

Storytelling for Cost Estimators

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Author Note

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Abstract

As estimators, we advocate the importance of good data; but without context, estimates and analyses are just numbers. To give true power to our work, we need to effectively pair good estimating with good communication. There is no existing best practice guidance for estimators on how to create a compelling narrative to accompany analysis. By leveraging a storytelling structure, we can inspire action, communicate our findings in a way that resonates, and ultimately become more effective.

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Introduction

During a 2009 interview, Google's Chief Economist Dr. Hal R. Varian stated – "the ability to take data—to be able to understand it, to process it, to extract value from it, to visualize it, to communicate it—that's going to be a hugely important skill in the next decades."¹

Typically, cost estimators are extremely familiar and comfortable with the data and analysis at our fingertips. Our focus primarily on the quantitative side of analytics doesn't mean a decision-maker can understand how that data is beneficial to them or what they should do with it. While we have refined the abilities and practice of cost estimating, as a community we have downplayed the skill to effectively communicate that data or make sure it is fully understood. A good story impacts people in a way that looking at charts or models do not. Even with the best cost models, estimators can still struggle with conveying their insights to others effectively—essentially, telling the story of the estimate/analysis.

A few moments of a good story can make you feel emotions in a way no Excel screenshot ever could - think of your favorite movies, books, and songs. Numbers, in and of themselves, are completely meaningless; what really matters is the story that those numbers tell. Cost estimators should implement practices that make us effective cost storytellers; working to bundle the data/information and present it in a way that a decision-maker can use. Cost analysts should be honored in our unique opportunity to be trusted strategic advisors, not just number crunchers. If we incorporate storytelling techniques into our cost estimate presentations and tailor the message

¹ Dykes, B. (2016, March 31). Data Storytelling: The Essential Data Science Skill Everyone Needs. Retrieved February 24, 2020, from <https://www.forbes.com/sites/brentdykes/2016/03/31/data-storytelling-the-essential-data-science-skill-everyone-needs/#3548e1bd52ad>

to our audience's needs, our stories will tell the meaning of our data more effectively than our numbers show it.

Story Structure

Our brains are wired for stories. Long before we had a way to record knowledge, humans passed on history, innovation, and discoveries using verbal stories that were carried through generations. Although graphs, charts, and numbers can be second nature to cost analysts, a presentation resonates and connects emotionally with people if it is accompanied by a good narrative. A bad presentation or “death by PowerPoint” can make a half hour meeting a struggle to pay attention through. And yet for three hours we can sit through a good movie or not be able to put down a novel. This is because of the magic of story. In 350B.C. Aristotle proposed in *Poetics* that every story followed a three-act structure that formed a basic triangle. “A whole [story] is what has a beginning and middle and end.” The triangle consisted of the beginning, the climax, and the resolution.

This “Beginning, Middle, End” structure of building plot was expanded upon by German literary critic Gustav Freytag in his *Technique of the Drama*, published in 1863. The model suggests a five-act structure that works very well for the action we need to inspire in our decision makers.

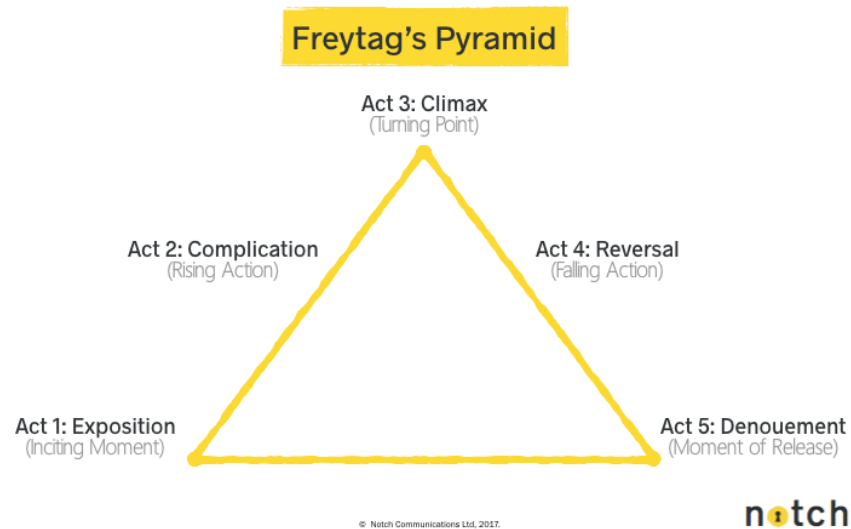


Figure 1- Freytag's Pyramid

Beginning in the bottom left, the plot structure proceeds as:

- 1) Exposition – Setting the scene for the work; ensures the audience is aware of the background details and the major characters.
- 2) Rising action - Audience becomes aware of a conflict/complication and are hooked on the story. This complication eventually leads to the peak of change.
- 3) Climax - The "turning point" of the work, when an important decision must be made.
- 4) Falling action – The conflict comes to a head and it is made clear the “hero” will reach their goal.
- 5) Denouncement (Resolution) – The loose ends are tied up and story concludes.

