

Avoiding “All Glitter No Gold”



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Data Viz Principles and Techniques Using MS-Office

Premise: We Are IR & IE

- We're not marketers or graphic designers
- Our job isn't to make something flashy or sell something
- Our job is to turn data into information **truthfully**
- Our job is to **accurately, clearly, and efficiently** communicate
- To that end, Practices and Principles mean more than Technology

Basic Data Viz Principles for IR/IE

- Readability is key
- Stakeholders are busy and don't have time to parse difficult to read graphs
- Using clear data and a headline, you can create a narrative and illustrate the most important points from the start
- Controlling the narrative increases clarity and efficiency, and reduces the likelihood of misinterpretation or inaccuracy.

Before the Good: the Bad and the Ugly

Before we go on to making good graphs, let's look at some of the bad and outright ugly ones:

- Gun Deaths in Florida, from Reuters via Medium
(deceptive, upside-down X axis)
- Obama-Era Unemployment Rate from Fox News via Medium
(height of lines do not match numbers represented)

Why MS-Office?

- Almost everybody has it already
- Excel graphs integrate well into Word for printing and PowerPoint for presentations
- It's easier to customize graphs in Excel than it is in Tableau, especially when you're looking to print or project them

Your Goal: To Tell a True Story

- Each graph, chart, or table has something to say
- Good data visualization will convey that quickly and accurately
- Clarity prevents misunderstanding

The Principles: Communication, Clarity, Accuracy

- Know what you're saying before you start
- Title your graph with a headline
- Make the text clear and large enough to read

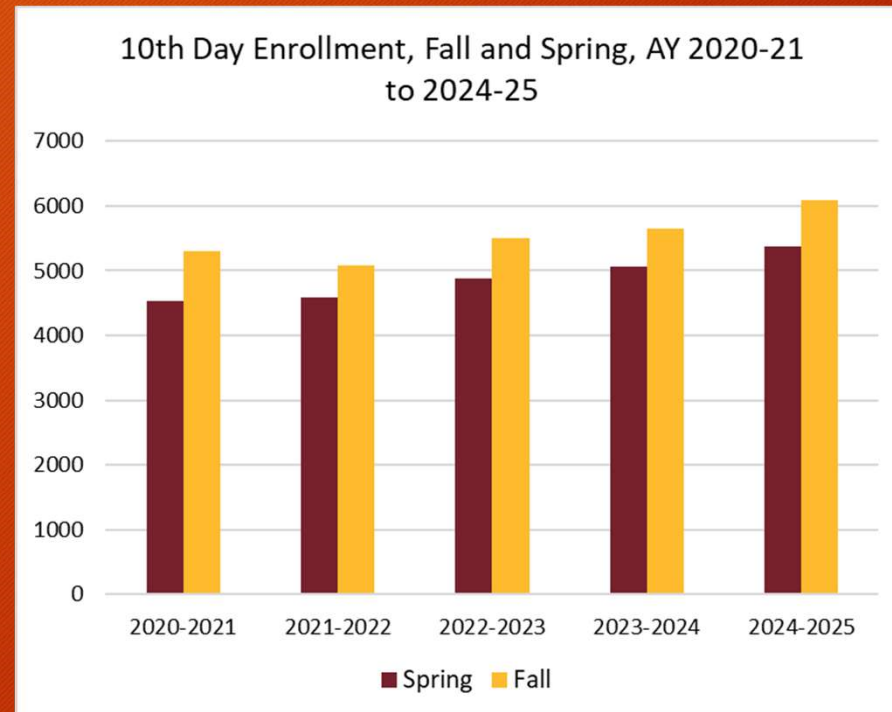
Flow Matters

- Design the graph so that the information follows the natural eye movements of English speakers:
 - Top to bottom
 - Then left to right

Two Graphs, One Set of Data. Before:

The reader's eyes must go all over:

