

Review: *Beautiful Evidence*, by Edward Tufte, Cheshire, CT: Graphics Press LLC. July 2006. 213 pages. ISBN-10: 0961392177.

Edward Tufte's books, workshops, and moderated online forum on the visual display of information have won him a cult following among designers and IT professionals. In *Beautiful Evidence*, Tufte elaborates principles introduced in *The Visual Display of Quantitative Information* (1983), *Envisioning Information* (1990), and *Visual Explanations* (1997). Tufte believes that information displays can and should more fully utilize the human capacity to visually process information. Illustrations should meet cartographic standards as high data-density, scaled and multi-layered color images representing large sets of multivariate contextualized data arranged adjacent in space within a single field of vision to facilitate comparison.

However, for the reader unfamiliar with Tufte's books, the above introduction is less than informative - a parade of abstract concepts in multisyllable. Verbal summaries of Tufte's ideas do not do them justice. Like its predecessors, *Beautiful Evidence* demonstrates rather than explains, taking the reader through a series of excellent, mediocre, and poor designs. Tufte explains the good and bad in these examples and how to improve them, going back and forth between art and science in testament to his belief in the "one deep communality of science and art: to show the results of intense seeing" (105). For Tufte, the content is the design; the data, not the layout, should be the focus of attention in the information display. From simple principles like designing tables with unobtrusive, thin gray lines to his controversial contempt for PowerPoint, his ideas on design and visual communication can be traced back to this insistence on clean, sparse, data-dense displays.

The first five chapters serve as a catalog of new and revised presentation techniques. Tufte begins with mapped pictures, which he defines as "representational images with scales, diagrams, overlays, numbers, words, [and] images" (13). Though designers have been overlaying photos with annotations for a long time, Tufte presents detailed guidelines for when and how to use them. Similarly, Tufte demonstrates how labeling and graphical differentiation can endow links and causal arrows with more explicit meanings, enhancing the presentation of causation and relationships. Tufte revises and codifies these common design elements to require creators to use them more consciously and purposefully.

Tufte also introduces a new technique called sparklines - word-like, inline, and high-resolution graphics representing quantitative information in context. Because sparklines are "adjacent in space rather than stacked in time" (63), the reader can easily compare large bodies of data by focusing on the shape of the sparkline in the context of a verbal explanation or of other sparklines.

Tufte then follows with the chapter "Words, Numbers, and Images - Together," in which he explains his own strict standards for mixing different modes of information. Tables and figures should not be segregated to the back of the book or even the next page, if possible. Explanatory numbers and images are integral components of the text to which they refer, necessitating that the entire explanation, regardless of the mode of the elements, be printed together in a single field of view. Throughout the book, Tufte follows his own advice, putting all images and illustrations inline and even printing references and notes in the right margin, directly beside the text to which they pertain. At no time does the reader have to flip pages back and forth to follow an argument.

The fifth chapter then summarizes Tufte's principles of analytical design, drawing on the preceding four chapters to outline a set of best practices of information design. While Tufte uses the Charles Joseph Minard illustration of French army losses during the 1812 invasion of Russia to explain each principle, this chapter is still more abstract and general than his usual style of breaking down example after example. However, Tufte's compelling portrayal of Minard's motives says as much about Tufte as it does about Minard. According to Tufte, the

veteran Minard created this famous illustration to show empirically the human losses of war, making it an information display as anti-war poster. Tufte believes that the accurate and efficient display of complex information can affect decisions which affects lives, as can be seen in his analyses of the Space Shuttle Challenger disaster and the 1854 London Cholera epidemic in *Visual Explanations* (27). For Tufte, good design contributes to the greater good by enabling better-informed decisions, and his mission as a scholar is to improve the quality of information displays.

The next chapter, "Corruption in Evidence Presentations," ends with an elaboration on ideas expressed in *The Visual Display of Information* and a transition to the following chapter. Tufte offers graphic design, linguistic, and statistical critiques of how presentations meant to support a particular viewpoint ultimately corrupt the data and the research endeavor itself. This chapter stands out because some of the analyses focus on how non-visual aspects of design, like language and statistics, can obscure rather than clarify the data.

"The Cognitive Style of PowerPoint: Pitching Out Corrupts Within" is the second edition of a booklet originally published in May of 2003. Tufte's opinion of PowerPoint is that the built-in graph templates are "broken beyond repair" (153), and he goes on to make the case that "PowerPoint, compared to other common presentation tools, reduces the analytical quality of serious presentations of evidence" (157). Tufte's extremely negative assessment of PowerPoint has been a point of debate on the Internet, in blogs, and in reviews of his books since the booklet's first publication in 2003, a key event in the controversy over PowerPoint in schools. Some have accused the first booklet of being a vague, elitist attack with no concrete guidelines, but Tufte's revision adds practical advice for improvement. Other authors, inspired by Tufte's design philosophy, have undertaken the task of improving the use of presentation software; examples include Garr Reynolds' blog Presentation Zen (<http://www.presentationzen.blogspot.com>) and the books *Multimedia Learning* by Richard E. Meyer and *Beyond Bullet Points* by Cliff Atkinson.