How to implement Story in the Cost Estimating Process

According to the Cost Estimating Body of Knowledge (CEBoK[®]), the purpose of cost estimating is to “...determine and **communicate** a realistic view of the likely cost outcome,

which can form the basis of the plan for executing the work”. As a profession we acknowledge our role in effectively communicating the story behind our analysis. As a community we spend significant amounts of time refining our estimating techniques, creating databases to collect data, and using advanced mathematics and methods. But there hasn’t been much work done on how to best communicate that work to a decision maker. Since the discipline of cost estimating supports various decision-making processes (determining whether a program is viable, how it should be structured, what resources are required to support it, etc.) the actual story we tell will be unique to each program. We can use a story structure with elements of context, plot twists, and clear ending to all estimates. Storytelling techniques will help tie our information to a framework that non-cost analysts can better understand. Looking at cost estimating process from the GAO cost estimating guide (Figure 2) we can see where we can institute storytelling into our traditional estimating process. We allocate a disproportionate amount of our hours and brain power on the analysis, at the expense of important creativity needed to effectively communicate this data. If we’re not successfully communicating, all the hard work on the analysis will be meaningless.

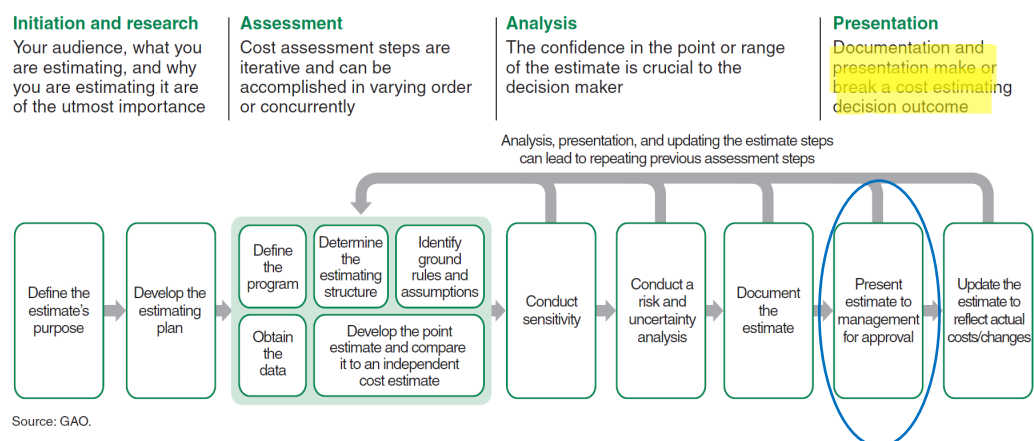


Figure 2 - GAO Cost Estimating Process

All estimates initiate because a decision-maker needs to quantify and understand the impact of a decision. When we start the estimate, we can provide context to our analysis if we keep that decision in mind. The context that will be used to create the plot of the story will begin at the same time as the estimating process and will be used at the end of the process when we present the estimate for approval.

All the great stories have relatable heroes that the story centers around (Harry Potter, Luke Skywalker) that the audience wants to succeed. We may want to think after all the work we put into the exploratory analysis, that we are the heroes and the audience wants to listen to our own estimating journey. By default, that is how most cost estimators present their data. We show how we stepped through the estimating process, the data we collected, the assumptions we've made, and present the final product of our labors. However, it's not our story we're telling. We are not the decision-makers. Although we may be the ones that bring the issues to light, we can't resolve the conflicts within the programs we are estimating. Our audience is the hero of the estimating narrative, and much like Yoda or Dumbledore, we are their guides to demonstrate how to resolve their conflicts. Our job is to show them how to more clearly "see" the takeaway from our analysis; we offer guidance, confidence and tools.²

If we are clear on our role in this story, we can then consider what is the end decision we need to be made and how we can help guide them. We do this by getting the answers to questions outlined in *Storytelling with Data*³.

² Duarte, N. (n.d.). *Resonate*. Retrieved from <https://www.duarte.com/resonate-book/chapter-3/>

³ Knafllic, C. N. (2019). *Storytelling with data*, Wiley Knafllic, C. N. (2015). *Storytelling with data: a data visualization guide for business professionals*. Hoboken: Wiley.

Questions to ask³:

- What background information is relevant or essential?
- Who is the audience or decision maker?
- What biases does our audience have that might make them supportive of or resistant to our message?
- What data is available that would strengthen our case? Is our audience familiar with this data or is it new?
- Where are the risks: what factors could weaken our case and do we need to proactively address them?
- What would a successful outcome look like?
- If you only had a limited amount of time what does your audience NEED to know, what would you say?

