Communicating Research:
Best Practices for Presenting and Visualizing Quantitative Evidence

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EdPolicyWorks: The Center on Education Policy and Workforce Competitiveness

Lesson Outline

- **Setting the Stage**
  - What's so hard about sharing quantitative evidence?
- **Frameworks and Principles**
  - Rhetorical Framework
  - Audience-First
  - Economy of Words
    - Enter Data Visualization
    - A Data Viz Best Practices Crash Course
- **Next Steps**
  - Tools to Learn
  - Additional Resources

Setting the Stage

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What could go wrong?

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- **Imagine**: You've spent the past two weeks researching an important policy issue and you've found a mostly-clear consensus in the current literature around a particular policy solution.

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- You have 20 minutes at an upcoming meeting of policymakers, who have the ability to implement said policy solution, to make your case using the evidence you've gathered.

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=

You don't change anyone's mind

What could go wrong?

You don't change anyone's mind

womp womp

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Frameworks and Principles

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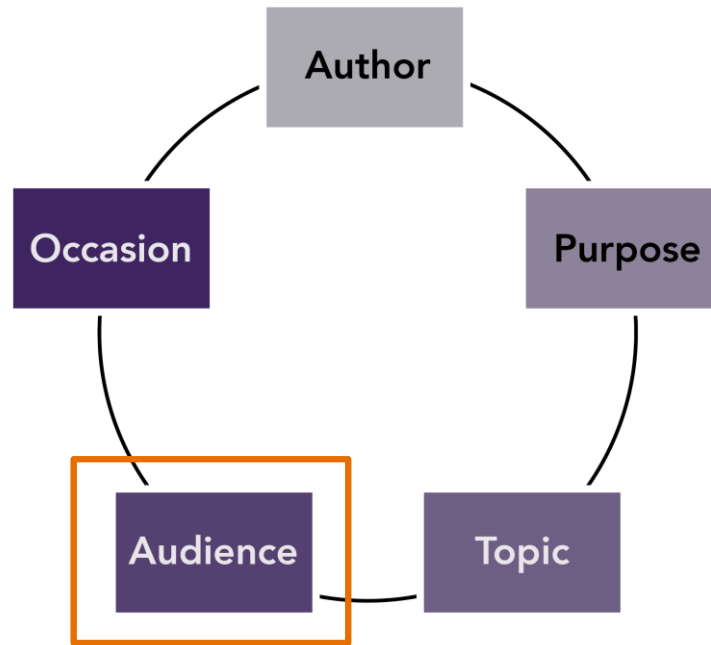BATTEN SCHOOL
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Rhetorical Framework

Rhetorical Framework

At the end of the day, you are making an *argument* when you present evidence – all the normal "rules" of argumentation and rhetoric still apply!
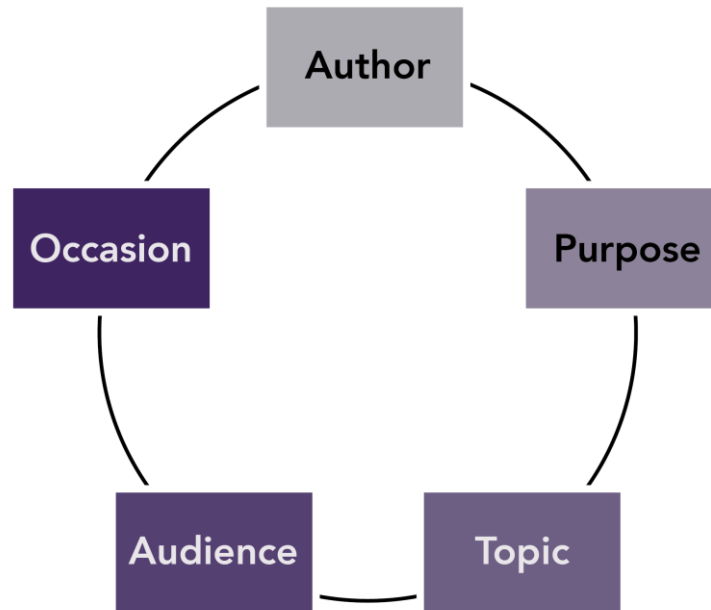
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Audience-First Mindset

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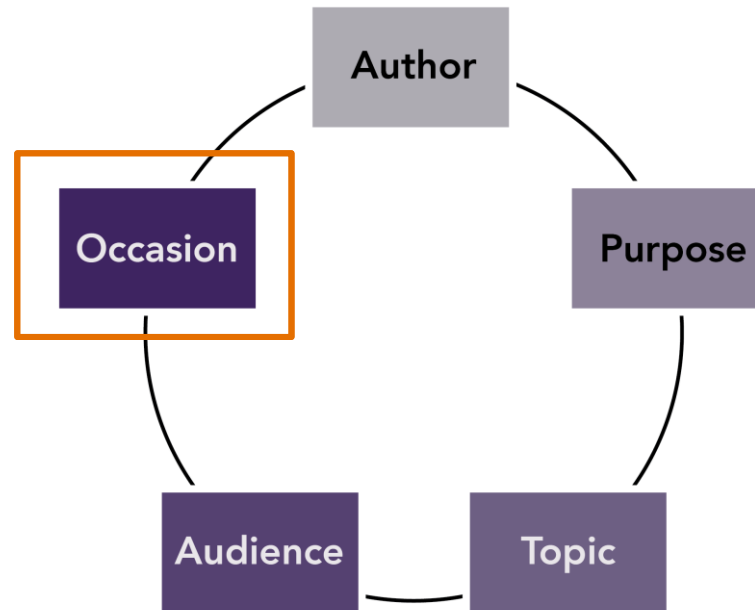
It doesn't matter what you said…

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Audience-First Mindset

It doesn't matter what you said…

…what matter is what *they think* you said.