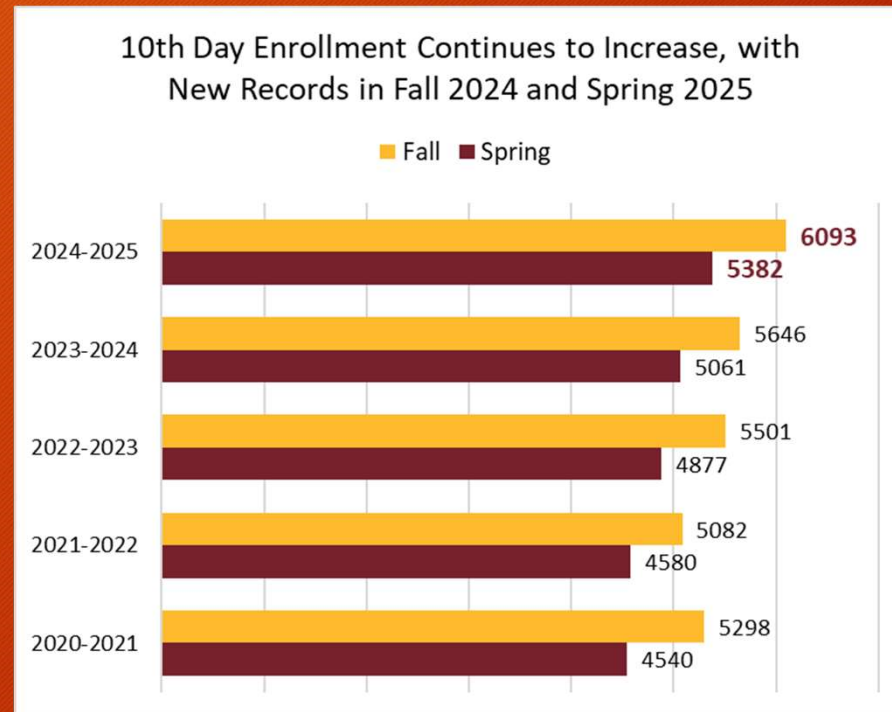
1. Title at the top
2. Legend and axis at the bottom
3. Values on the left
4. Finally, the relative bar sizes in the center.



...and After

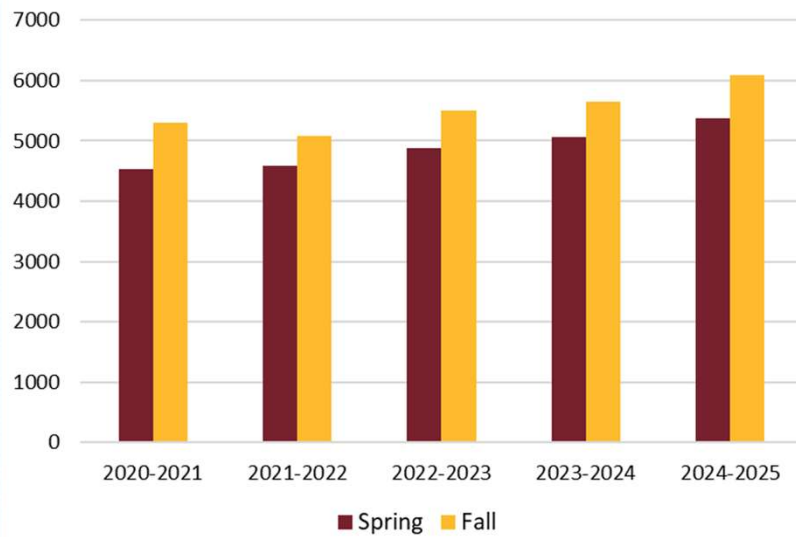
The reader starts at the top with the Title and Legend, then goes left to right with the axis titles, the bars, and the labels.

The title's headline tells the main point up front.