We took the time to get the context for the presentation from the questions above, now we can begin walking through the story structure.

1) Exposition – *Setting the stage for the work.*

Give the background to the audience as to the who and what of our estimates. In the first step of the GAO estimating process, we determine the estimate's purpose and establish who will receive the estimate. Our first goal in this beginning stage is to set the plot. We should take time to make sure the audience understands the who, what, and why of our analysis. This doesn't mean showing every minute detail, but instead ensuring the audience is ready to be captivated by what we intend to present. We should be involving the audience and making sure we clearly explain what's in it for them, what we need from them, and give them reasons why they should pay attention. When we think of how we want to focus our audience's attention on the decision they will have to make, we can better determine what data is most important in the conflict/complication to come.

2) Rising action- *when the audience becomes aware of a conflict/complication.*

Conflict and tension are important components of any important story. If in our analysis we are reporting there are no programmatic risks, sufficient budget, no chance of schedule overrun – it wouldn't be action-inspiring. What would we want the audience to do? If we want the decision makers to have a stake in the solution, we must illustrate the importance in the part they play. Is there enough funding to complete the program? An opportunity to buy ahead of need? Are there competing solutions that were evaluated in a Business Case Analysis (BCA)? One of the pioneers in the data-story field, Nancy Duarte, calls the rising action and tension “the conflict between what is and what could be”. This is the time to pique the audience's interest and show them the plot points you can give them to help solve the problem.

3) Climax - *The "turning point" of the work, when an important decision must be made.*

Now that the decision-makers understand their role, by “putting ourselves into their shoes” we should be looking to figure out what will motivate them into action. We introduced a conflict and a potential “what could be” and now we need to convince them they should walk away from the presentation ready to do something. This is when we can bring forth data that clearly demonstrates the problem and articulate what happens if no action is taken or changes are made. “When you combine the right visuals and narrative with the right data, you have a data story that can influence and drive change.” Brent Dykes, Forbes Magazine

4) Falling action – *The conflict comes to a head and it is made clear the “hero” will reach their goal.*

At this stage the decision-maker realizes their path, we have armed them with the tools and knowledge to move forward. By guiding decision-makers with their perspective in mind, they should feel more confident in their own understanding of the analysis. Depending on the situation we can use this opportunity to make a case that they should accept a proposed solution or engage the audience by discussing potential options for addressing the problem. Either way, our audience will feel empowered, clearly understand the problem, and in our role as their guide we have convinced them they are accountable for the next step.

5) Resolution – *loose ends are tied up and story concludes.*

To wrap up the story we restate the problem and the need for action, making sure the audience is ready to act. “There’s a difference between being convinced with logic and believing with personal conviction. Your audience may agree with the thought process you present, but they still might not respond to the call”⁴. We need them to be the “hero” and walk away from the presentation knowing more and ready to take some action.

An Example

Assume that you are the cost estimator for Program ABC. You have created a Life Cycle Cost Estimate (LCCE) for the program and have a high-level of confidence that the program will

⁴ Duarte, N. (n.d.). *Resonate*. Retrieved from <https://www.duarte.com/resonate-book/chapter-1/>

be able to be executed and meet schedule at the current funding. You have incorporated risk analysis in the estimate and the current budget meets the 50th percentile of the estimate's production Cumulative Density Function (CDF). For the next budget cycle, the program office is asked to respond to a funding drill that implements a 10% decrement to the annual budget.

You as the Program ABC cost analyst must demonstrate the impact of the funding loss to the decision-makers. You could simply show the negative difference each fiscal year, but that does not tell the full story of how the reduction will impact Program ABC holistically so you begin stepping through the questions from *Storytelling with Data*:

- Pertinent Background information - Program ABC is a critical safety item for Naval aviators that is fully funded due to the high visibility of the program
- The audience of the presentation – Initially, we will report the story to our program manager in a way that resonates with them so that it can be effectively re-told.
- Biases our audience has that might make them supportive of or resistant to our message – although our program manager believes in the Program ABC solution, they know all programs will be subject to this 10% budget cut and therefore don't believe there is a chance to avoid the mark
- What data is available that would strengthen our case – we have an LCCE that shows the likelihood of executing at the reduced budget and also the updated estimate with the 10% mark
- Where are the risks: what factors could weaken our case – The comptrollers will be hearing the impact to every program and Program ABC will just be one of many
- What would a successful outcome look like – preserving as much of a budget as possible during the existing planned Fiscal Years to avoid pushing the procurement out an additional year
- If you only had a limited amount of time what does your audience NEED to know, what would you say -Program ABC provides a critical solution the

warfighter needs to safely complete their mission, and it is imperative the solution is delivered as soon as possible. This potential budget cut will reduce the likelihood of successful execution from 50% to under 20%, result in a higher unit cost, and most likely push the full delivery of product out an additional year.

