Illustration: Paul Combs

Introduction. Boom! I am excited. Barely one year after I went to my first conference full of data analysts here I am talking to data analysts. That alone calls for excitement.

I knew we had a data analyst in my fire department. I knew that we had a guy who produced excel spreadsheets and tables for documents. I didn't know that we had a data analyst. To be fair, we really didn't treat them like a data analyst. We treated them like a data retriever and data arranger, but never like an analyst.

So, the exciting part is that I have no idea of what you are doing at your desk. I have no idea what you are talking about at the water cooler. **I don't know and I don't have time to learn it**. You enthusiastically show me "logarithmical adjusted thingies" like cats bringing a mouse home to its owner. You are sad if I don't recognize the beauty of the dead mouse prize.

I do know that you like to talk with letters…more "n's" are better than fewer "n's." There is something about the value of "p" that means something to me…not sure what it is. I also know that a time series can be stationary and that stationarity means something important…TO YOU. And that makes things exciting.

But I am not a data analyst. In another life, perhaps, but right now I am, for the sake of argument, the Operations Chief of a large municipal fire department and I am heading into budget development season and what I really need to know is whether I should buy more ambulances or buy more fire trucks and I need the "data" if I am going to make the right decisions AND you are the data analyst.

Analyzing. An analyst is a person who analyzes and analyzing means to dig into something, to break it down into its constituent parts. The idea is that if you can understand the parts you can understand the whole.

And understanding the whole in a complex environment is more than the understanding of the parts.

This leads us to the bigger part of the idea. We are not differentiating between factors and correlations, "n's" and "p's" for nothing. We are doing it with the idea that something like understanding is going to emerge.

So your work as an analyst *[from my perspective]* is to help me make meaning out of the stream of numbers floating through my head. And in order to do that, to help me make meaning, you must know something about my operational context.

You can't find context in tables.

Wicked problems. The operational context of the modern fire department is defined by wicked problems. Here are ten characteristics of wicked problems:

1. There is no clear problem definition
2. They are multi-causal, multi-scalar, and interconnected
3. They can't be completely solved
4. Each problem is unique
5. Takes a long time to evaluate solutions
6. There is no right or wrong, only better and worse
7. Each solution ramifies throughout the system
8. Each problems is connected to other problems
9. Problems overlap hierarchies and program boundaries
10. There are goal conflicts

Remember, if you don't get the question right, your answer doesn't matter. ~William Lind

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The pacing challenge. "How do we configure our thinking and subsequently our resources in ways that allow us to learn faster and be more adaptable in the face of a constantly changing environment?"

Asking questions. There are these things that help to frame out what is important:

1. The mission
2. The stated objectives
3. The guardrails
4. The people
5. The culture *[Edgar Schein]*
    a. Artifacts are the overt and obvious elements of an organization.
    b. Espoused values are the company's declared set of values and norms.
    c. Shared basic assumptions are the bedrock of organizational culture
6. The political environment
7. The data structure

The most important thing. Use the data to tell a story.

Building Context

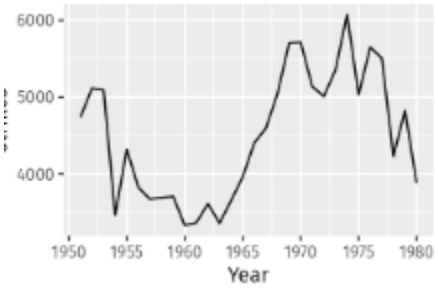
Story elements. Each story comes with a series of elements and each story is told with a discrete purpose in mind.

explanatory. Most fire department thinking around data analytics is explanatory i.e., the use of historical data sets to tell the story of what already happened.

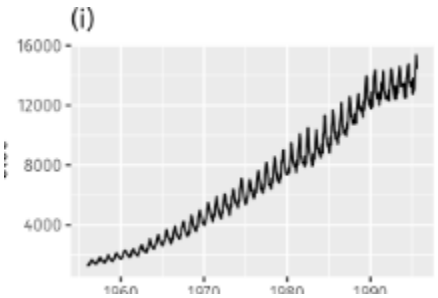
predictive**.** Most fire department action is based on the premise that the explanatory is actually predictive. It's not. Fire departments are not hermetically sealed from the environment.

bounded. Most data analysts don't do a good job of explaining the difference between what they found out about yesterday and what that means for tomorrow.

Not too technical of a push back. Much of current data analytics in the fire service is based on well behaved data, normal distributions, and the assumption of linearity. This means that much of current data analytics in the fire service is based on lies. The world is not well behaved.



What does this mean?



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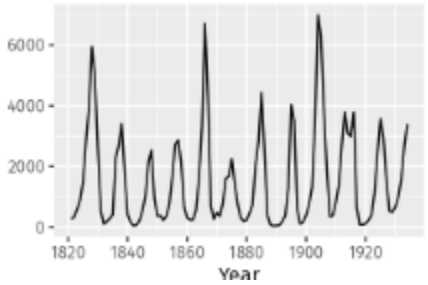

What does this mean?

Real Life. After each fire the fire department floods the affected neighborhood and checks smoke alarms and distributes prevention literature. The people cheer!

1. Did the after the fire impact have any value?
2. How do you know that?

Questions that I wish the analyst would ask.

- What is your objective?
- What is your hypothesis?
- What do you assume to be true?
- How do you think about the problem?
- Are you having similar problems elsewhere?

Idea Evaluation Rubric

In order for an “idea" to be considered the idea holder must present a narrative that explains the relationship between the idea and the ten-level evaluation rubric.

Consider each of the requirements carefully and honestly. While unlikely, it is possible for an idea to fail through all these requirements and still have value.

Level One: The Idea. Explain your idea in no more than one page? Include:

- The assumptions you are making
- The context you imagine the idea working in
- The “value proposition” for the community

Level Two Data. What data supports your idea? In this case anecdotes may be sufficient.

Level Three: Doctrinal/Legal Requirements. How is the idea situated in reference to laws, accreditation, departmental doctrine?

Level Four: Leader's Intent. How does the idea support the leader's intent?

Level Six Measuring. What does it mean for the idea to have worked and how will you measure success be sure to include:

- Desired outcomes
- Relevant program performance measures

Level Seven Equity Impact. Consider access, input, distribution, scale, time horizon.

- Does the idea improve access to services/outcomes for vulnerable communities
- How do we expect to get stakeholder input on the idea
- Does the idea improve the distribution of value
- At what scale do the improvements occur? Individual, community, or population
- Over what time horizon are the improvements expected to make a tangible improvement

Level Eight- Fiscal Impact.

- How much will the idea cost
- Where is the money coming from

Level Nine-Partner Impacts.

- Labor/contract impacts
- Policy impacts
- Internal org. Impacts logistics, other programs
- External org. impacts other agencies and departments

Some Basic Rules of the Road

1. Wiggle in where you can
    a. Being involved in the planning stages of an idea gives you the chance to help guide data collection, management, and interpretation
2. Learn how to ask questions
3. No images without explanation
    a. Explain the meaning of your own charts
    b. Explain the context of your own charts.
    c. Explain the assumptions
    d. Explain the objective in your words
4. Elementary explanations work better
    a. Imagine you are talking to a bunch of five year olds…because you kind of are
5. Less is more
    a. Only explain what you have to
    b. Only use as much detail as is absolutely necessary
6. Learn to think in stories
    a. No one will remember the chart, and no one will forget the story it told