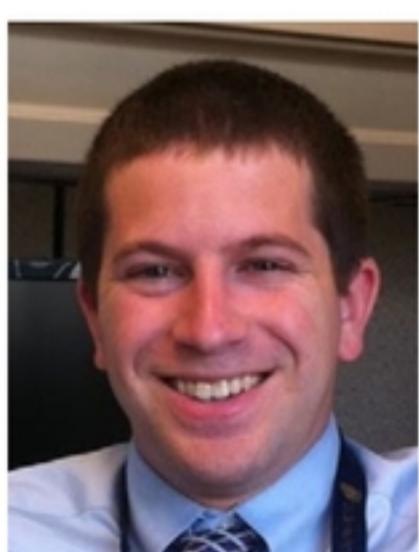




Fundamental principles of analytic communication



BY EVAN S. LEVINE

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Analytic ideas and findings are often surprising, subtle and technically complex.

These qualities can make them challenging to communicate, regardless of the audience. On the other hand, analysts have a great deal of freedom over the manner in which they communicate ideas and findings – some overarching, general principles can help analysts make decisions in this regard.

These sorts of principles are useful because communication advice for analysts is fragmented, primarily by medium. We use data visualization books to help us build plots, slide construction guides to help us build presentations, and Web manuals to help us build Websites. The advice specific to these media is very useful, but establishing overarching principles helps analysts make decisions regarding how to organize communication materials by keeping a small set of objectives in mind.

Four principles apply to all analytic communication, regardless of audience or medium. These principles are: clarity, transparency, integrity and humility. (A similar list of principles for excellence in analytic communication appears in Markel (2012 [1]).

Whenever you are faced with a design decision for a communication product, return to these principles and they will guide you to a good solution.

An alternative frame for these principles is to think of them as fundamental objectives (as the term is used in decision analysis) for the analytic communication process. Some alternatives will solely impact one of the objectives; for example, sometimes an analyst can improve the clarity of a plot by changing the color that the lines are drawn with. On the other hand, sometimes alternatives will involve tradeoffs between the objectives; those decisions are generally more difficult, and which alternative is preferred can depend on the audience or the medium.

Let's discuss each of the principles in more depth.

CLARITY

Clarity is the expression of an analytic concept in a manner that is simple, direct, efficient and effective. Extraneous lines, words, colors and other markings are minimized so the key idea can be placed front and center. At the same time, the concept must be expressed in a manner that is understandable and not oversimplified; minimization should not be taken so far that the finding disappears or key data features are lost.

Consider how experts on analytic communication in various media make recommendations that maximize clarity:

- In data visualization, clarity is exemplified by Tufte's first two

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principles in the theory of data graphics (Tufte 2001 [2]) – “above all else show the data” and “maximize the data-ink ratio.” In other words, when making a data visualization, don’t add tick marks, gridlines or decorative elements unless they actually convey information. At the same time, don’t eliminate any markings that impart information about the data.

- Iliinsky and Steele (2011 [3]), in their book on data visualization, are expressing the desire for clarity when they recommend “function first, suave second.” (Personally, I would put suave even lower on the list.)
- In his guide to slide presentations, Reynolds describes the Zen concept of simplicity as one of his guiding principles (Reynolds 2008 [4]). Reynolds’ simplicity is similar to what I’ve called clarity, as evidenced by his advice that “simplicity can be obtained through the careful reduction of the nonessential,” as long as it also “gets to the essence of an issue.”
- In their classic book on style in writing, Strunk and White (1959 [5]) stress the importance of clarity by emphasizing the repercussions when an author fails to achieve it: “Muddiness is not merely a destroyer of prose, it is also a destroyer of life, of hope: death on the highway caused by a badly worded road sign, heartbreak among lovers caused by a misplaced phrase in a well-intentioned letter, anguish of a traveler expecting to be met at a railroad station and not being met because of a slipshod telegram. Think of the tragedies that are rooted in ambiguity, and be clear!”

- One of the rules of journalism is not to “bury the lead (intro).” The writer should put the most important finding at the front of the story, stated directly. If the important finding is placed deeper in the story, the audience is more likely to miss it.

In summary, when communicating analytic ideas and findings, clarity means that you should maximize efficiency, whether measured through words, lines or colors, while still

conveying your thoughts forcefully, definitively and, most importantly, understandably. (Scientists can think about clarity as maximizing the signal-to-noise ratio of communication.)

TRANSPARENCY

Transparent analytic communication explains to the audience the method by which the findings were derived, accessibly and to an appropriate depth. In addition to presenting the methodology, part of transparency is ensuring that the



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audience understands the assumptions that underlie the analysis. This is important because if the assumptions are violated (whether through further study, natural change or some other means), or even if the audience just doesn't accept the assumptions, there will be implications for the findings. Transparency is most appropriately applied to the entirety of an analytic communication package, as opposed, for example, to a single plot inside of a technical document.

Some examples of transparency in action include:

- A journal article that describes the methodology behind an interesting result. In many fields, the author of an article is required to publish his or her methods to the level of detail required for another researcher to replicate every step.
- A financial analyst making a presentation who discloses his data sources and the techniques by which he processed them.
- An analyst who publishes on the Web the raw documents and code used in his new text mining method.
- A scientist speaking to the general public who, given the limited time allotted for her presentation, refers the audience to a freely available white paper for those who would like more technical detail.

