relative Google searches and articles appearing on Google News through the week of Feb. 27, 2016

ARTICLES ON GOOGLE NEWS

GOOGLE SEARCHES

Ben Carson · Ted Cruz · John Kasich · Marco Rubio · Donald Trump

AUG '15 — FEB '16

FIVETHIRTYEIGHT · SOURCE: GOOGLE TRENDS
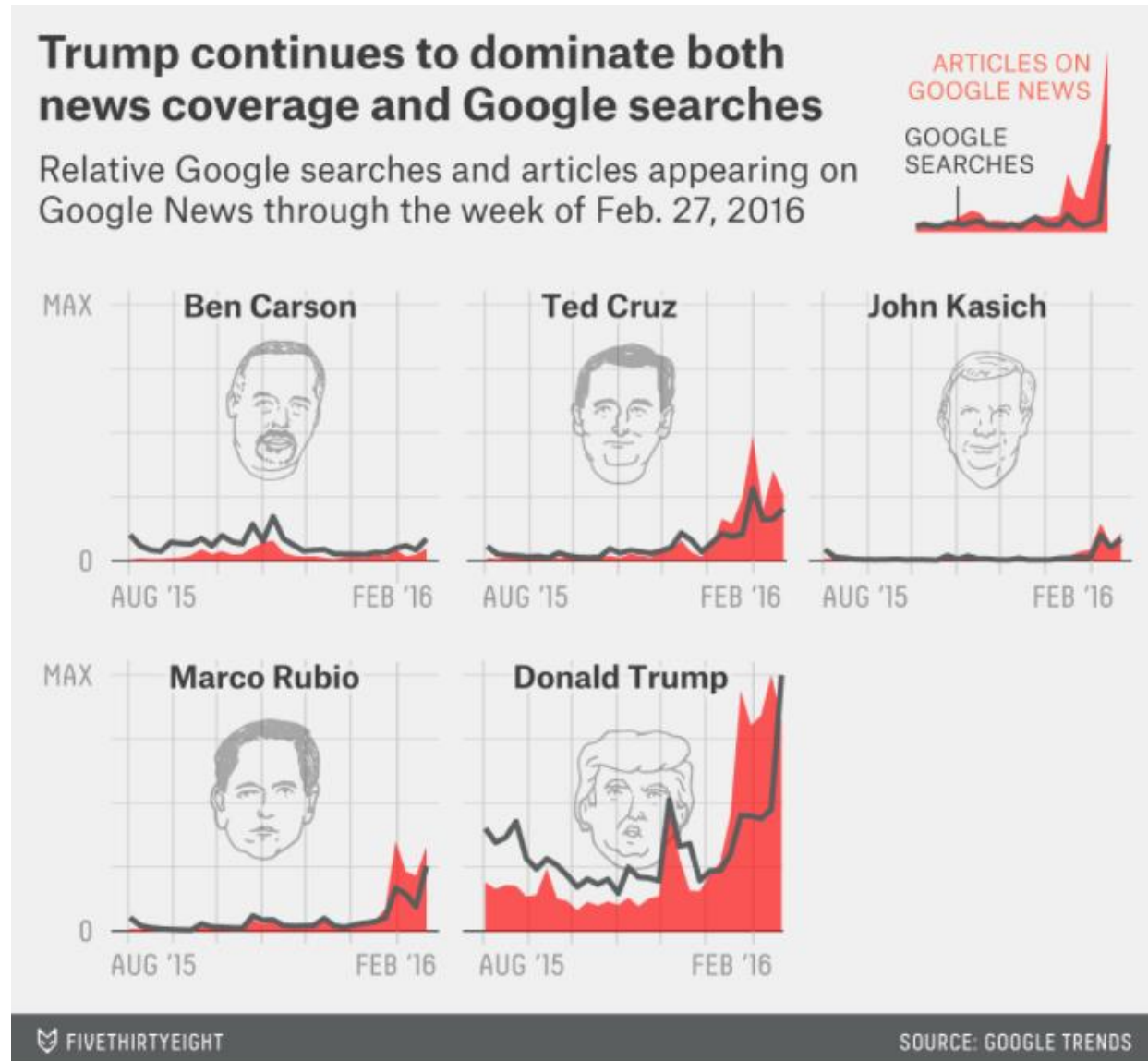
USE DATA VIZ PRINCIPLES...USUALLY
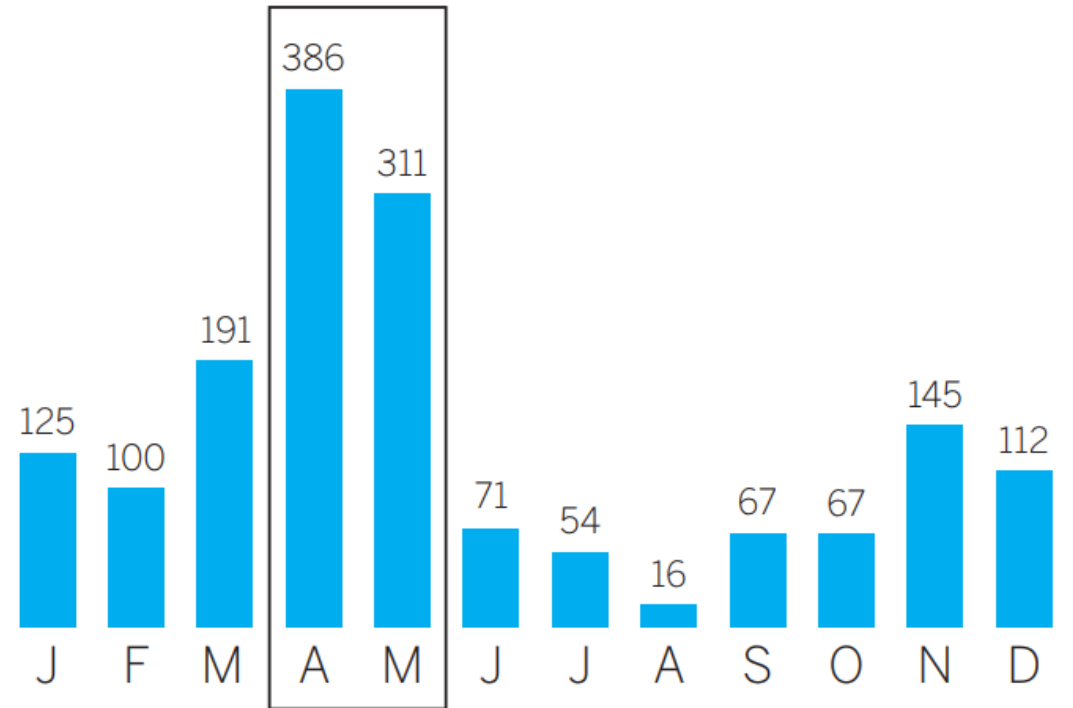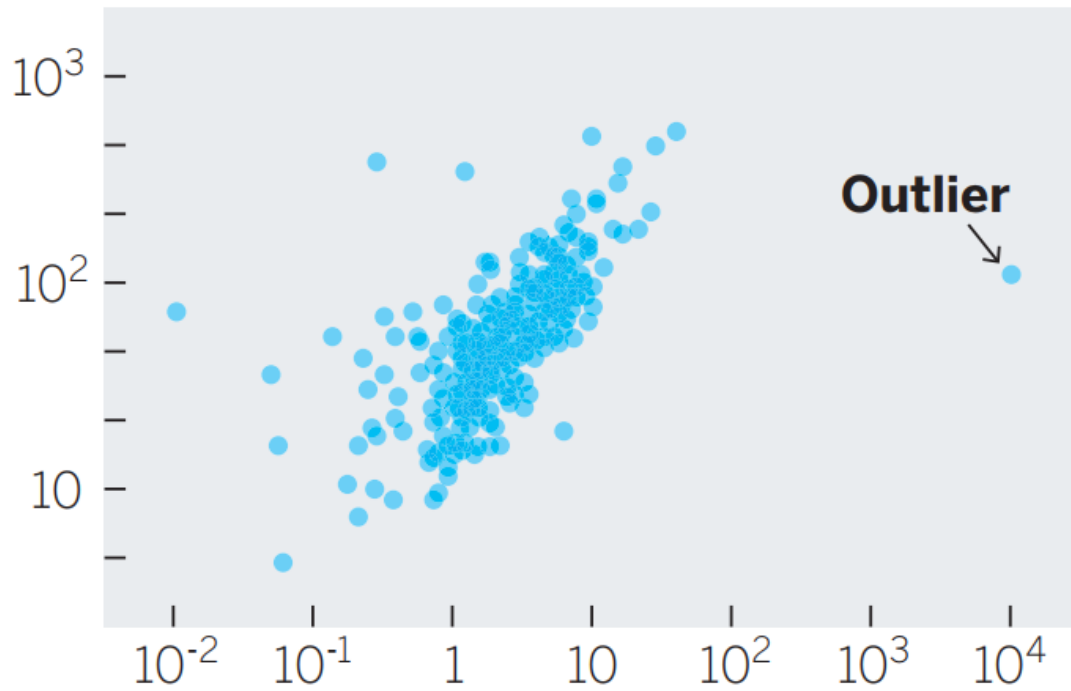
DASHBOARDING PRINCIPLES

