

Telling Engaging Stories with Data

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Economy of Information

“Having all the information in the world at our fingertips doesn't make it easier to communicate, it makes it harder.”

— *Cole Nussbaumer Knaflic*

“I have made this longer than usual because I have not had time to make it shorter.”

— *Blaise Pascal*

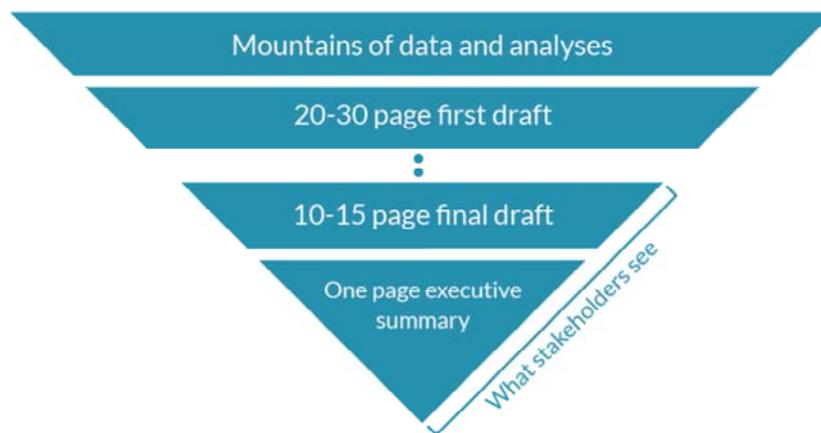


Economy and parsimony of information is key for engaging with stakeholders of SLDS research. This is something we struggled with at ERDC.

Table of Contents		
Executive Summary	2	Figure 1: The distribution of schools by poverty and ACEs
Introduction	6	Figure 2: Community differences on key study demographics
Poverty, Adverse Childhood Experiences, and why where we live matters	6	Figure 3: Mean ELA pass percent by community type
Childhood adversity as an indicator of community risk	7	Figure 4: Mean Math pass percent by community type
Ethnic diversity and the paradoxical impact on academic success and developmental risk	10	Figure 5: ELA pass percent by Hispanic enrollment in grades 3-5
Methodology	11	Figure 6: Math pass percent by Hispanic enrollment grades 3-5
Results	12	Figure 7: Grade 3 ELA poverty by ACEs interaction-All students
A. Summary descriptive data	12	Figure 8: Grade 3 Math poverty by ACEs interaction- All students
B. Poverty, ACEs, and community risk	16	Figure 9: Grade 4 ELA poverty by ACEs interaction-All students
B. Hispanic and ELL enrollment effects on standardized test success	19	Figure 10: Grade 4 Math poverty by ACEs interaction
C. Standardized test success as predicted by poverty and ACEs	21	Figure 11: Grade 5 ELA poverty by ACEs interaction- All students
1. All Students and SBA Outcomes	22	Figure 12: Grade 5 Math poverty by ACEs interaction- All students
2. White Students and SBA Outcomes	35	Figure 13: Grade 6 ELA poverty by ACEs interaction- All students
3. Hispanic Students and SBA Outcomes	46	Figure 14: Grade 6 Math poverty by ACEs interaction
4. 'Not Low Income' Students and SBA Outcomes	51	Figure 15: Grade 7 ELA poverty by ACEs interaction
5. Low Income Students and SBA Outcomes	63	Figure 16: Grade 7 Math poverty by ACEs interaction
6. Not Special Education Enrolled and SBA Outcomes	66	Figure 17: Grade 8 Math poverty by ACEs interaction
7. Special Education Students (SPED) and SBA Outcomes	69	Figure 18: Grade 8 Science poverty by ACEs interaction
D. Education Achievement Index	71	Figure 19: Grade 4 ELA poverty by ACEs interaction- White Students
E. Attendance	73	Figure 20: Grade 4 Math poverty by ACEs interaction- White Students
Discussion	74	Figure 21: Grade 5 ELA poverty by ACEs interaction- White Students
Poverty and community ACEs as core organizing concepts	76	Figure 22: Grade 6 Math poverty by ACEs interaction- White Students
The impact of poverty and ACEs in student sub-populations	76	Figure 23: Grade 7 Math poverty by ACEs interaction- White Students
Recommendations	77	Figure 24: Grade 8 Science poverty by ACEs interaction- White Students
References	80	Figure 25: Grade 3 ELA poverty by ACEs interaction- Hispanic Students
		Figure 26: Grade 3 Math poverty by ACEs interaction- Hispanic Students
		Figure 27: Grade 5: Math poverty by ACEs interaction- Hispanic Students
		Figure 28: Grade 3 ELA poverty by ACEs interaction- Not Low-Income Students
		Figure 29: Grade 3 Math poverty by ACEs interaction- Not Low-Income Students
		Figure 30: Grade 6 Math poverty by ACEs interaction- Not Low-Income Students
		Figure 31: Grade 7 ELA poverty by ACEs interaction- Not Low-Income Students
		Figure 32: Grade 8 Math poverty by ACEs- Not low income
		Figure 33: Grade 8 Science poverty by ACE interaction- Not low income
		Figure 34: Grade 6 ELA poverty by ACEs interaction- Low Income Students
		Figure 35: EDS Growth Index 2016-17 by School Poverty and Community ACEs