Armed with the context and the action we want from the decision-maker, we can make the traditional funding chart in Figure 3 but also incorporate story in Figure 4.

(\$ in Millions / Then Year)	FY19	FY20	FY21	FY22	FY23	FY24	FY19-24	To Comp	Prog Total
PROCUREMENT									
Prior \$ (PB20)	22.500	23.063	23.639	24.230	24.836	0.000	118.267	-	118.267
Current \$ (-10% Budget)	22.500	20.756	21.275	21.807	22.352	0.000	108.691		108.691
Delta \$ (Current - Prior)	0.000	(2.306)	(2.364)	(2.423)	(2.484)	0.000	(9.577)		(9.577)
Required¹ \$	22.500	20.756	21.275	21.807	22.352	24.599	133.290		133.290
Delta \$ (Current - Required)	0.000	0.000	0.000	0.000	0.000	(24.599)	(24.599)	-	(24.599)

Figure 3- Budget Drill Update

The Figure 3 slide is probably what the decision-maker asked for – a table without a narrative to explain the importance of Program ABC - and it will look very similar to the data they see for every other program. If we intend to inspire action in the decision-maker based on our analysis, the cost analyst must convey that the 10% reduction in budget per year will result in Program ABC procuring significantly less product during the FYDP. The reduced annual product results in a lower economy of scale and a greater unit price, which causes the 10% reduction in budget to generate a less than 20% likelihood of execution, or a more likely scenario that the amount needed will be \$15 million dollars over the original budget due to the additional year of procurement.

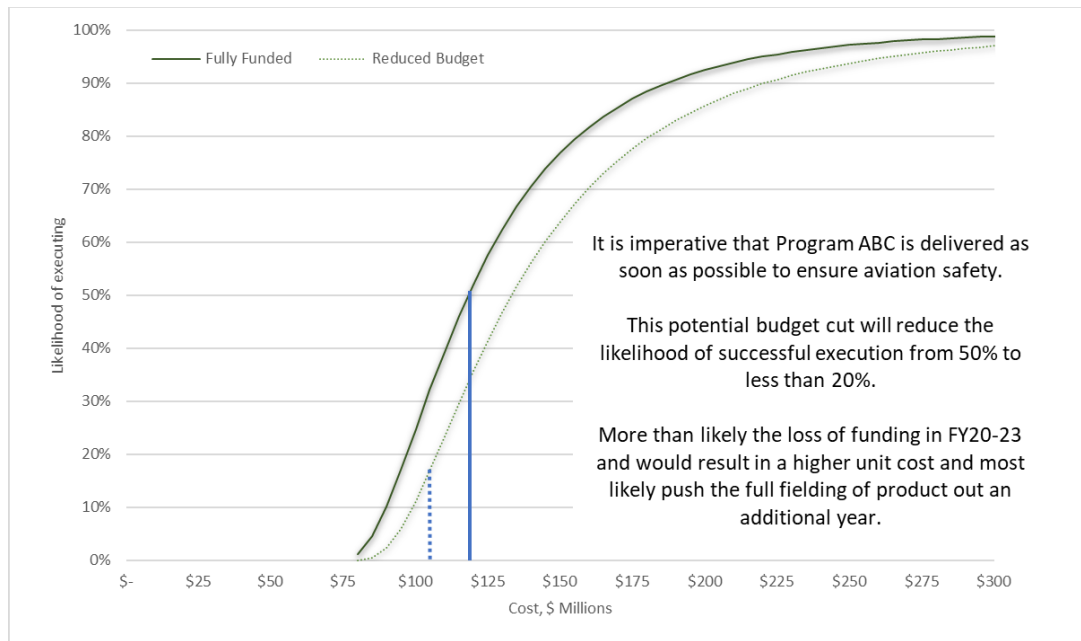


Figure 4 - Storytelling Budget Update

Armed with this data, the program manager for Program ABC now thoroughly understands the full impact of the 10% budget decrement. We've given metrics that are extremely important to the manager and the ultimate decision-makers. Not only does our story resonate with them so it can be retold, but they are also inspired to act and be the "hero" that protects the Program ABC funding to ensure the program is delivered on time.

Summary

Estimators can better guide decision-makers better by effectively communicating their insights using storytelling techniques. By applying a five-act narrative structure to our briefings, we can incorporate plots, twists, and endings that inspire action. Our presentations should be memorable and give our audience a clear understanding of what we want them to do after they receive the information. Incorporating these storytelling techniques into the way we present our cost estimates allow us to guide our “heroes” through the saga of their decision and should resonate in a way that inspires action.

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