Why is it important for analytic communication to be transparent? Shouldn't an analyst only care that the findings are communicated correctly?

First of all, one of the benefits of doing analysis is that there is a logical line of reasoning that leads to a finding; analysts don't need to rely on the assertion of findings without support. This gives analytics a competitive advantage versus other types of arguments, such as "gut-based" reasoning or subject matter expertise, and that advantage should only be squandered for very good reason. In other words, transparency builds the audience's confidence in the findings.

Secondly, part of our responsibility as analysts is to expose our line of reasoning to questions and comments. Sometimes this feedback reveals errors, oversights or forgotten assumptions. These corrections should be welcomed, because in the long run they result in better analysis. In most cases, however, an analyst will have a ready answer to a question or a comment because he or she has spent more time thinking about the data and findings than the audience. Answering questions directly also increases the audience's confidence in the findings.

Finally, transparency helps to spur on other analysis. This occurs because revealing the methodology behind a finding can give a member of the audience an idea to

solve a problem they've encountered or, even if transparency doesn't spark an immediate idea, it can add another tool to the analytic toolbox of the audience members. The audience can also more easily recognize other opportunities to apply analytics, sometimes bringing business and collaborative opportunities to the analyst.

The transparency communication objective demonstrates a benefit of keeping the line of reasoning as simple as possible – simple methodologies are easier to explain, and if you can't explain the methodology in

a way that the audience will understand, few people will believe the findings.

INTEGRITY

Analytic communication with integrity conveys defensible and sound conclusions driven by the data, while properly representing the limitations and uncertainty in the findings.

As analysts, our first responsibility is to ensure that we are communicating the data and findings accurately and honestly. However, it can be tempting to



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exaggerate the implications of the data, because, in all likelihood, no one will look at your data as thoroughly as you will. Analysts engage in exaggeration for many different reasons, whether to further their career, to please the audience or simply to make a stronger argument than the data support. It is important to understand that this temptation is common; as analysts, we spend inordinate amounts of time and energy focused on our work and to be tempted by a larger reward is entirely natural.

However, it is counterproductive to engage in this kind of overreach, whatever the reasoning behind it. In the long run this kind of behavior will have a negative effect on your career, particularly in the opinion of other analysts. Additionally, as analysts, we study real phenomena, and our techniques are designed to reveal real insight regarding these phenomena. Even if your colleagues can't tell that you've gone too far, eventually the phenomena you are studying will show the truth.

In addition to communicating the data and findings accurately, the presentation of limitations and uncertainty in analytic communication is integral to integrity. This information allows the audience to use the findings responsibly – if limitations and uncertainty are not presented or are minimized, the audience is likely to apply the findings in regimes beyond which they are valid. It also

facilitates comparisons between different analysts' findings.

Integrity is connected to the concept of "epistemological modesty," a complicated sounding phrase that describes a simple idea. Roughly, analysts that demonstrate epistemological modesty do not overstate the findings and certainty of their work because they recognize that the real world is quite complex and often difficult to understand and model. Analysis can break down in very surprising ways even if you've carefully accounted for the known sources of uncertainty. Keep this in mind when communicating findings. A good example of the concept of integrity in action can be found in data visualization. When making plots, it is easy to exaggerate the trend you are trying to demonstrate by adjusting the axes in improper ways or by showing only selected subsets of the data. (This behavior is common in situations where the analysis was carried out to support a predetermined position – it's often seen in politics.) Tufte (2001, [2]) expresses integrity by arguing that "graphical excellence begins with telling the truth about the data." The analyst should present the data in such a way that the audience leaves with an accurate and complete impression.

HUMILITY

By humility in analytic communication, I mean that we should strive to remove

the analyst from the message. In writing, Strunk and White (1959, [5]) recommend that authors, “Place yourself in the background. Write in a way that draws the reader’s attention to the sense and substance of the writing, rather than to the mood and temper of the author.” In analytic communication, too often the audience takes away the idea that the analyst is some kind of super-genius, that analytical work is inaccessible, or that they could never carry out their own analyses. These perceptions are detrimental to the future of our profession; analytics is a young field and in order to grow we need to attract people and business by making ourselves and our work as accessible as possible. Furthermore, the data and the conclusions drawn from it should speak for themselves – if you find yourself needing to rely on your authority as an analyst, that’s a sign that you may be overreaching.

We can communicate with humility by not encouraging a “cult of personality” around the analyst. For example, you can talk about mistakes that you made in the initial pass through the analysis or ways you feel the findings are difficult for you to understand. Discussing these sorts of things won’t hurt the audience’s opinion of you; in fact, it will actually improve it, because they will find you more relatable. Furthermore, they’ll also think you are smart, in the way that we think great teachers are smart

– good analytic communication requires a great deal of intelligence!

CONCLUSION

These basic principles can help guide our decision-making when it comes to communicating analytics. However, I don’t to imply that there is one right answer to communication decisions. Even with the constraints imposed by the principles there is still plenty of room for individual style, unique voices and elegant solutions. ■

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