#2: **KNOW YOUR OBJECTIVES**

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KNOW YOUR OBJECTIVES (AND AUDIENCE)

What will the dashboard be used to monitor, and what **objectives** will it support?

What **questions** will the dashboard answer?

What actions will be taken in response to these dashboards?

From *Information Dashboard Design* by Stephen Few
*Emphasis is mine.

LASTING ENVIRONMENTS | INNOVATIVE ENTERPRISES | VIBRANT COMMUNITIES

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KNOW YOUR OBJECTIVES (AND AUDIENCE)

Feature	Items
Audience Size	Single person Multiple people w/ different requirements
User Expertise	Novice Expert
Screen Type	Large screen Mobile screen Variable
Update Frequency	Near real time Daily Weekly

Adapted from *Information Dashboard Design* by Stephen Few

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Activity time!

What are your objectives?

Who is your audience?

ACTIVITY: OBJECTIVES AND AUDIENCE?

Feature	Items
Audience Size	Single person Multiple people
User Expertise	Novice Expert
Screen Type	Large screen Mobile screen Variable
Update Frequency	Near real time Daily Weekly

1. What will the dashboard be used to monitor, and what **objectives** will it support?

2. What questions will the dashboard answer?

3. **What actions will be taken** in response to these dashboards?

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DASHBOARDING PRINCIPLES

#3: **MAKE IT USER FRIENDLY**

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MAKE IT USER FRIENDLY

Use a grid to align objects.

MAKE IT USER FRIENDLY

Group like items together.
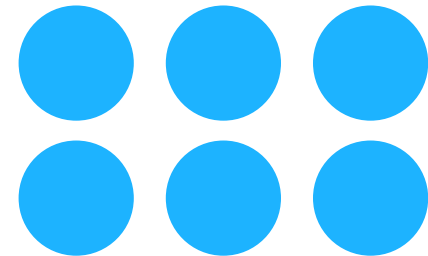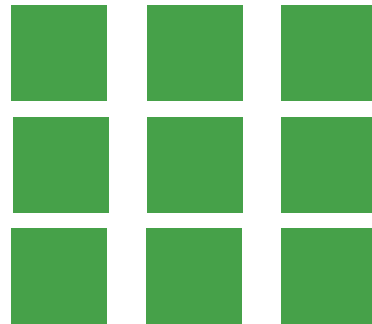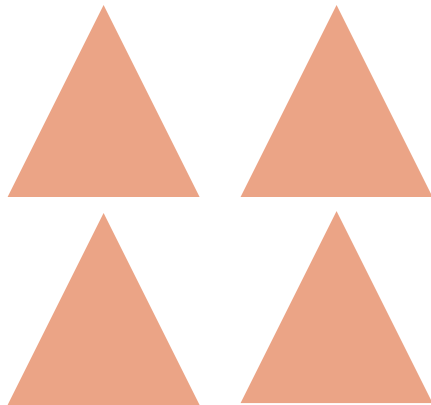
Crimes in India

District wise crimes committed under **Indian Penal Code (IPC)** from 2001 to 2014. The Indian Penal Code is the main criminal code of India intended to cover all substantive aspects of criminal law. All the district names and mapping are as per 2011 census.