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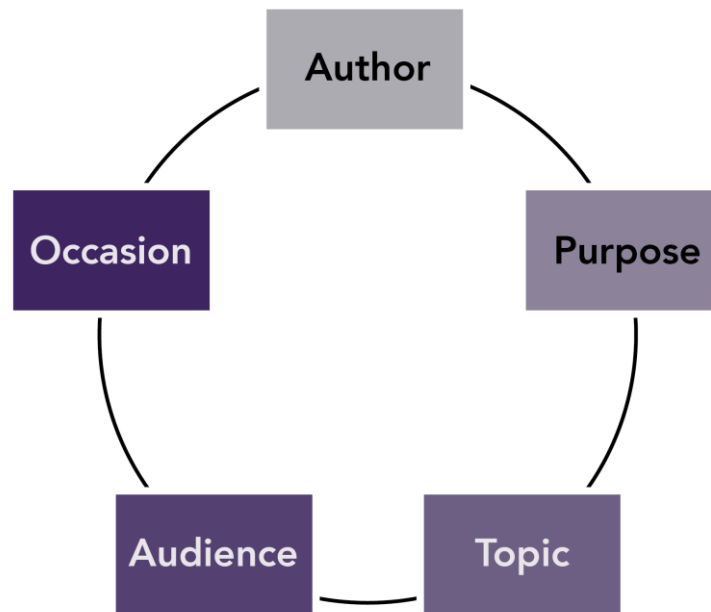
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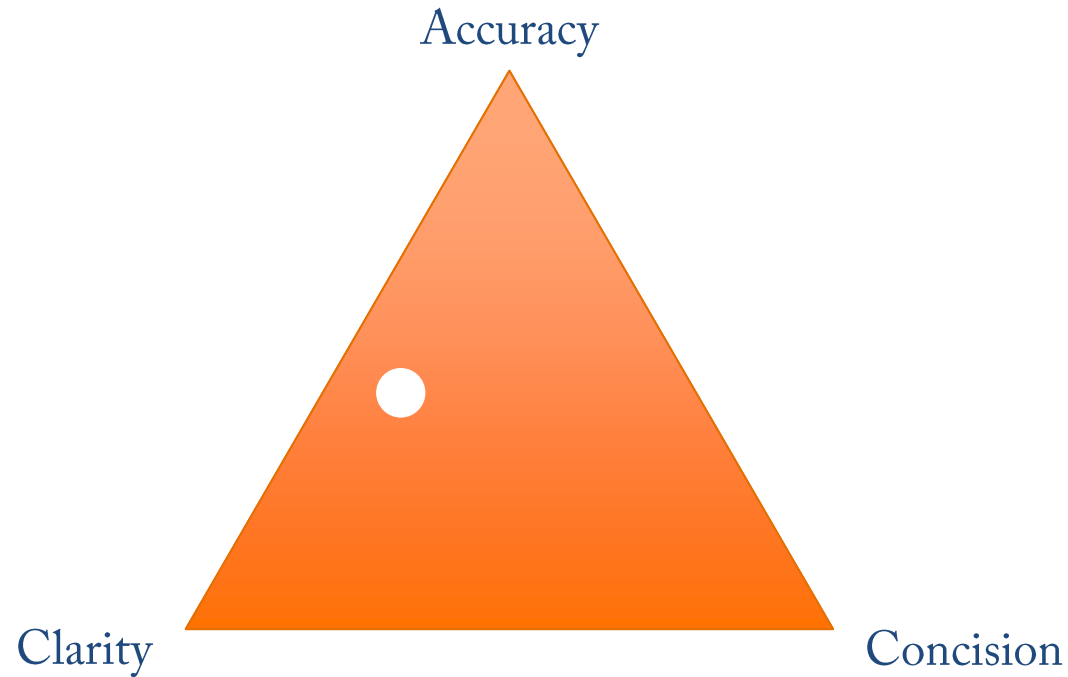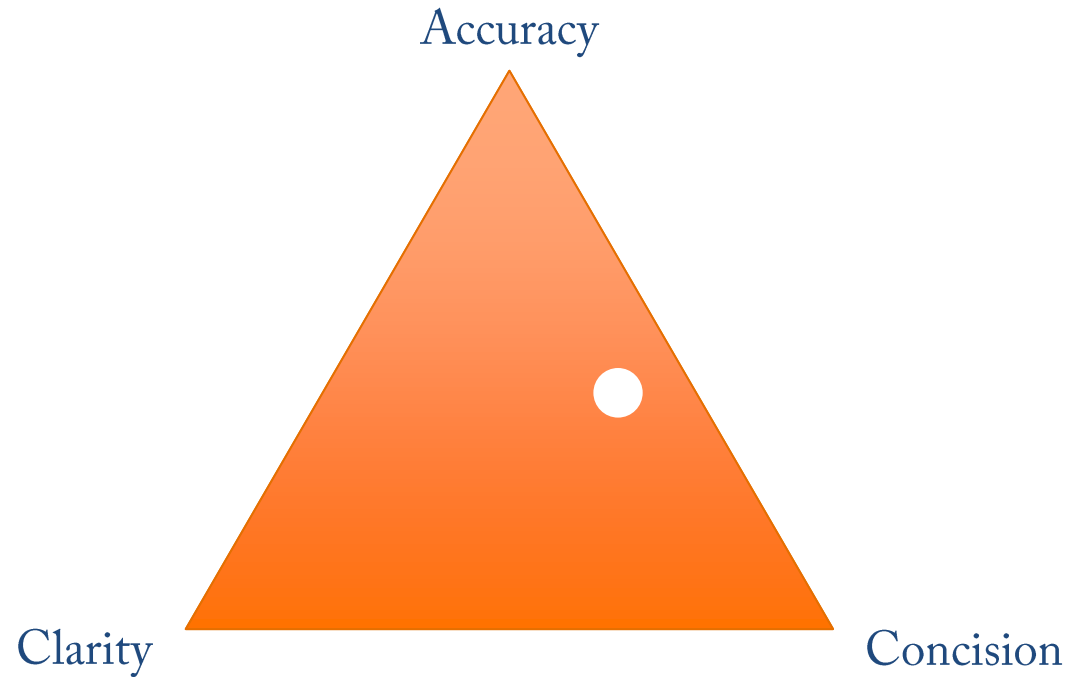
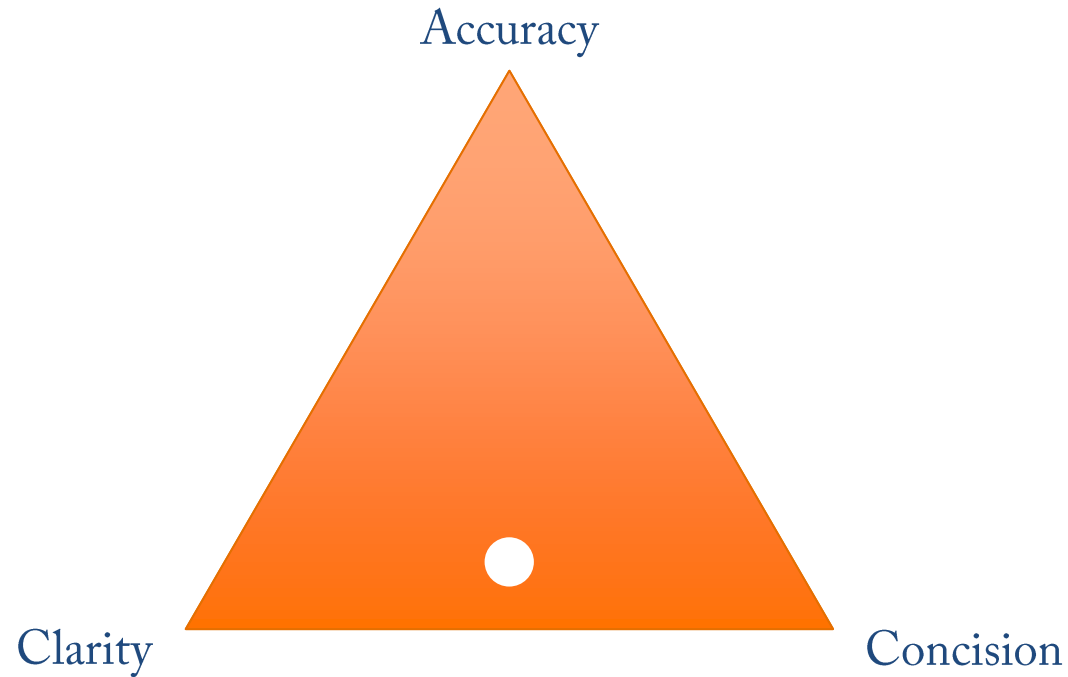# The Economy of Words