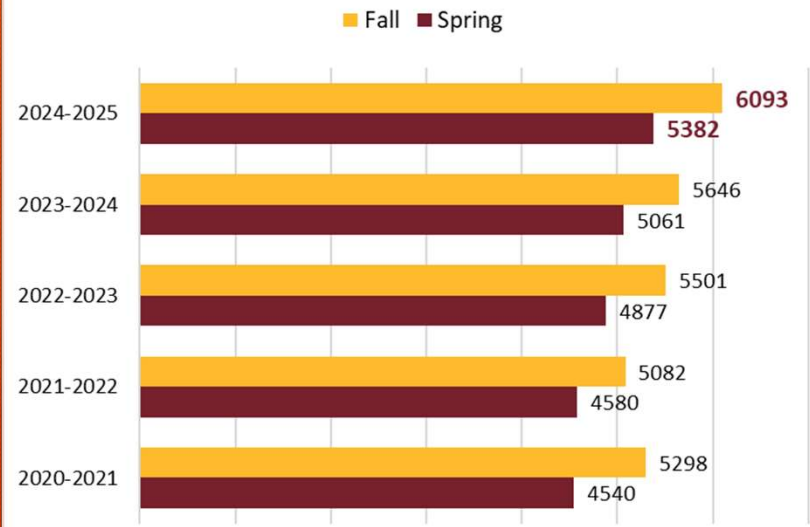


Side by Side

10th Day Enrollment, Fall and Spring, AY 2020-21 to 2024-25

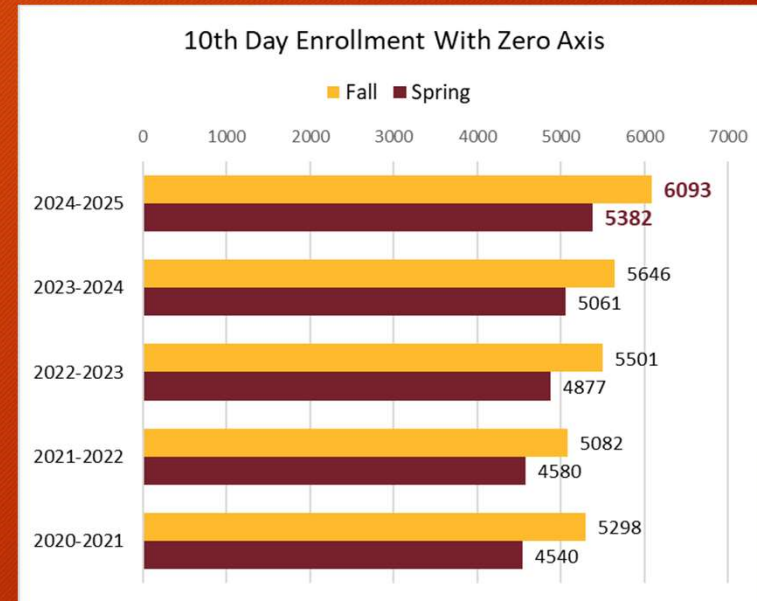
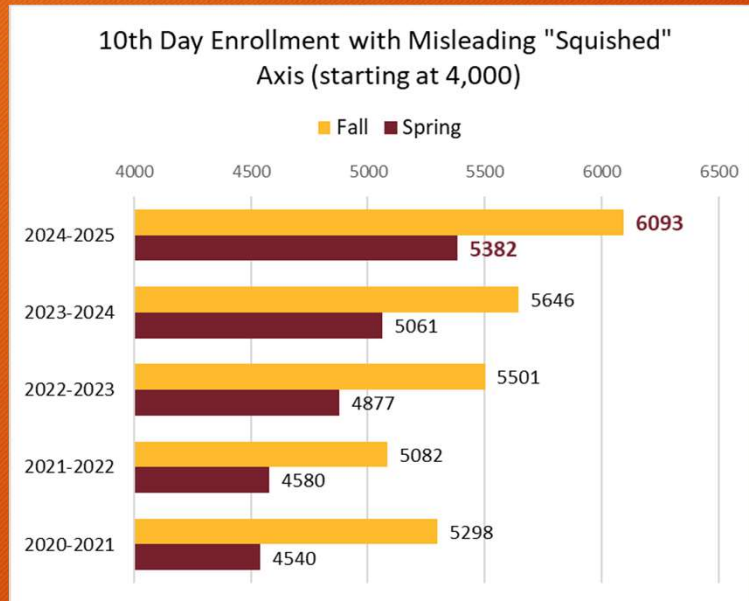


10th Day Enrollment Continues to Increase, with New Records in Fall 2024 and Spring 2025