Highlight the Crime

All
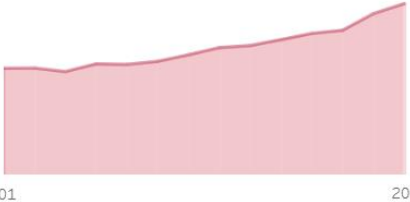
3,312,038
Total Crimes in 2014

2001   2014

Crime	Count
Theft : Auto & Other	884.9K
Assault On Women	260.6K
Grevious Hurt	210.9K
Burglary	199.3K
Riots	133.9K
Causing Death By Negligence	128.8K
Rape Attacks	116.0K
Cheating	109.7K
Kidnapping & Abduction	78.4K
Attempted: Rape,Murder & Others	50.6K
Robbery	38.1K
Murder	34.1K
Criminal Breach Of Trust	20.1K
Counterfieting	16.9K
Dacoity	11.6K
Insult To Modesty Of Women	9.7K
Arson	9.3K
Dowry Deaths	8.5K
Culpable Homicide Not Murder	3.3K

MAKE IT USER FRIENDLY

Consider concise instructions.

And be careful with color!
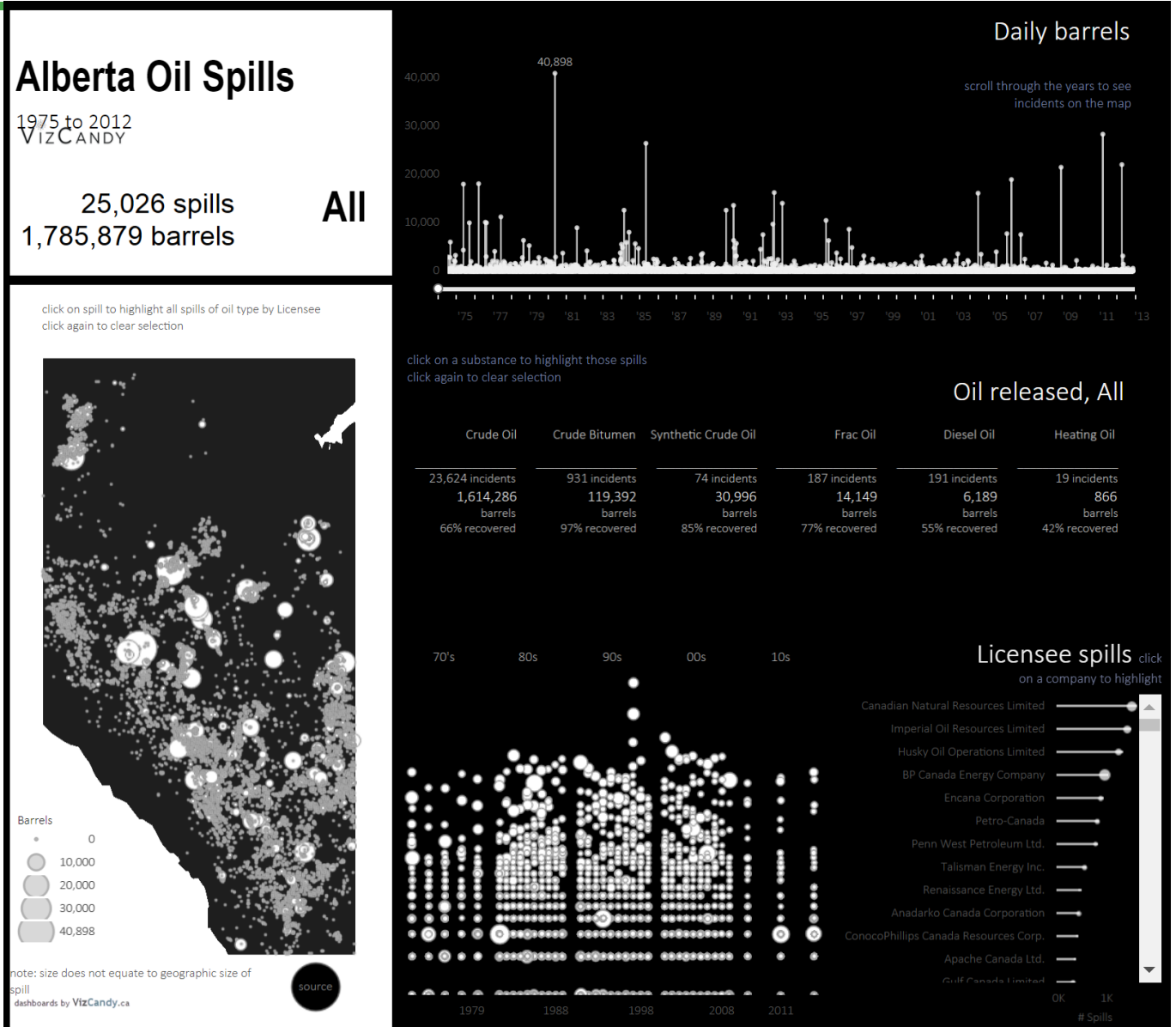
Vary your chart types.

In 2015 **73,390** people were involved in the fatal accidents. **28,671** vehicle occupants died.

Fatality Distribution by Age

Those **not wearing seat belts or helmets** were **45.0 %** more likely to have died in these accidents

Fatality Rate by Helmet/Seat Belt Use

Not Used	69.64%
Unknown	33.65%
Used	24.66%
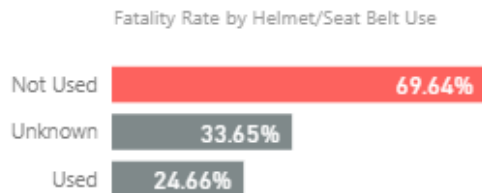
Vehicle **drivers** account for the majority of accident fatalities

22.09%

77.91%

● Driver ● Passenger
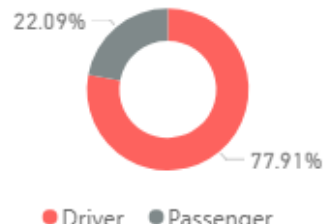
In addition to seat belt use, the fatality rate varies greatly by the **type of vehicle**, **point of impact** in an accident, and **seating position** within a vehicle.