The Economy of Words

Accuracy

Clarity

Concision

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Accuracy

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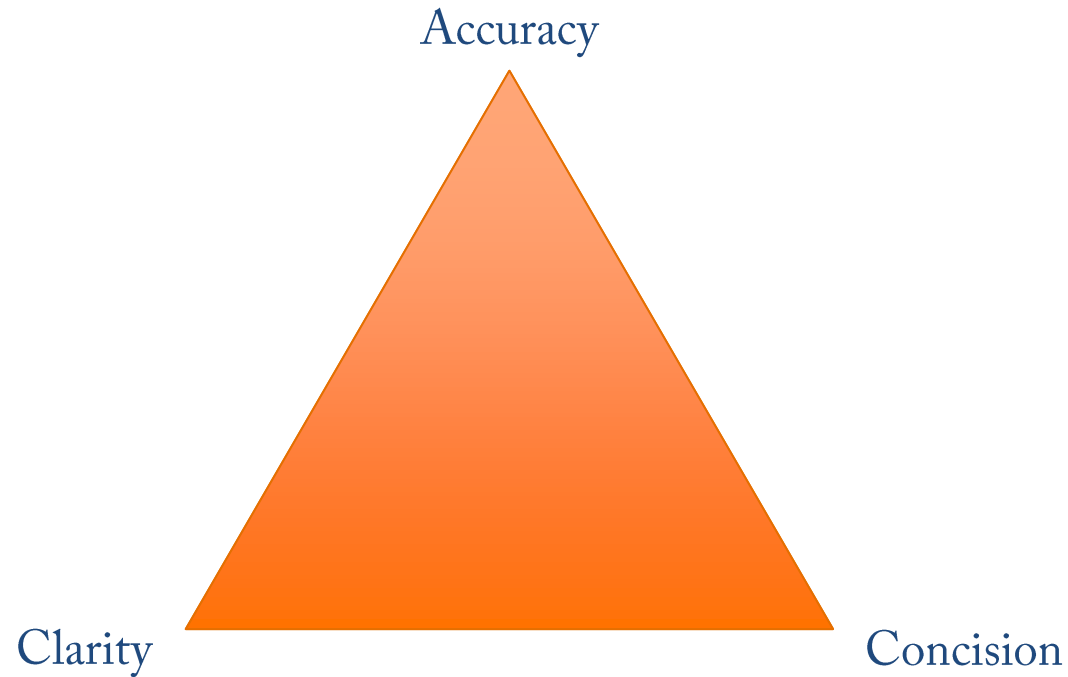
The Economy of Words

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Nearly **1,900** parents, families, and community members engaged.

More than **450** Public Charter School families participated.

More than **500** people responded to a canvassing survey developed by Parents Amplifying Voices in Education (PAVE).

Nearly **100** students contributed their input.

More than **150** families of children with disabilities participated.

65 Parent Leaders in Education (PLE) members engaged in in-person sessions hosted by PAVE.

More than **170** English learner families participated.

More than **600** DC Public Schools families participated.

200+ parents and stakeholders engaged at EdFEST on December 9.

260 people offered their input via the OSSE online survey.

600+ residents engaged from Wards 5, 7, and 8.

More than **750** community members participated in in-person feedback sessions.

Source: Office of the State Superintendent of Education, DCPS

Enter Data Visualization

Communicating

Information

Visually

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Communicating

~~Displaying~~

Information

Visually

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Communicating

~~Showing~~

Information

Visually

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Communicating

~~Presenting~~

Information

Visually

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Enter Data Visualization

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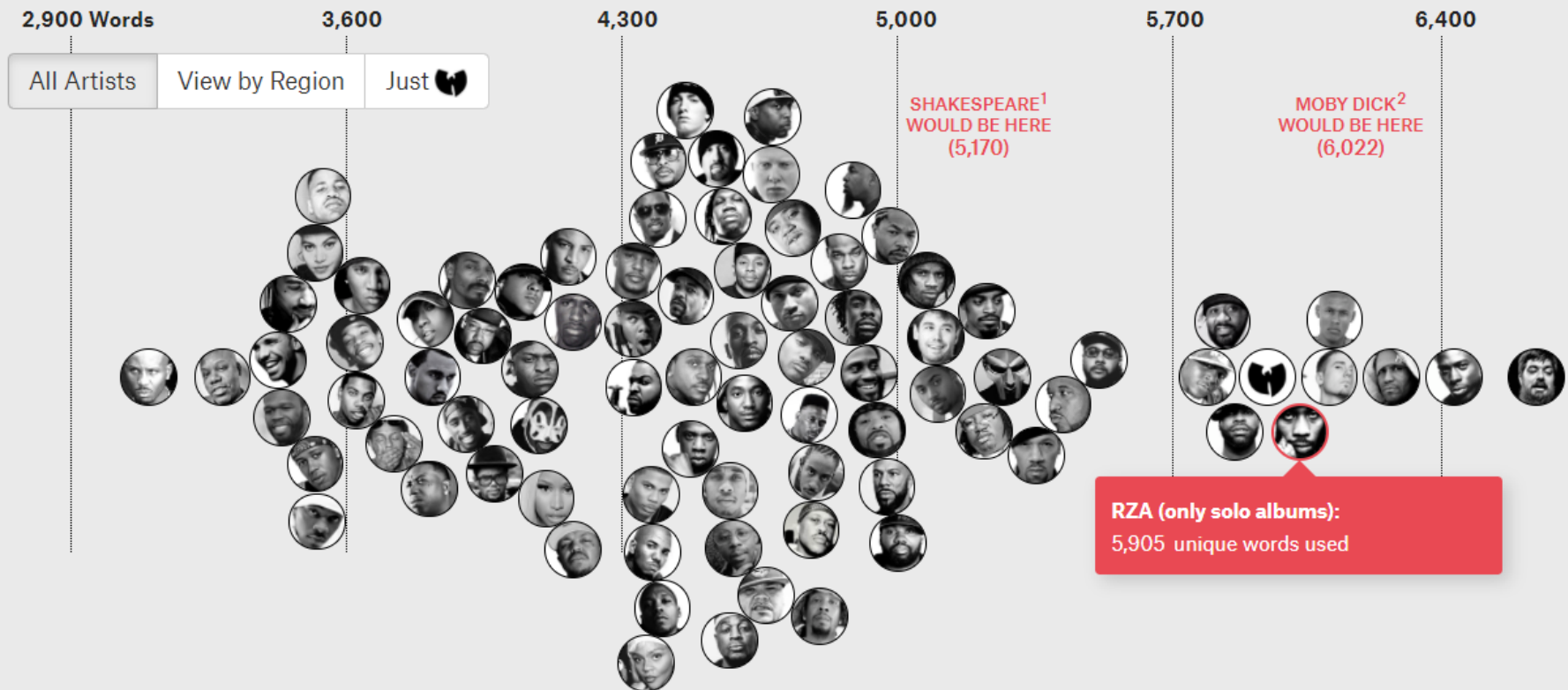
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Strong Visualizations *should…*

- ✓ Have a focused purpose or intention
- ✓ Reveal insight, learnings, or ideas to the audience
- ✓ Be irreplaceable with words alone
- ✓ Be responsive to the intended audience
- ✓ Present the data in a meaningful context
- ✓ Represent the data accurately, truthfully, and objectively

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OF UNIQUE WORDS USED WITHIN ARTIST'S FIRST 35,000 LYRICS

2,900 Words   3,600   4,300   5,000   5,700   6,400

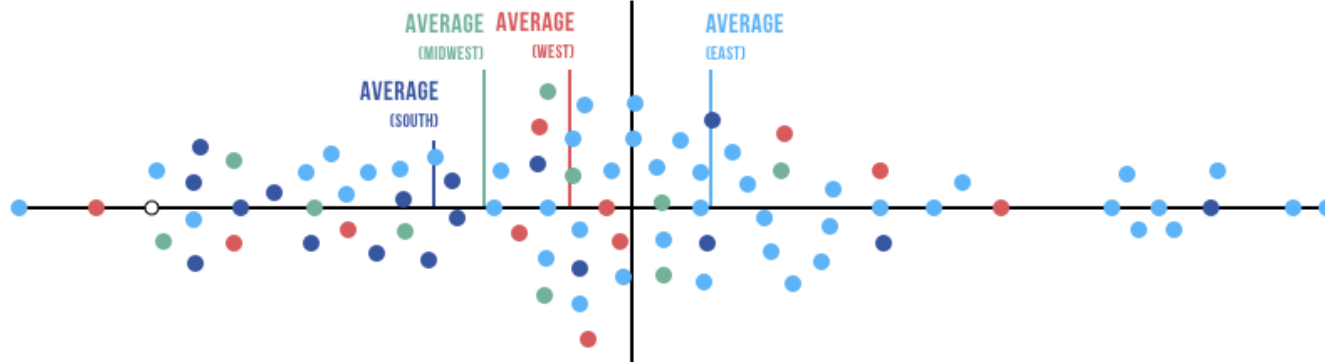All Artists   View by Region   Just

SHAKESPEARE[1] WOULD BE HERE (5,170)