Avoiding Misleading Graphs: Use the 0 Axis

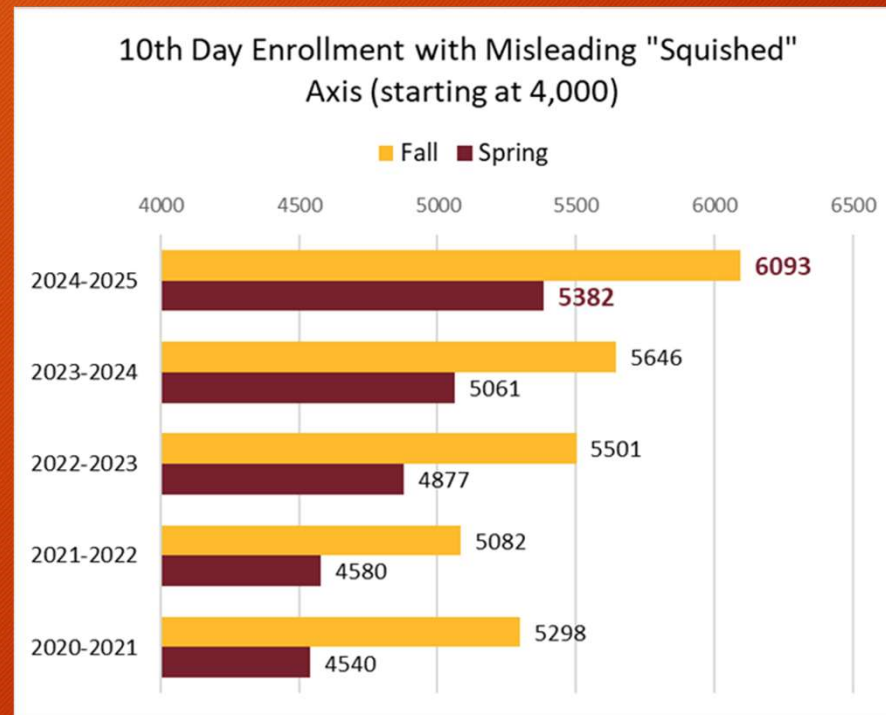
- #1: For Bar and Column Graphs, Always start your Axis at Zero.



A Non-Zero Axis Exaggerates the Differences

It looks like Spring 2025's enrollment is double Spring 2021's, by bar size.

The labels help clarify it, but people will still see and subconsciously internalize the outsized difference.



Avoiding Misleading Graphs

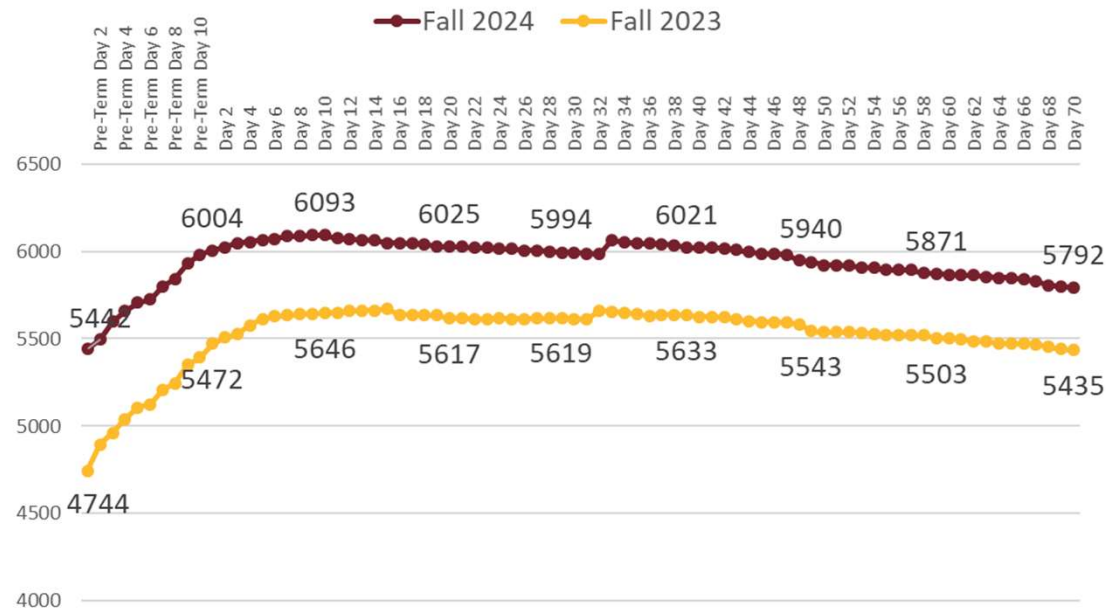
- Other types of graphs don't require a zero axis, for example, line graphs.
- The general rule is that if zero is a possible value, include it, but if not, don't.
- Comparing growth of enrollment over time doesn't require a zero axis, because you don't have zero enrollment (Evergreen, n.d.)