Fatality Rate for Occupants in Crashes With 1 or More Fatality

Motorcycles	88.06%
Passenger Cars	42.27%
Other/Unknown	33.40%
Light Trucks & Vans	32.37%
SUVs	31.36%
Medium Trucks	20.46%
Heavy Trucks	13.88%
Bus	

Left Side

53.47 %
43.48 %
35.57 % 40.92 %
23.89 % 25.68 %
23.60 %

Right Side

48.35 %
23.60 % 30.22 %
24.67 %
41.48 %
37.68 % 35.57 %

Driver's Seat [45.56 %]	1st Row Middle [19.83 %]	1st Row Right [30.07 %]
2nd Row Left [26.64 %]	2nd Row Middle [17.72 %]	2nd Row Right [23.14 %]
3rd Row Left [9.38 %]	3rd Row Middle [12.31 %]	3rd Row Right [14.90 %]

Cargo Area [9.73 %]

Riding Exterior [67.50 %]

DASHBOARDING PRINCIPLES

#4: **EFFICIENCY!**

EFFICIENCY!

WHICH ELEMENTS SHOULD YOU KEEP?

Is this element necessary?

— **Yes** — Is this element unique?

— **Yes** — **Yes** — Can this element be made any simpler?

— **Yes** — Simplify and keep this element

— **No** — Keep this element

— **No** — Compare with similar elements and consider eliminating one or the other

— **No** — Consider eliminating this element
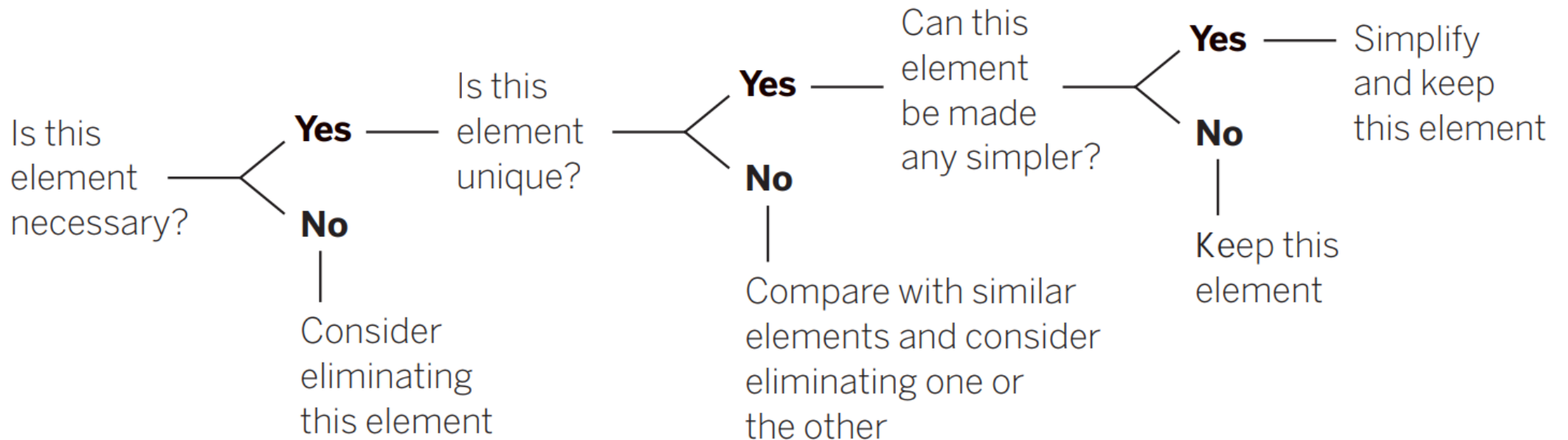
From: *Good Charts* by Scott Berinato

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EFFICIENCY!

Highlight the Crime

All ▼

Service

☐ British Transport Police
■ Police Force

Category

☐ Anti-social behaviour
■ Bicycle theft
☐ Burglary
☐ Criminal damage an...
☐ Drugs
☐ Other crime
☐ Other theft
☐ Possession of weapo...
☐ Public order
☐ Robbery
☐ Shoplifting
☐ Theft from the person
☐ Vehicle crime
☐ Violence and sexual ...

Country

☐ Canada
☐ France
☐ Germany
☐ Mexico
☐ United States of Ameri...

Hick's Law:

As options increase, decision time increases exponentially.

Segment

☐ Channel Partners
☐ Enterprise
☐ Government
☐ Midmarket
☐ Small Business

Last Uploaded

8/21/2015   10/18/2016

Product

☐ Amarilla
☐ Carretera
☐ Montana
☐ Paseo
☐ Velo
☐ VTT

Absence Reduction Report
Secondary Level

Big View

Use this report to drive informed conversations to reduce absences, improve educational value, and increase test scores.

District Status

Select a month to filter dashboard:

| Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Forecast |

2.8%
3.0%
4.4%
2.1%
Target
1.5%
1.6%
0.7%
0.8%
1.2%

1.6%	1.5%
Actual Absence %	Target Absence %
217K	204K
Total Absences	Target Absences

Schools Meeting Target

8

0   19

Opportunities By School

Select schools to filter: All

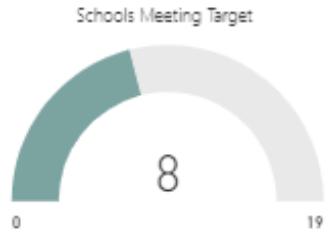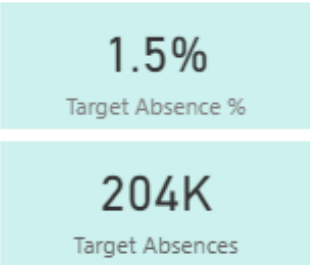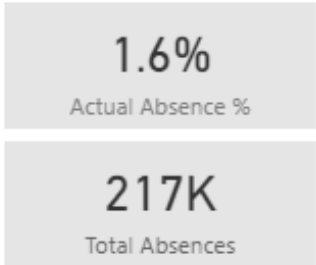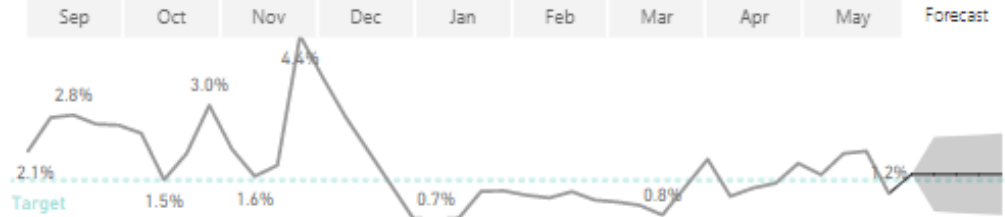| School	Total Absences	Absence Percentage	Reduction Goal ❓
Arts & Crafts Academy	22,415	2.6 %	9,546
Small High School	8,061	3.9 %	4,970
Seashore High School	33,092	1.7 %	4,506
Tech High School	11,497	1.9 %	2,592
Special School	16,313	1.7 %	2,120
Stevens Pass High School	43,576	1.5 %	1,220