MOBY DICK[2] WOULD BE HERE (6,022)

RZA (only solo albums): 5,905 unique words used

https://pudding.cool/2017/02/vocabulary/

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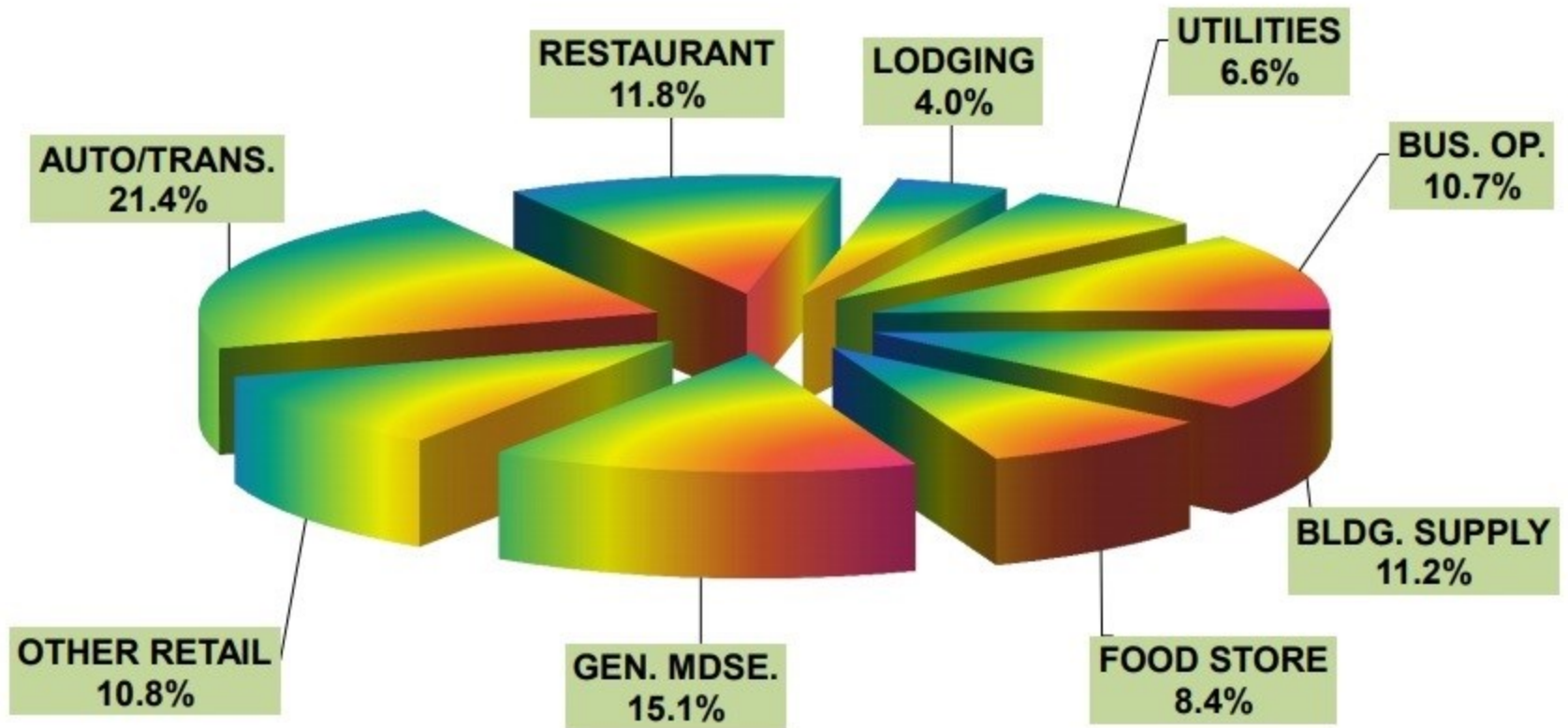
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SOUTHERN | MIDWEST | WEST COAST | EAST COAST

AVERAGE (TOTAL)

AVERAGE (MIDWEST)   AVERAGE (WEST)   AVERAGE (EAST)

AVERAGE (SOUTH)

38

2015 Maine Taxable Sales by Sector

- RESTAURANT 11.8%
- LODGING 4.0%
- UTILITIES 6.6%
- BUS. OP. 10.7%
- AUTO/TRANS. 21.4%
- BLDG. SUPPLY 11.2%
- OTHER RETAIL 10.8%
- GEN. MDSE. 15.1%
- FOOD STORE 8.4%

https://legislature.maine.gov/uploads/originals/2016-december-report-final-2.pdf

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Rainfall (in cm)

Source: Databison.com
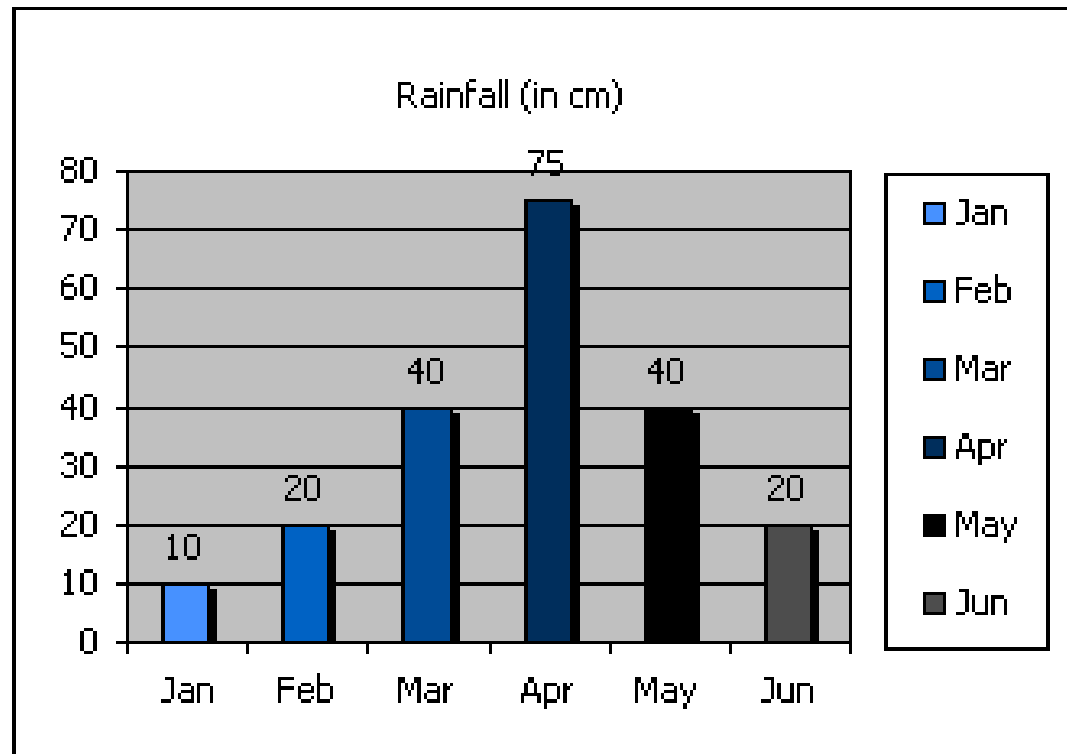
The chart area border: Does it aid information gathering ?

The values: Can we remove them if they are self evident ?

The Gridlines: Can we do without them ?

Background color : Is it necessary ?