According to Tufte, the low resolution of PP slides minimizes the amount of information that can be presented on each screen, requiring a long series of slides to present content of any considerable complexity. "Information stacked in time makes it difficult to understand context and evaluate relationships. Visual reasoning usually works more effectively when the relevant evidence is shown adjacent in space within our eye span" (159). Though Tufte does admit that PowerPoint's "quick chunks of thin data may be useful [for] (flash-card memorizing)" (160) and "full-screen projected images and videos" (168), he considers PowerPoint unsuitable for portraying causality and relationships, which are necessary to build a well-structured argument.

Tufte's opposition to PowerPoint in schools begins with his belief that the tool resembles the toolmaker. PowerPoint's metaphor for presentations is that of the organization that created it - a large, hierarchical commercial bureaucracy of computer programmers and marketers. He suggests that a better metaphor for presentations would be teaching, because "the core ideas of teaching - explanation, reasoning, finding things out, questioning, content, evidence, credible authority not patronizing authoritarianism - are contrary to the cognitive style of PowerPoint." (161). According to Tufte, the philosophy of marketing, on which PowerPoint was designed, is incompatible with teaching, making the introduction of PowerPoint in schools "especially disturbing," because "[i]nstead of writing a report using sentences, children learn how to decorate client pitches and infomercials" (161).

Tufte's solution to PowerPoint is the printed handout. Rather than giving a marketing slideshow and one-sided talk followed by questions, Tufte suggests that presentations begin with "a concise briefing paper or technical report," for which he recommends a single sheet of A3 paper folded in half to make four double-sided pages. "Following the reading period, the presenter might provide a guided analysis of the briefing paper and then encourage and perhaps lead a discussion of the material at hand" (184). Tufte's position is that the higher data density

afforded by printed materials and the ability to mark up and then review the paper handout makes it a better communication tool than a linear progression of projected images.

The last two chapters relate loosely to the rest of the book in that they concern presentation, but the focus is on sculpture, not data. One chapter concerns pedestals in artistic and political statues; the other, Tufte's own landscape sculptures. The photos and design of both chapters meet the standards of the rest of the book, but some readers might at this point accuse Tufte of self-indulgence.

Tufte writes, designs, and publishes these books himself. As founder and head of Graphics Press, he has chosen skilled people who share his philosophy. The quality of the printing - from design and layout to choice of pigments and paper - reveals a painstaking attention to detail, which has produced visually compelling scholarly books suitable for both graduate syllabi and glass-top coffee tables.

Beautiful Evidence itself is an example of Tufte's high standards. Each topic within each chapter begins on a left and ends on a right page, making the two-page spread the basic unit of Tufte's arguments, thus giving the reader a single visual field of information at a time. All elements of the argument, regardless of the mode of expression, are kept adjacent in space to allow the reader to review and compare elements. The power of this layout shines in the first two pages of "Punning, Overreaching, and Economizing" (148-149), where he delivers a critique of David Galenson's *Painting Outside the Lines: Patterns of Creativity in Modern Art*. Instead of breaking the target text into quotations scattered throughout the argument, Tufte divides the two-page spread into three equal-width columns; he then prints the complete four-paragraph excerpt in the middle, framed by detailed analyses on the left and right. Yellow highlighting separates the excerpt into passages, and fine gray lines connect the passages to Tufte's commentary. Though one could argue that only an author with his own publishing house could pull this off, the layout allows the audience to read the passage in full, keeping the cited quotations in context and the entire linguistic analysis on one two-page spread. Allowing Galenson's text to stand on its own reassures the reader that Tufte is not quoting him out of context. Faithfully representing the object of the critique makes for a more elegant and more condemning argument, testimony to a principle that Tufte summarizes in a quotation from Eric Gill - "If you look after truth and goodness, beauty looks after herself" (2).

Upon finishing the book, *Beautiful Evidence* seems more like a collection of essays than a cohesive whole, probably because one chapter was previously published as a booklet and many more were developed through dialogues with readers on Tufte's moderated web forum "Ask ET" (<http://www.edwardtufte.com/bboard/>).

Regardless, *Beautiful Evidence*, like the three books before it, makes an informative and enjoyable read for any serious communicator. Also recommended is Tufte's web forum, where the reader can monitor and contribute to discussions that will probably become topics in future Tufte books.

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