Paper outlines and table of contents that looks like this was our “wake up call”. Stakeholders simply weren’t going to read this, and if they did, they weren’t going to glom onto the most relevant or interesting bits. This is a jungle in which they’ll only get lost. Out time and effort was going to waste on long, dense reports no one in their right minds were going to read.

Economy of Information



There's a temptation to want to "show something" for all of our work, but stakeholders should only see the tip of the iceberg, the gold nuggets we mine from the mountain. They shouldn't get lost in the ore, much less the mines themselves.

Getting to the heart of the story

- “What’s the story here?”
- The story needs to be crystal clear at a glance.
 - We have to assume a short attention span
 - We have to assume competing priorities
 - We can’t assume more than a skim

Old Outline

1. **Introduction**
2. **Description of Study Groups**
3. **Definition of “Un-met Need”**
4. **Work**
5. **Characteristics of the Cohorts**
6. **Unmet Need Overview**
 - First year Postsecondary education students
 - Average annual aid
7. **Persistence to 45 Credits**
8. **Completion**
9. **Quartile Analysis**
 - Persistence
 - Completion
10. **Appendices**

This is the outline of one research study ERDC researchers were working on. We decided to completely revamp the paper, placing the reader front and center.

1. Introduction

- Questions
- Cohorts
- Definitions

2. Those with greater unmet need persisted and graduated less

- This was true for both men and women (at different levels)
- This was true for both CTC and 4-yr students (at different levels)

3. Despite lower tuition, CTC was more expensive for poor students

- CTC students had lower tuitions but greater unmet need
- This was true for both genders

4. 4-yr students and CTC students responded unmet need in different ways

- 4-yr students took out loans to make up the difference
- CTC students worked to make up the difference

5. Conclusion

The new outline highlights the actual findings as top-level headers in the document, makes it *really* easy to skim and get the “big picture” of the story.

Thought Problem

“Teachers from the Third Lunar School District will be receiving new training designed to help them become better classroom managers. The training is funded by the Solar Gates Foundation, which specializes in funding extra-terrestrial education initiatives, original founded by the estate of Bill Gates in partnership with the estate of the late Elon Musk. Teachers from the Third Lunar School District have applied for the training for three years, and have finally received approval.

“The training will take during the day on Friday and is expected to continue partway into Saturday. The district superintendent has remarked at how proud he is of the teachers in his district and expects that the training will help them become better educators. During his tenure as superintendent, he has spearheaded a teacher improvement program that specifically sets aside funds for teacher training programs.”

Here are the details of a story. What should the headline be for parents?

What's the headline for parents?

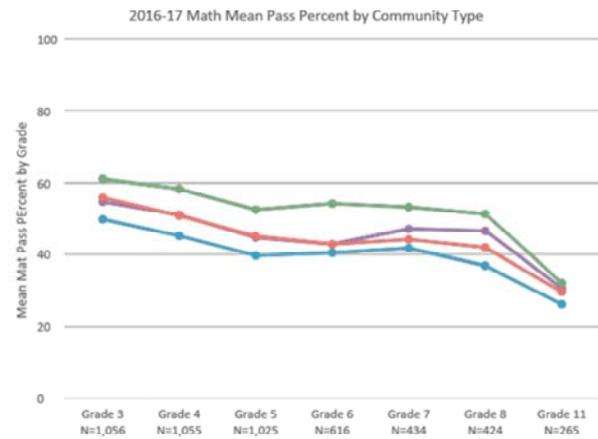
"No school on Friday, expected to resume Monday."