Tick marks: Are they needed ?
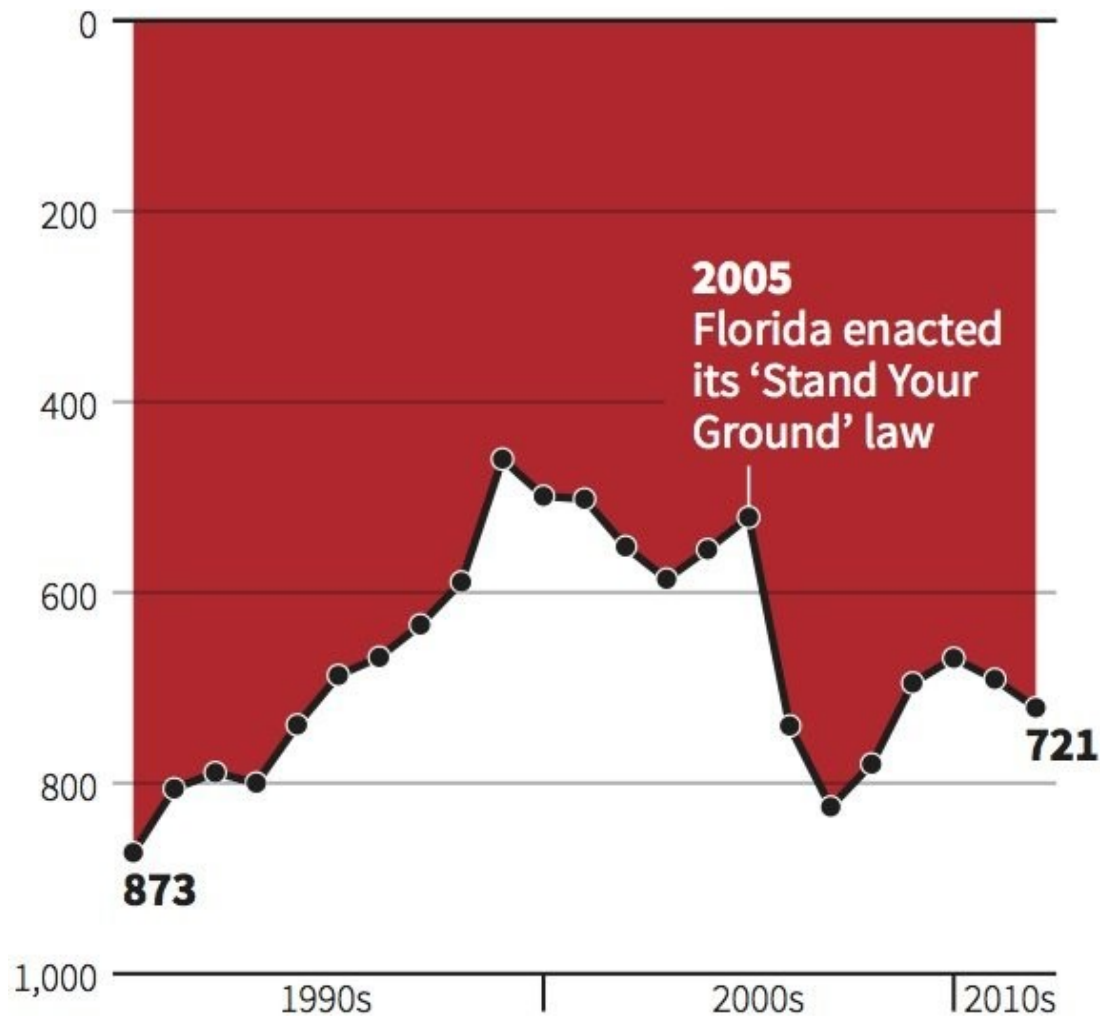
Legend: Does it present additional information ?
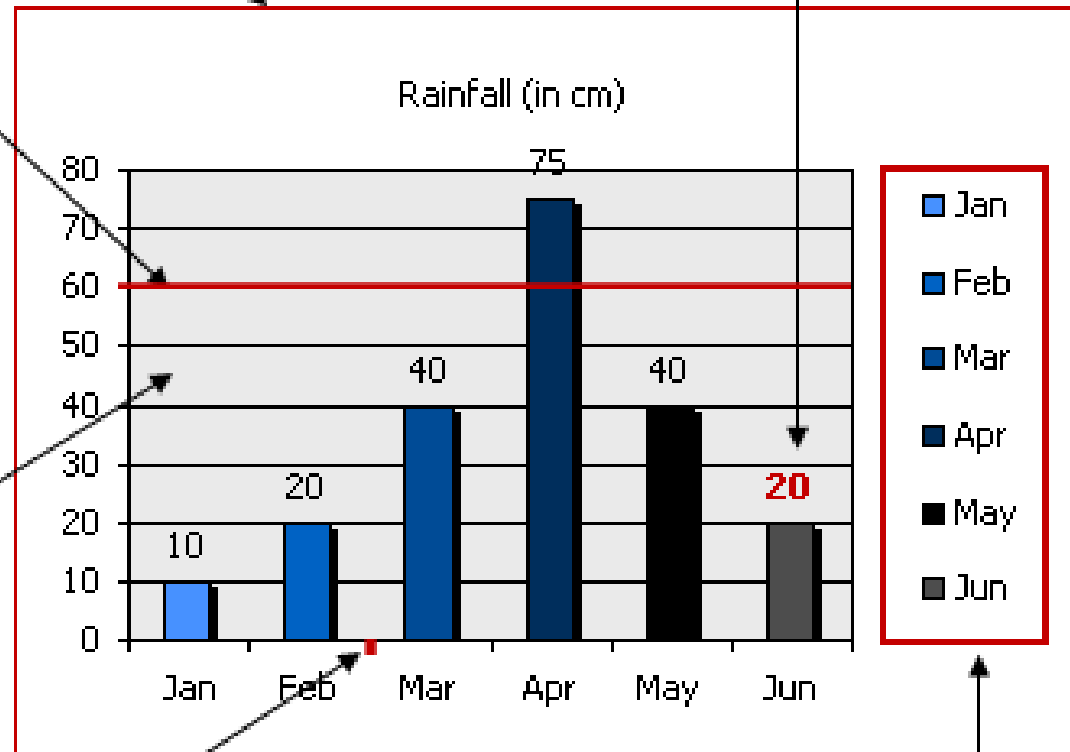
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Gun deaths in Florida

Number of murders committed using firearms

2005
Florida enacted its 'Stand Your Ground' law

873

721

1990s   2000s   2010s

Source: Florida Department of Law Enforcement

C. Chan 16/02/2014   REUTERS

Source: Heap.io

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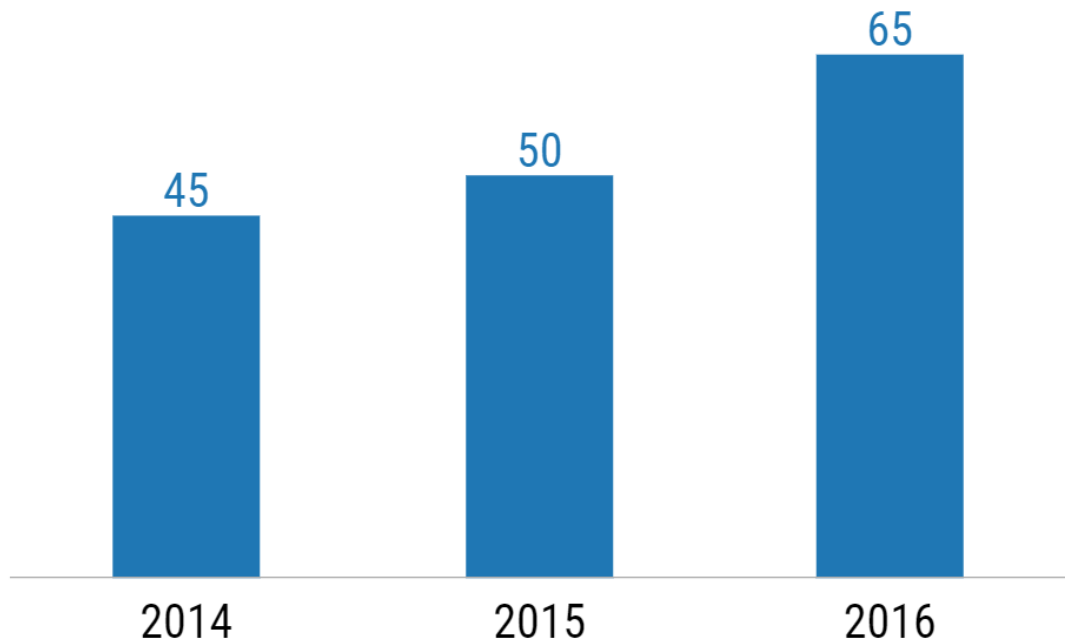- ✓ Represent the data accurately, truthfully, and objectively