Absence Percentage By Subject

1.8%	1.8%	1.7%	1.7%	1.6%	1.6%	1.5%	1.3%	1.2%
Fine Arts	Career	Social Studies	Math	English	Physical Education	Science	World Language	Advanced Placement

Conversation Topics

Select a subject to filter: All

Teacher	Principal	Total Absences	Absence Percentage	Reduction Goal ❓
Yang, Steve	Kerr, Tyrone	2,142	3.9 %	1,309
Meyer, Dan	Buckley, William	2,681	2.9 %	1,281
Alvarado, Clifford	Buckley, William	1,943	3.8 %	1,172
Weeks, Liza	Buckley, William	2,038	3.4 %	1,144
Rollins, Clinton	Kerr, Tyrone	1,501	5.0 %	1,054
Reid, Diana	Buckley, William	1,760	3.1 %	906

Select a teacher to filter: All

1 2 3 4 5 6
Absence Percentage By Period
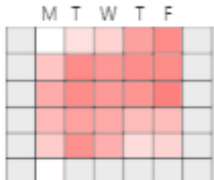
M T W T F
Absence Percentage By Day

Course	Actual Absence % ▼
Introduction To Robotics	8.7 %
Welding 1	7.9 %
Beginning American Si...	7.8 %
AP Calculus BC	7.5 %
Beginning Reading - ELL	7.5 %
Welding 2	6.7 %
Principles Of Engineeri...	6.5 %

Absence Percentage By Class

51

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WHEN FATAL CRASHES HAPPENED

Each cell represents the percentage of crashes involving the selected factor, occurring during the given month and time in 2015.
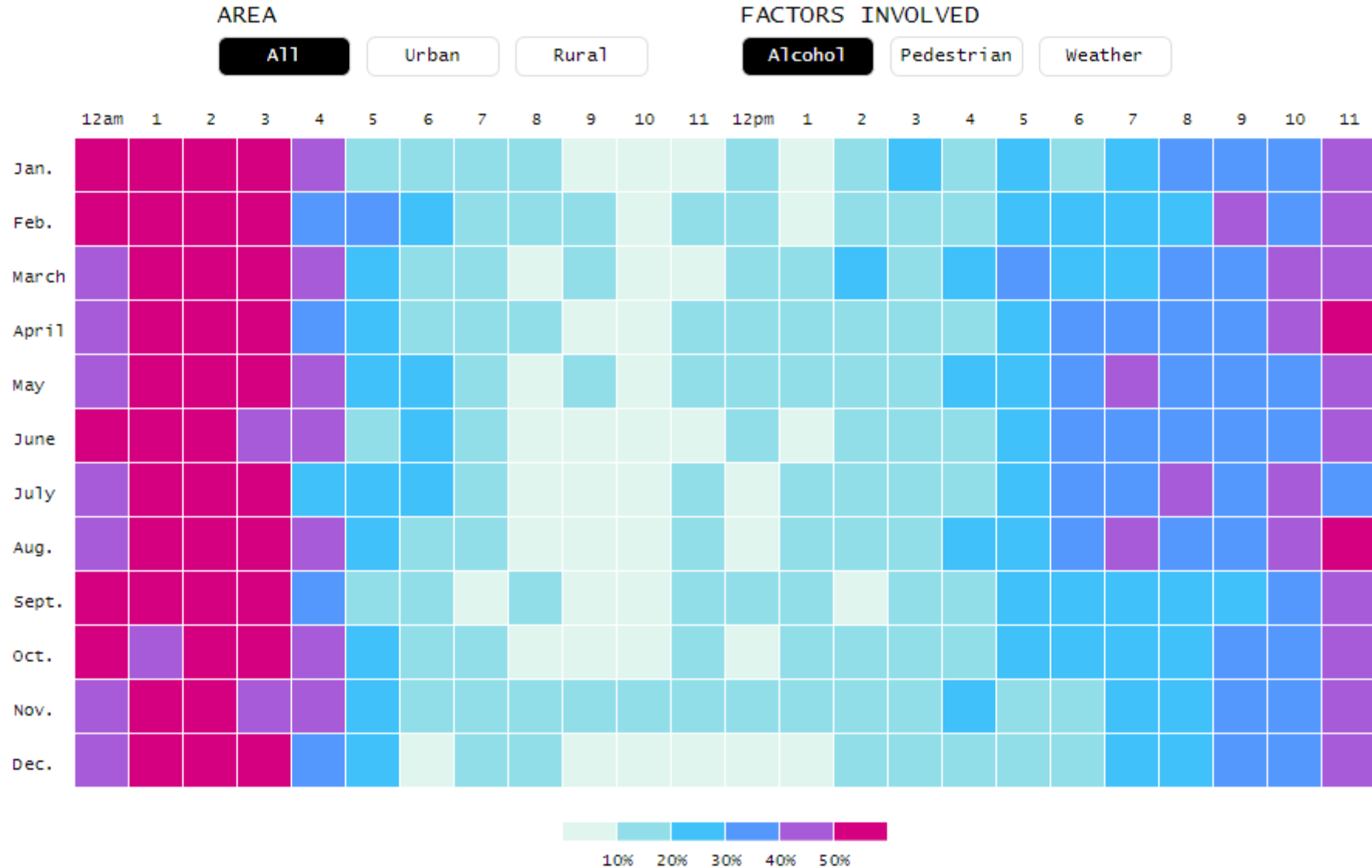
DASHBOARDING PRINCIPLES

#5: **AT A GLANCE OR LOOK DEEPER**

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AT A GLANCE OR LOOK DEEPER

Keep each dashboard to one computer screen if you can…

AT A GLANCE OR LOOK DEEPER

Performance of services contributing to Calgary's quality of life

Waste landfilled per capita

431 kg per person

Waste & Recycling Services (WRS) uses the amount of waste that goes to the landfill...

On Track

View Goal

Roads: Summer Maintenance

78 per cent

The City is committed to maintaining the integrity and quality of Calgary's roadways and...