Line Graph with Non-Zero Axis

Because Zero is not a possible number of enrolled students (thankfully!), the line graph of overall enrollment does not require a zero axis.

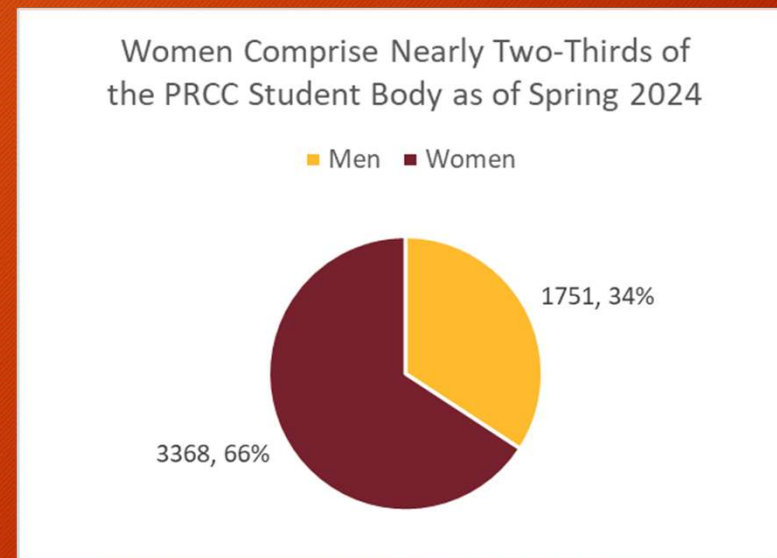
Line graphs show change over time, rather than quantity.

As of Day 70 (December 4, 2024), **Fall 2024** has greater **Overall Enrollment** than **Fall 2023** (**5,792** vs **5,435**), but less growth since Pre-Term Day 1 (**+6.4%** vs **+14.6%**)



The Pie Charts Can Work, Sometimes

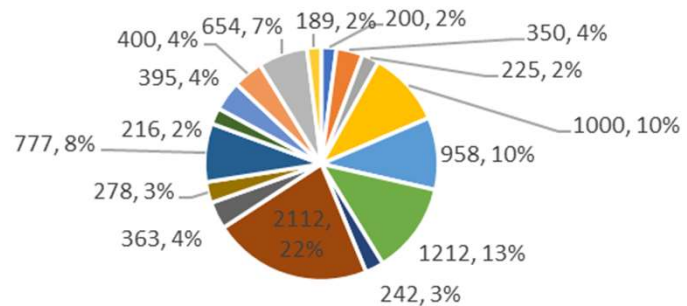
- Pie charts are overused, and a pie chart with more than 4 entries is almost always hard to read.
- But sometimes they're the clearest and most effective way to show 2-3 different groups.



...on the other hand...

This Was a Very Bad Idea

- Agriculture, Food & Natural Resources
- Architecture & Construction
- Arts, A/V Technology & Communications
- Business Management & Administration
- Education & Training
- Finance
- Government & Public Administration
- Health Sciences
- Hospitality & Tourism
- Human Services
- Information Technology
- Law, Public Safety, Corrections & Security
- Manufacturing
- Marketing
- Science, Technology, Engineering & Mathematics
- Transportation Distribution & Logistics