What readers are most interested in is often not what we as researchers fixate on. Understanding their policy interests is key for turning mountains of data analysis into actionable insight, and not drowning them in information they don't really care about.

Getting to the heart of the story

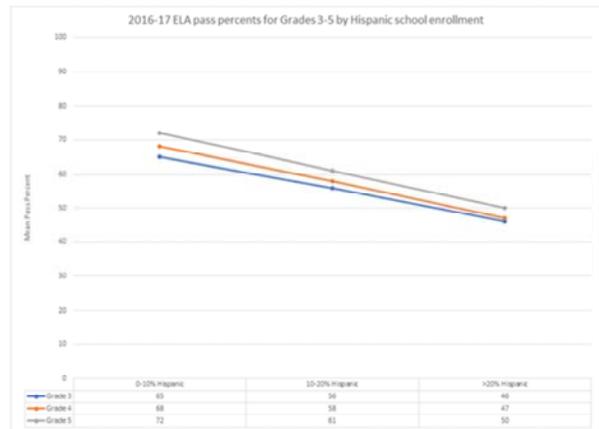
- So a first question is: **What is the story?**
- If we don't know the story, or can't express it in words, then we may have a hard time telling the story in visuals.
 - Creating executive summaries, "elevator pitches" for ERDC reports.
 - Tell the story in words before trying to put it in visuals.
 - Don't use visuals as a crutch for an underdeveloped story.

Figure 4: Mean Math pass percent by community type



All grade level community differences are significant ANOVA tests at $p < .001$ except for Grade 11 which is non-significant

Figure 5: ELA pass percent by Hispanic enrollment in grades 3-5

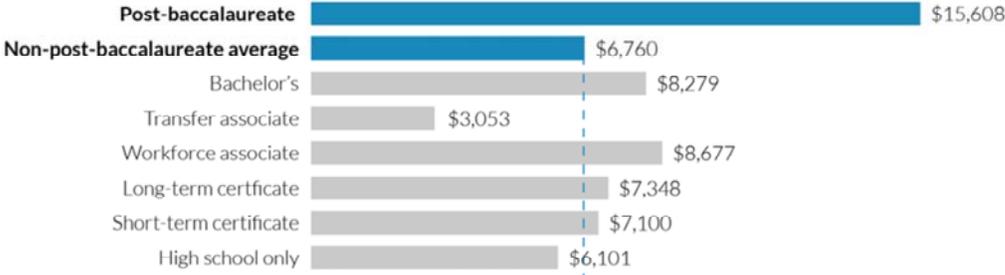


Main effect for Hispanic enrollment in each year significant at $p < .001$

These are examples of visuals that don't really tell a story. We spent an hour or so studying these visuals trying to figure out the story, and it turns out there wasn't one. They were just being used to add visual interest, masking the fact that the underlying data was entirely uninteresting. We ended up just omitting them entirely.

Getting to the heart of the story

The gender deficit is largest for post-baccalaureate degrees – by a large margin.



Keep visuals simple, and zero in on the aspects that tell the story. Don't clutter with information not relevant to the story being told. In this story, we highlighted the two data points of interest, and greyed out the rest.

Creating engaging data stories

- Distill the content to main ideas -- what are the 3-5 takeaways that you want people to walk away remembering?
- Create visualizations that will tell these stories at a glance.
- Include a few sentences that will clarify potential points of confusion and provide context for the headline. This information should also help explain why these findings matter.
- Link to where they can learn more about your methods, your data, your definitions, etc.

Keep visuals simple, and zero in on the aspects that tell the story. Don't clutter with information not relevant to the story being told. In this story, we highlighted the two data points of interest, and greyed out the rest.

And finally, watch your language

The intention of the committee is to audit the records.



The committee intends to audit the records.

The agency conducted an investigation into the matter.



The agency investigated the matter.

These findings are consistent with evidence presented in the literature review regarding the nature and direction of the relationship between these variables and the outcomes of interest.



These findings are consistent with prior research.

PSM separates these two components of the treatment effect and reveals the impacts attributable to the treatment, assuming the matching process matched treatment group members to similar comparison group members, eliminating the portion of the treatment effect attributable to personal characteristics.



PSM isolates the effect of treatment from personal characteristics by matching and comparing individuals with similar backgrounds.

Economy of words when presenting results can go a long way -- especially if we are clear, cogent, and concise. It's almost always possible to dramatically shorten a document or presentation without any loss of meaning, while at the same time being more clear and relevant.