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65

2016

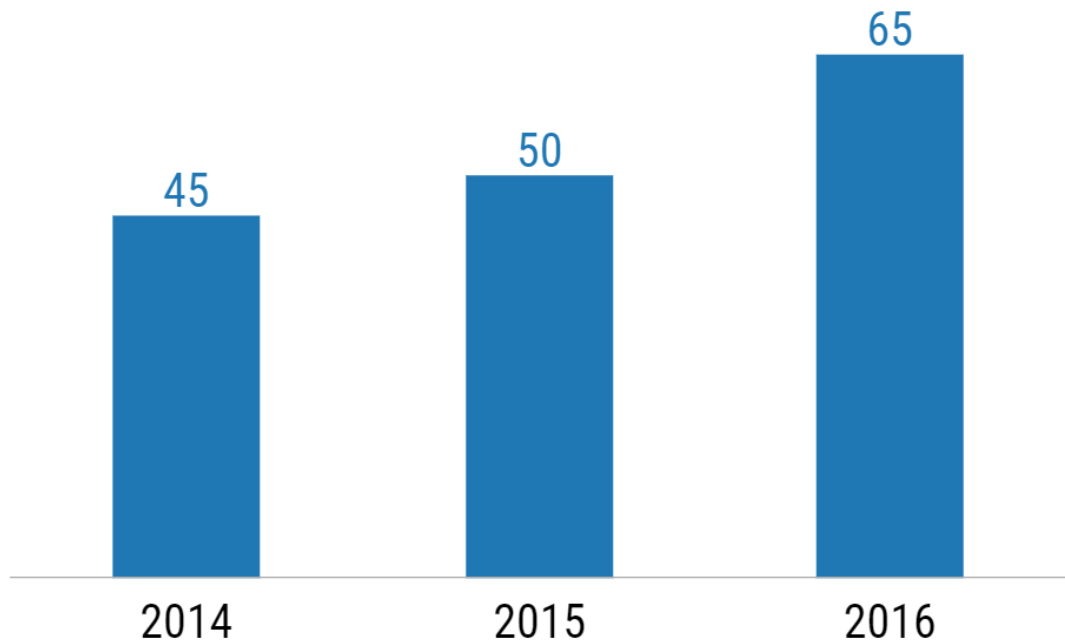# English Academic Achievement

65

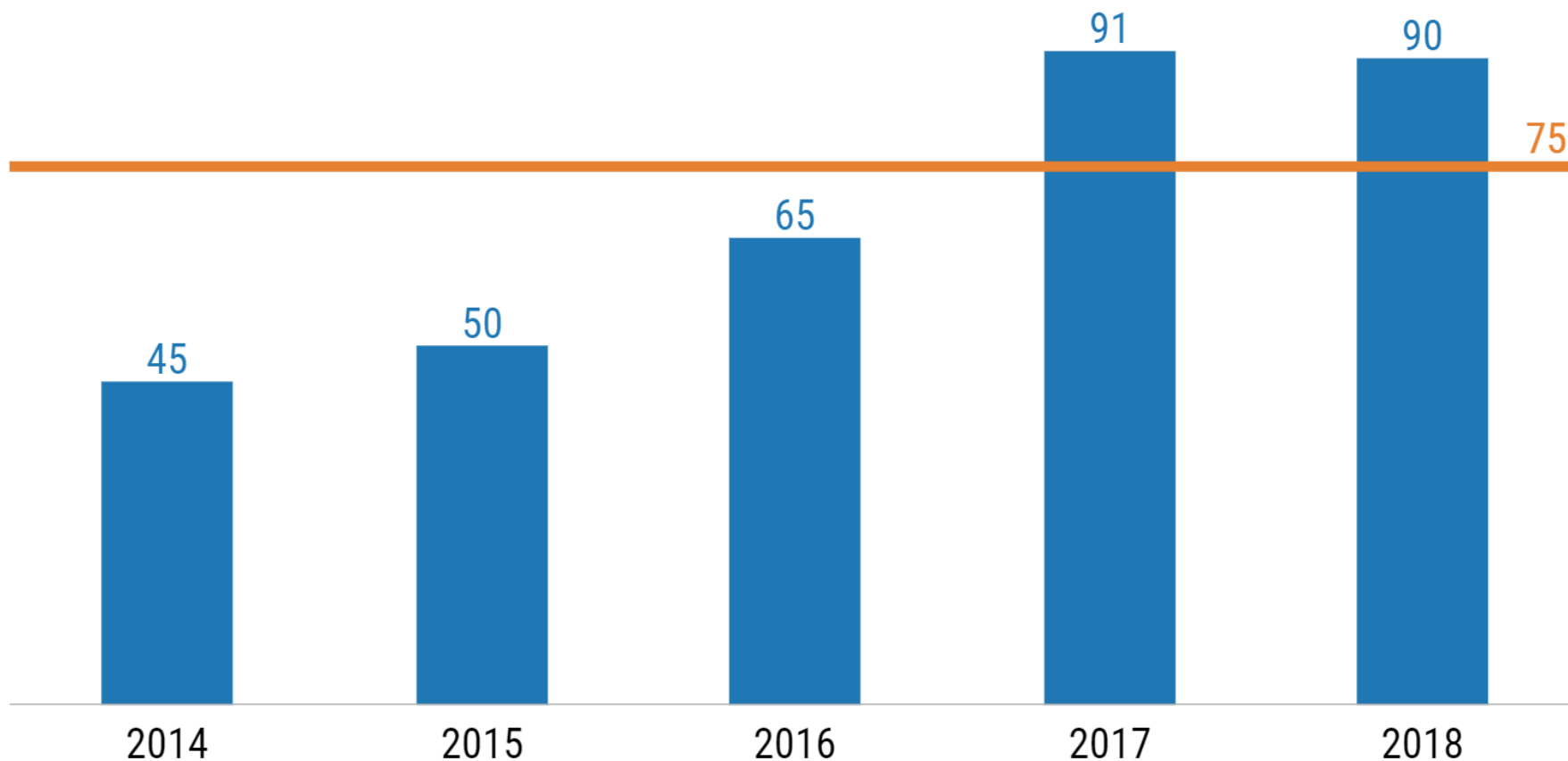2016

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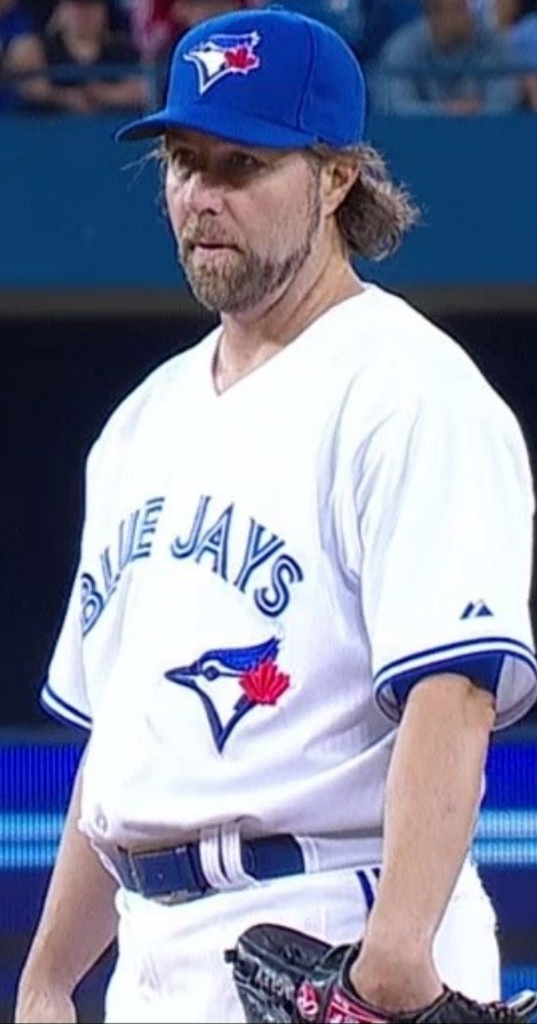
Students with Disabilities