Your Friends the Bar and the Line

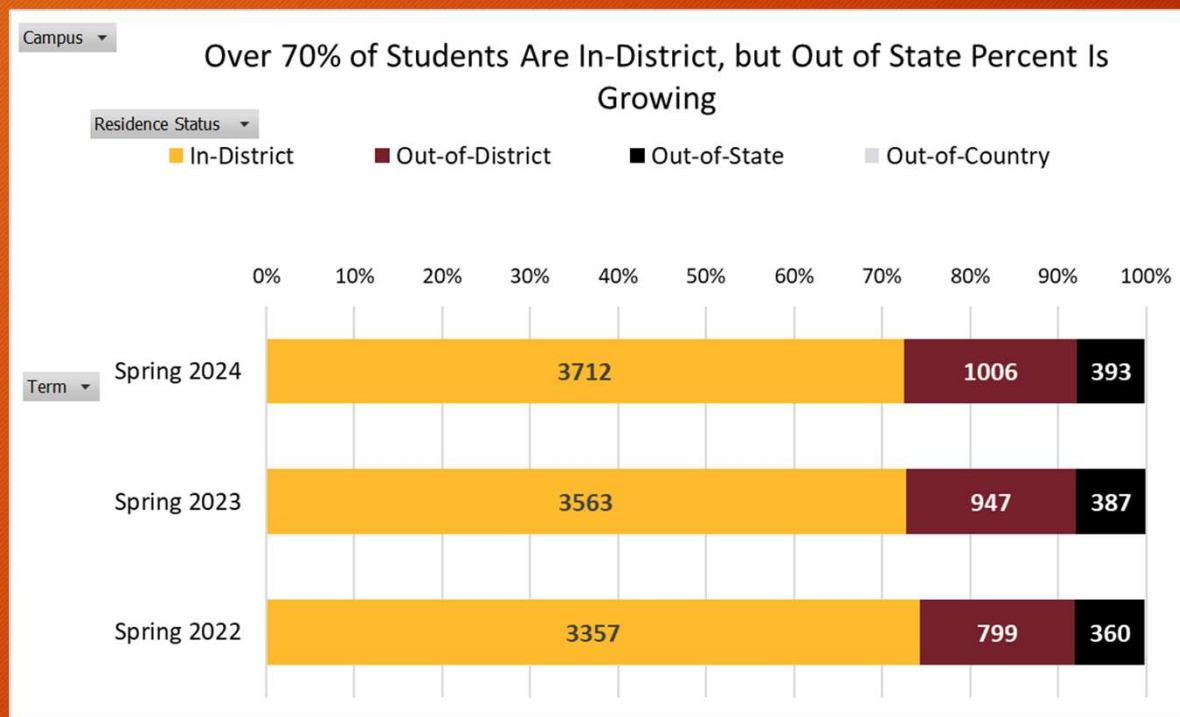
Most of what you need to do with graphs in IE/IR can be accomplished with two charts:

- The horizontal bar chart
- The line chart

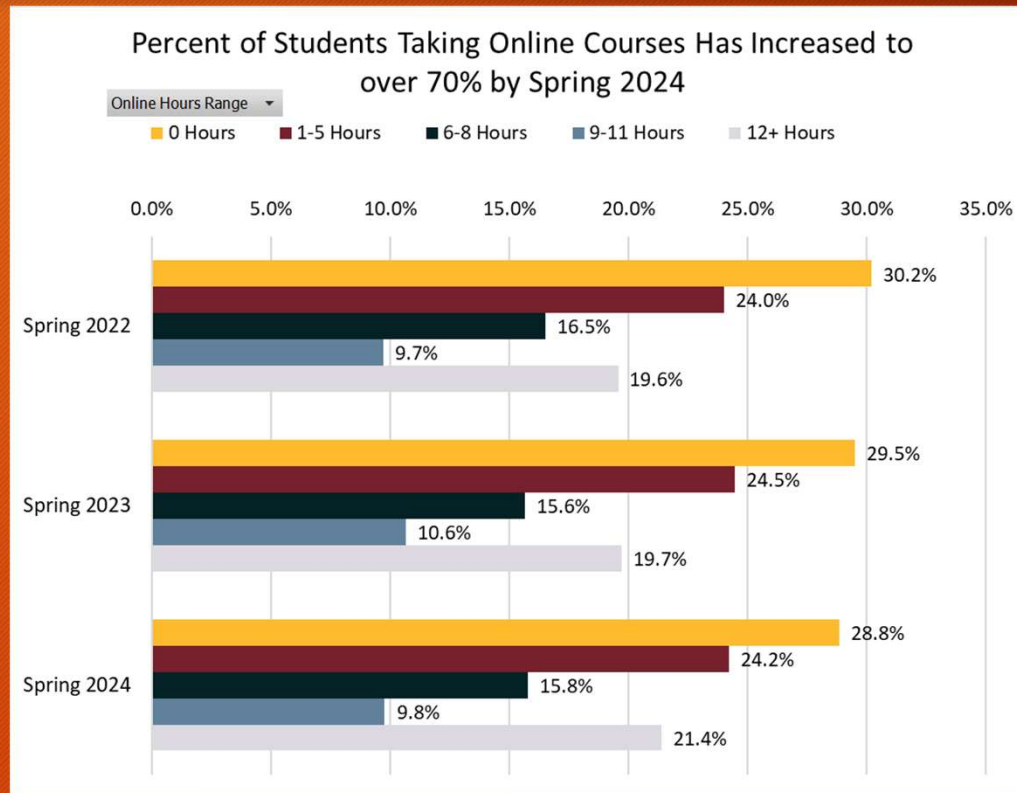
The horizontal bar chart compares quantities or two points in time and can handle a many groups efficiently.