Near Target

View Goal

Fire response within 7 minutes

82 per cent of the ti...

Response times are an important m... citizen safety and service. In the eve...

On Track

View Goal

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DASHBOARDING PRINCIPLES

1. Use data viz principles…usually

2. Know your objectives (and audience)

3. Make it user friendly

4. Efficiency!

5. At a glance…or look deeper

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Questions?

LASTING ENVIRONMENTS | INNOVATIVE ENTERPRISES | VIBRANT COMMUNITIES

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THE PROCESS

THE PROCESS

1. User research (objectives, functionality needs, etc.)

2. Steal ideas!

3. Sketch it out on paper (or PowerPoint)

4. Access, clean and explore the data

5. Create and test draft dashboard

6. Integrate feedback

7. Train users and deploy

Activity time!

Sketch a Dashboard

POWER BI

POWER BI

WHAT IS POWER BI?

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WHAT IS POWER BI

- Data viz and dashboarding

- Automatic data refresh

- Use many different data types

- Share with others

Source: Gartner (February 2017)

POWER BI

A TUTORIAL

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Questions Asked at Boise Libraries
Since January 2016

Total # of Questions
14.72K

# of Questions YTD
8,613

Select a date range

1/2/2016   11/12/2017

Select customer age
- ☐ Adult
- ☐ Kid
- ☐ Teen

Select a format
- ☐ Book a Librar...
- ☐ Email
- ☐ In-person
- ☐ Page
- ☐ Phone

ID by Year, Quarter and Month
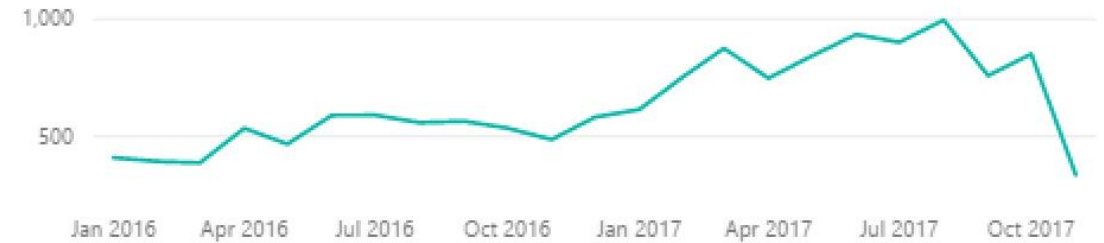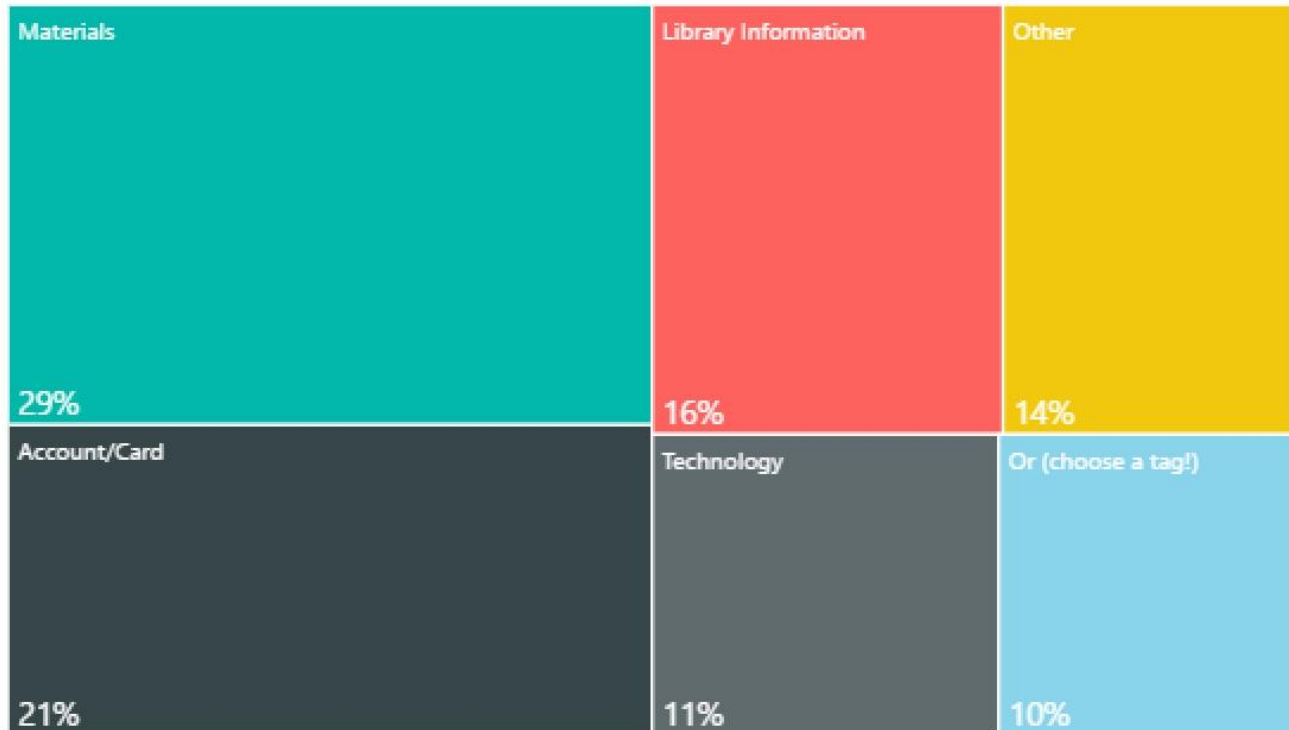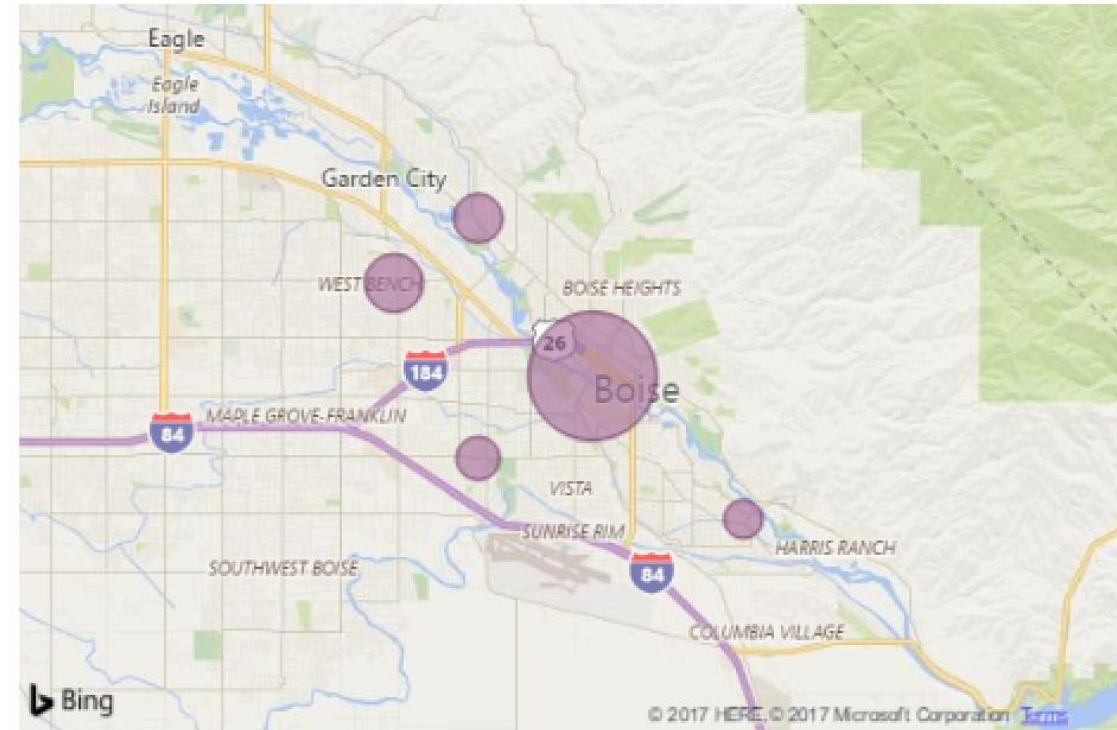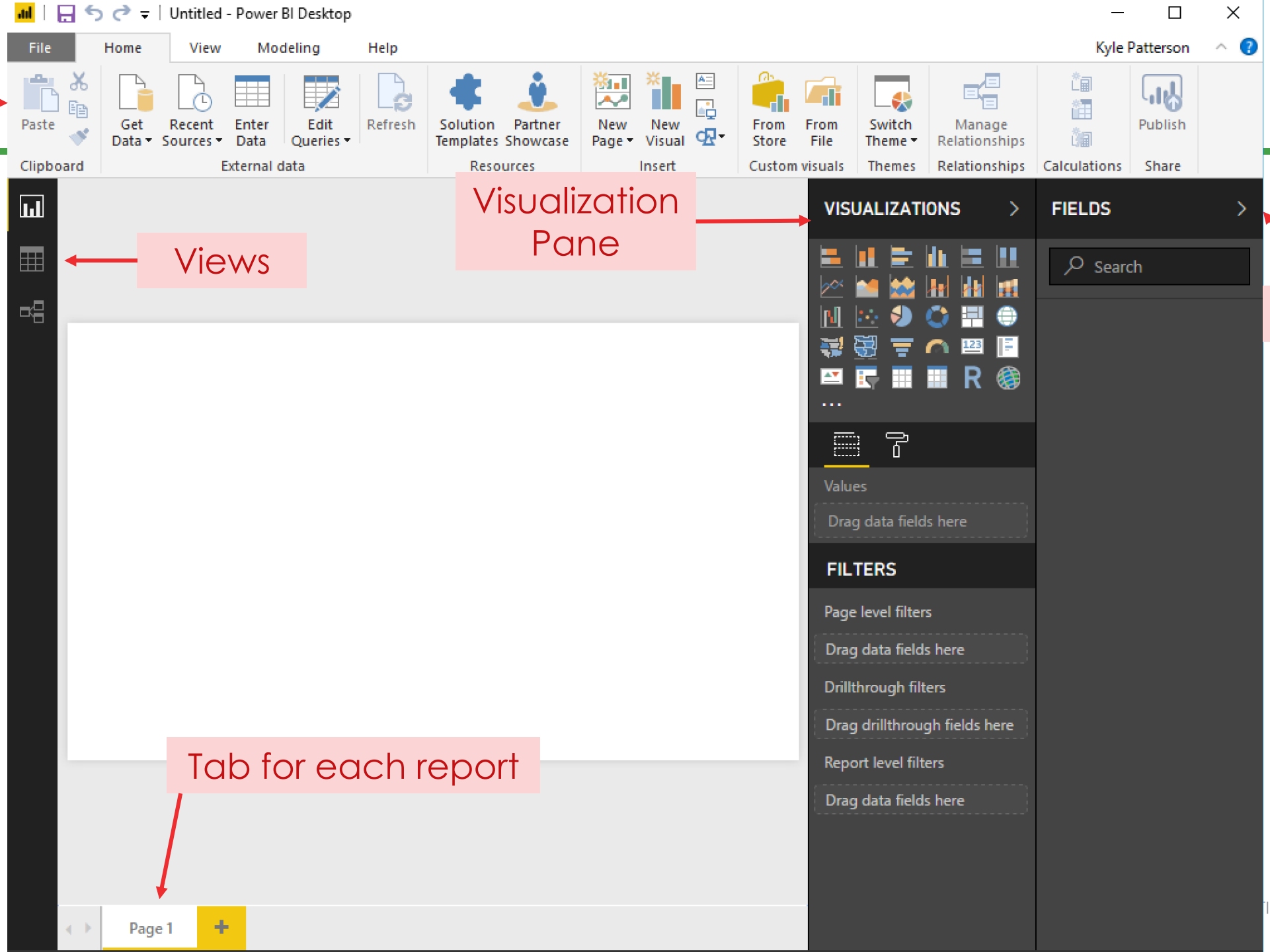
1,000

500

Jan 2016   Apr 2016   Jul 2016   Oct 2016   Jan 2017   Apr 2017   Jul 2017   Oct 2017

of Questions by Type

Materials	Library Information	Other
29%	16%	14%
Account/Card	Technology	Or (choose a tag!)
21%	11%	10%

of Questions by Library

Bing

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time!!!!!

LASTING ENVIRONMENTS | INNOVATIVE ENTERPRISES | VIBRANT COMMUNITIES

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Spend 5 minutes exploring your dashboard.