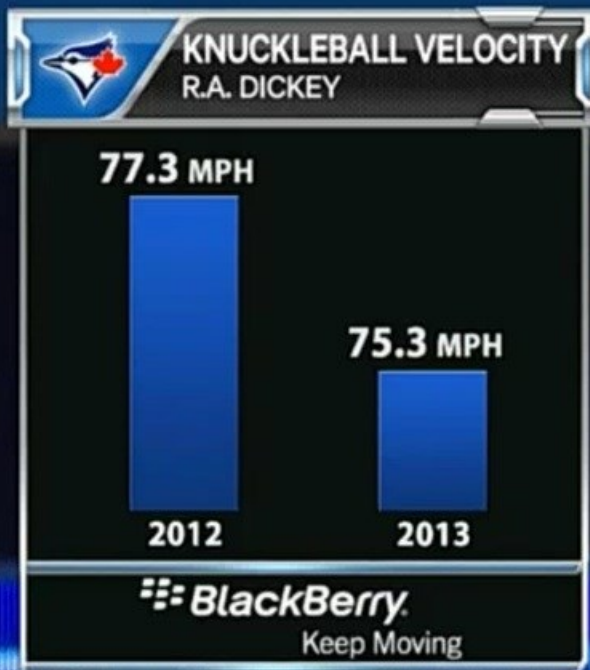# English Academic Achievement
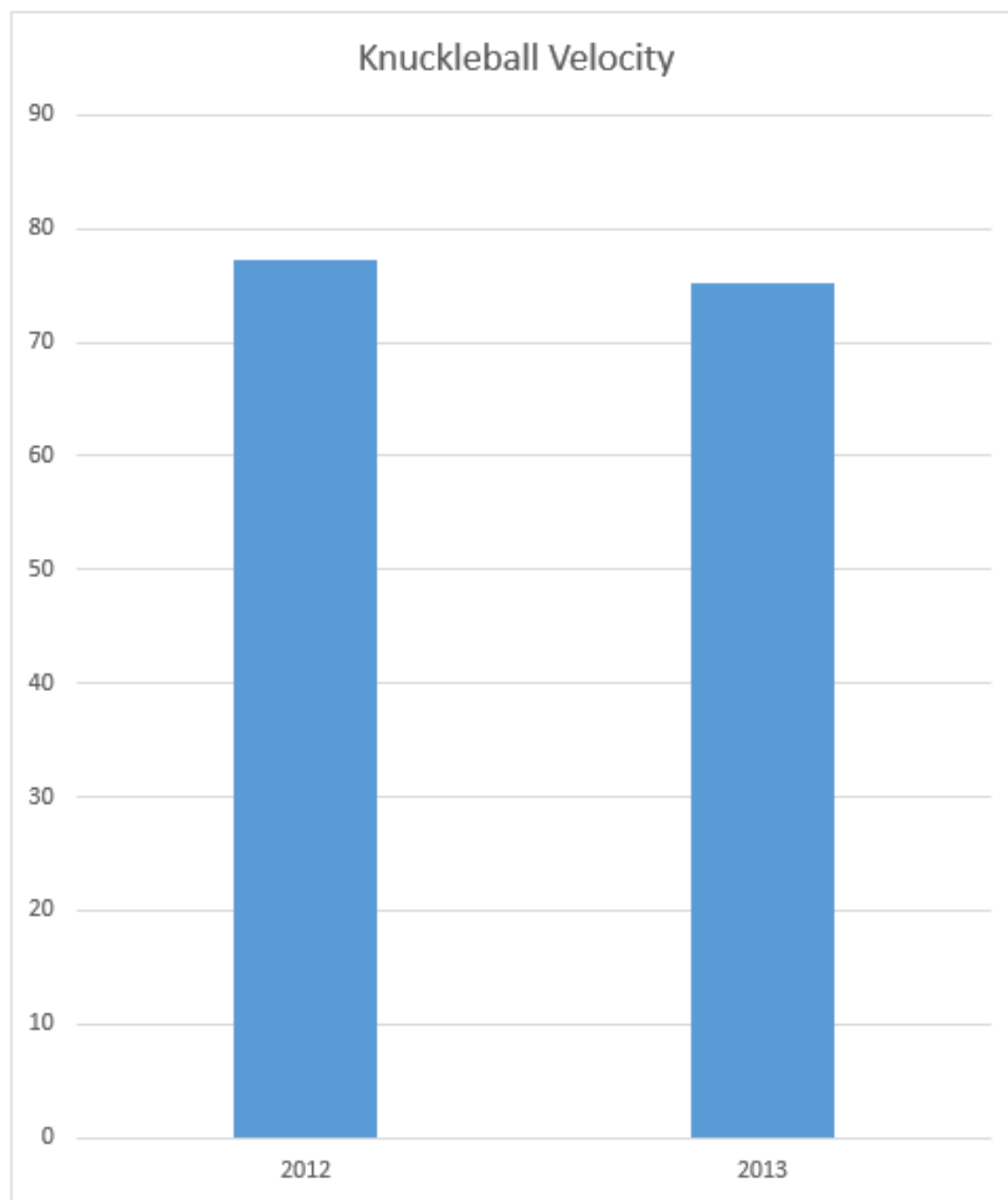## Students with Disabilities