The line chart covers change over time.

Stacked Bar Chart Example

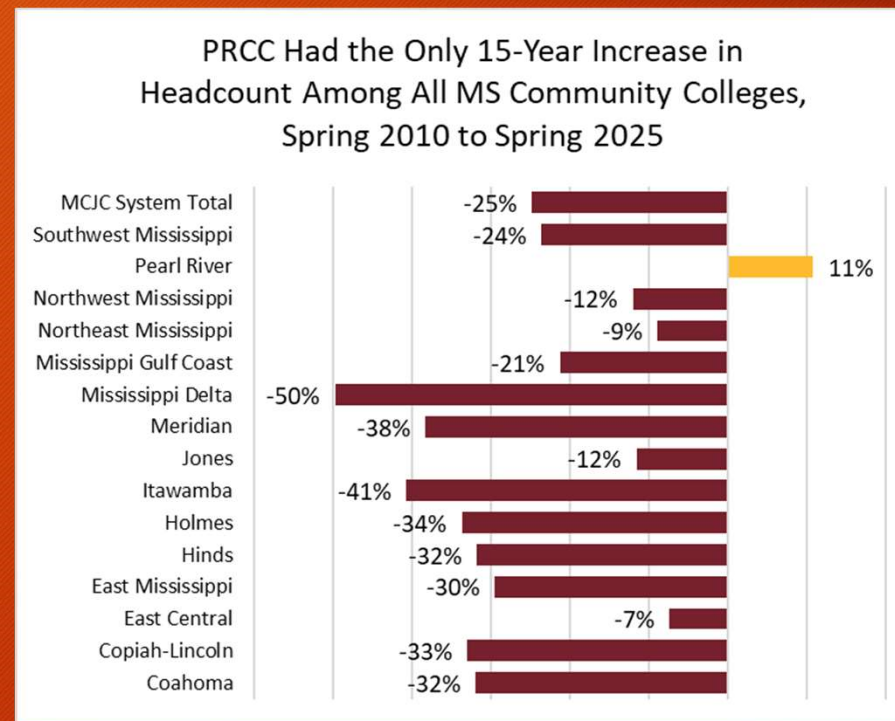


Bar Chart Example

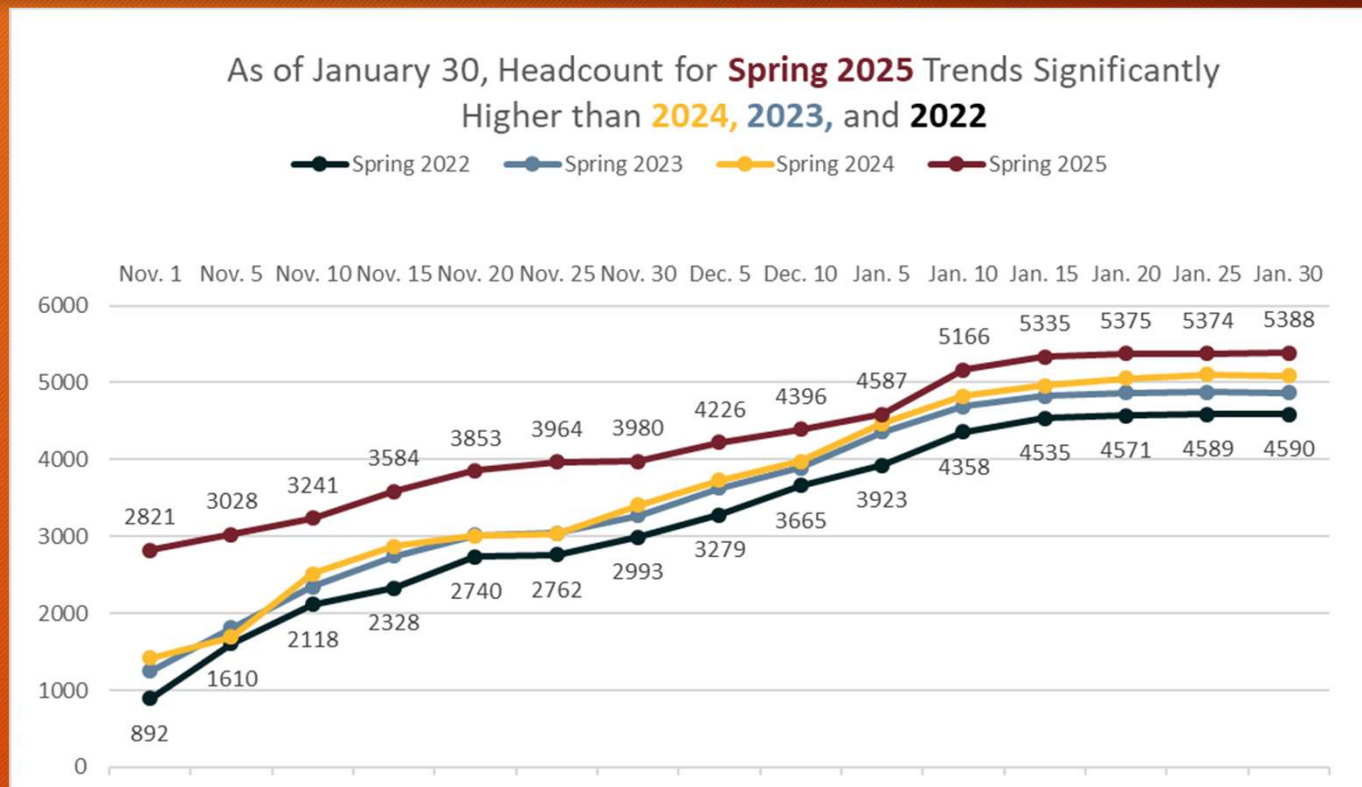


Bar Chart Example: Change Between Points

- I used the 10th day numbers from MCCB to make this.
- I calculated a percent change over time, positive or negative, between Spring 2010 and Spring 2025.
- I used contrasting colors to set PRCC apart immediately.



Line Chart Example



The How-To

- Let's look at the handout to see some important how-to advice and screenshots
- Making graphs in Excel is relatively easy, and moving them to Word and PowerPoint are, too.
- But it's still worth going over the process, because it's not 100% intuitive.

Any Questions?

Works Cited

Evergreen, Stephanie. (n.d.). “Where to Start and End Your Y-Axis Scale.” Evergreen Data, <https://stephanieevergreen.com/y-axis/>
Medium, “Graphs Gone Wrong: Misleading Data Visualizations”
https://medium.com/@Ana_kin/graphs-gone-wrong-misleading-data-visualizations-d4805d1c4700

Additional Resources

- Delivering Data Analytics: Data-Ink Ratio: How to Simplify Data Visualization <https://deliveringdataanalytics.com/the-data-to-ink-ratio-chart-makeover/?srsltid=AfmBOoqWe-CeQYG-imP4AKYVuTzOk-Iby5xBNDiysAGgE4DlOg1o2OZW>
- Flowing Data: Real Chart Rules to Follow. <https://flowingdata.com/2015/08/11/real-chart-rules-to-follow/>
- Statistics How To, “Misleading Graphs: Real Life Examples” <https://www.statisticshowto.com/probability-and-statistics/descriptive-statistics/misleading-graphs/>
- Stephanie Evergreen, Evergreen Data. Great resource, with a data visualization checklist, blog, etc. <https://stephanieevergreen.com/>