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Questions?

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Make these charts:

1. Line chart with # of questions by day for Nov-Dec 2016

2. Treemap by "Site" and "Location" (where in Library)

3. 100% stacked bar chart of question type by age group
(each bar represents an age group, and segments within bars represent question type)

4. Create one visualization from the "Store"

RESOURCES

Inspiration and Advice
- [Tableau Blog](#) *new
- [Tableau Gallery](#)*new
- [Power BI Data Stories Gallery](#)*new
- [Data Viz Done Right](#)
- [NY Times - The Upshot](#)
- The Economist [tweets](#)
- [FiveThirtyEight](#)
- [Information is Beautiful](#)

Use the right chart
- [Visuals Reference](#) guide*new
- [Infogram](#) guide

I have books! You can borrow them!
- Information Dashboard Design
- Good Charts
- Knowledge is Beautiful
- Edward Tufte books (4 of them)

Free Power BI Videos/Courses
- [EdX Course](#)*new
- [Microsoft Videos](#)*new

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NEXT STEPS

- Meetings with Kyle/Marnie

- Develop Project Charter by December 15

- December meeting? Pivot Tables?

- Tutorial on sharing to come

- Evaluation form – see email
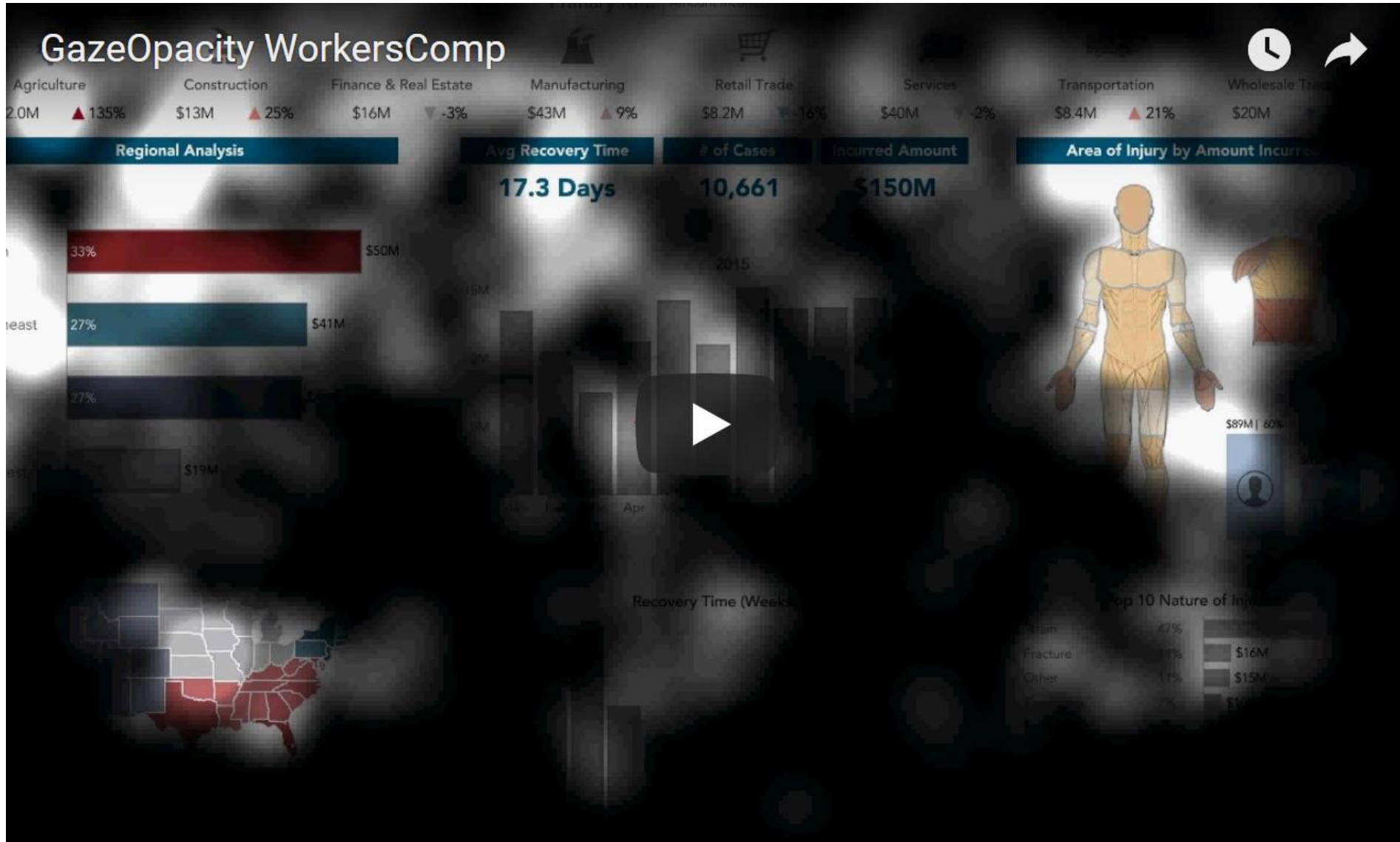
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Activity time!

Evaluation

Appendices

LASTING ENVIRONMENTS | INNOVATIVE ENTERPRISES | VIBRANT COMMUNITIES

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EYE TRACKING STUDY

KEY PRINCIPLES

Visualizing Data

1. Know your message
2. Use the right chart
3. Compared to what?
4. Don't mislead
5. Efficiency!
6. Use chart elements for impact
7. It doesn't hurt to be visually appealing (in data viz and life)

Presenting Data

1. Know your audience
2. Efficiency! (again)
3. So What?

OUTLINE

- Intro/Context – 35 min   8:30 – 9:05am
  - Opening Activity – 10 min
  - Slides – 15 min
  - Beatlemania activity – 10 min
- Principles of dashboarding – 75 min   9:05 – 10:20am
  - Slides – 15 min
  - Break – 10 min
  - Objectives/Audience Activity – 10 min
  - Slides – 15 min
  - Sketch Activity – 25 minutes
- Power BI - 115 min   10:20 - 12:15pm
  - Create dashboard together – 50 min
  - Break – 10 min
  - Dashboard activity - 55 min
- Closeout – 15 min   12:15 – 12:30pm
  - Resources and Next Steps – 5 min
  - Evaluation – 10 min

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