49

65

2016

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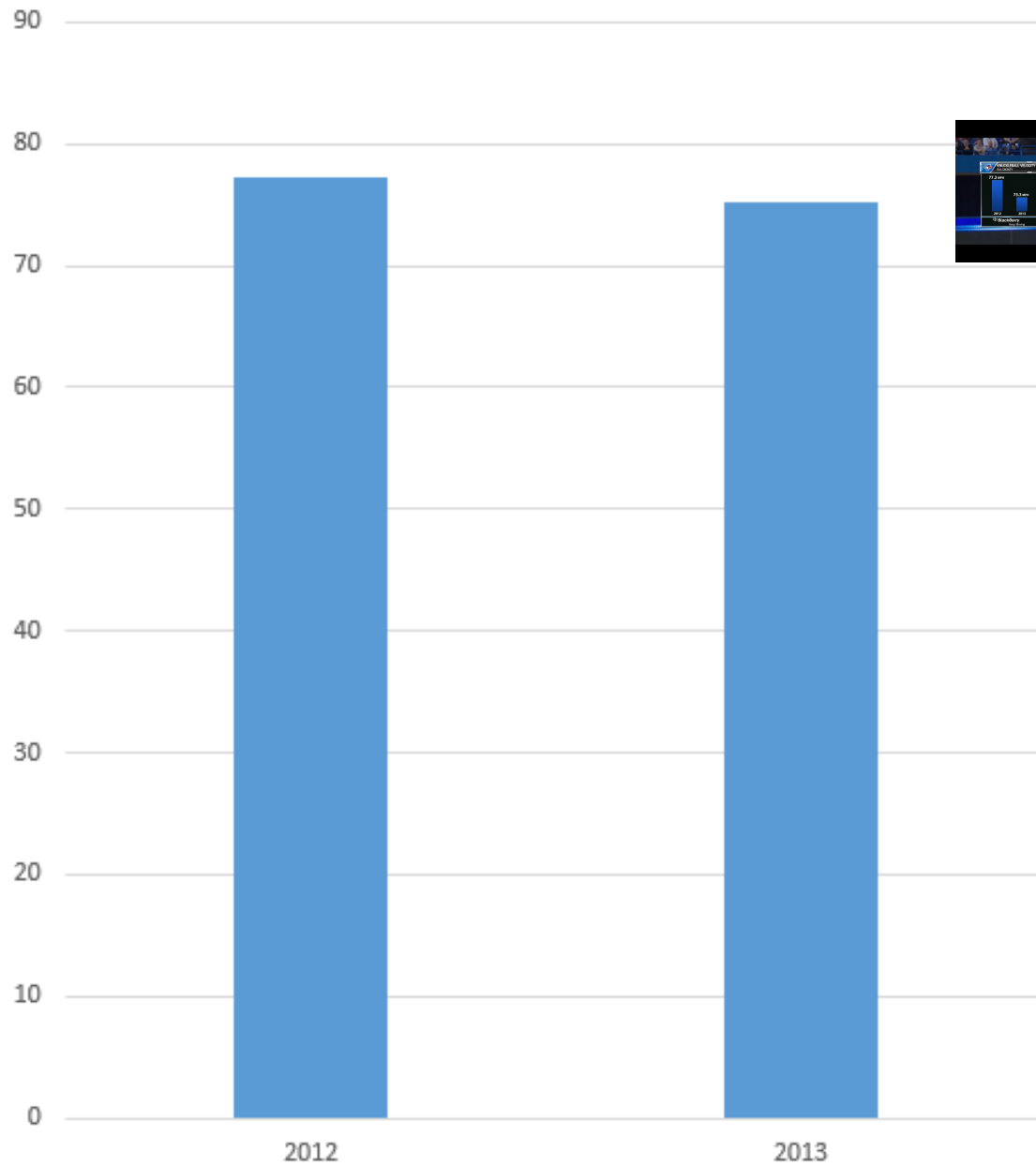- ✓ Have a focused purpose or intention
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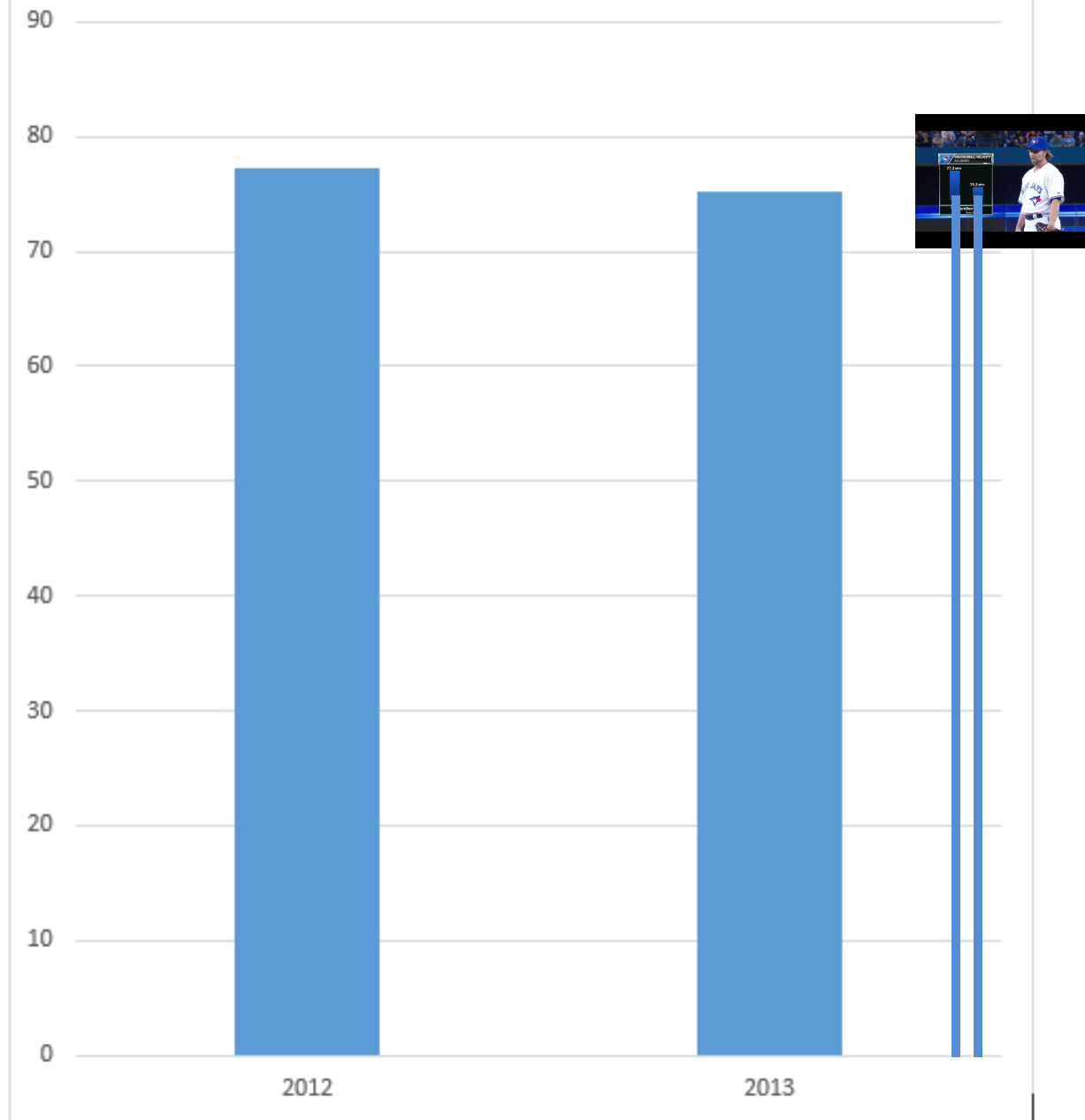
KNUCKLEBALL VELOCITY
R.A. DICKEY

77.3 MPH

75.3 MPH

2012   2013

BlackBerry.
Keep Moving

Source: Heap.io

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Knuckleball Velocity

Getting Started

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Taking a Test Drive

- Please go to the following link:
  - http://app.rawgraphs.io/
- As you experiment, think about the following questions:
  - What interesting relationships might exist in these data?
  - How can I best explore those relationships?
  - What further questions should I explore?

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Next Steps

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Tools to Learn (a.k.a. Pick your Poison)

- Less flexible viz, but more approachable:
  - Excel / Google Sheets
  - Rawgraphs.io
  - Tableau (free for students!)
- Very flexible viz, but steep learning curve:
  - R: ggplot2, plotly, leaflet
  - Python: Matplotlib and Seaborn
  - Javascript: D3 ("Data-Driven Documents")

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Additional Resources

- ## For Inspiration:

  - https://flowingdata.com/
  - https://observablehq.com/collection/@observablehq/visualization
  - https://datavizcatalogue.com/index.html
  - https://www.d3-graph-gallery.com/
  - https://www.tableau.com/about/blog
  - https://github.com/d3/d3/wiki/Gallery
  - https://bl.ocks.org/
  - http://www.visualisingdata.com/
  - https://junkcharts.typepad.com/
  - http://www.storytellingwithdata.com/

- ## For Consumption:

  - https://pudding.cool/
  - https://www.nytimes.com/section/upshot
  - https://fivethirtyeight.com/
  - https://www.economist.com/graphic-detail/
  - https://www.census.gov/dataviz/

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Thank you!

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