

# No more lousy PowerPoint slides

**Eric S. Cheney**, Department of Earth and Space Sciences, Box 351310, Univ. of Washington, Seattle, Washington 98195-1310, USA, [cheney@ess.washington.edu](mailto:cheney@ess.washington.edu)

## ABSTRACT

Too many PowerPoint and other visual presentations are positively lousy: The graphics or the text on the slides are illegible. Illustrations directly imported into PowerPoint from a printed page or the Internet are routinely lousy, especially if two or more such illustrations are placed on a single slide. The most effective slides are those expressly crafted for a visual presentation. However, remedial techniques can make published illustrations effective. The key to creating effective slides is to make both images and text sufficiently large and simple.

## INTRODUCTION

The major purpose of any visual presentation is effective communication, which enhances the speaker's message. However, at GSA's and other professional meetings too many PowerPoint slides are positively lousy: The graphics and text are not legible from the back of the hall. Of course, a slide can be legible and still communicate little of substance (Tufte, 2006). Beauty, artistic frills, and fine details are of minuscule importance. Too commonly, slides seem only to serve as lecture notes for, and visible only to, the speaker (and to the audience in the two front rows). Many speakers even have lousy slides for their signature presentations.

For those unfamiliar with the vast literature on graphic design, two important empirical guidelines exist. The first is Gallagher's 12:1 ratio (1965): Measure the maximum dimension of the original figure (most commonly now a computer image) in inches; then step back that far in feet; if everything is legible, the slide will project well. Since Gallagher's time, technological advances in projection equipment probably have reduced the ratio to 10:1.

The second guideline (Cheney, 1996) is known in the U.S. military as KISSing: Keep It Simple, Stupid. Stupid refers to the speaker, not to the message. KISSing means that slides should be simple, not complex, and that slides with only peripheral relevance (no matter how beautiful) should be deleted. Of course, KISSing is an acquired skill.

Two types of illustrations in graphic design are analysis graphics and presentation graphics (Tufte, 1997; Dutrow, 2007). Analysis graphics range from computer plots of raw data to illustrations in engineering and scientific papers; these are used for research (discovery, insight, and the testing of hypotheses). In contrast, presentation graphics, such as PowerPoint, are designed to communicate concepts effectively and quickly. To the extent that PowerPoint presentations summarize or simplify evidence,

instead of showing it, they corrupt data and debase the scientific method in favor of marketing or spin (e.g., Tufte, 2006). However, because PowerPoint is ubiquitous, we should use it effectively by employing Gallagher and KISSing, while at the same time preserving the sanctity of data and the scientific method.

The best strategy is to redraft all analysis graphics into presentation slides. However, too many speakers use images taken directly from a printed page (analysis graphics) or from the Internet, both of which routinely violate Gallagher's ratio and KISSing. Some imported photographs are suitable, but almost all graphs, maps, and other illustrations will be illegible. Two or more such images on a single slide (a favorite technique) are always illegible from the back of the hall. For speakers addicted to the Internet and with limited computer drafting skills, time, or funding, the remedial techniques mentioned below can produce acceptable presentation slides.

## PRESENTATION SLIDES

The first step in planning a presentation slide is to heed Gallagher. To utilize the maximum dimensions of virtually all modern projection screens, slides should be composed in landscape configuration, not portrait.

The second step is to eliminate trivia. Trivia, or "chartjunk" (Tufte, 1990; Dutrow, 2007), includes grid lines, logos, fancy fonts, numerous small labels (where a few large ones would do), separate keys instead of labels, etc. Text or labels that are not telegraphic in style also are chartjunk.

Simple x-y plots are the easiest graphics for the audience to comprehend. A general audience probably will not quickly understand diagrams or projections that are specific to the speaker's subdiscipline. Complex diagrams (such as many three-dimensional representations) can sow apprehension, confusion, or even distrust in an audience (e.g., Dutrow, 2007). An effective method of showing change is several small but very simple two-dimensional images, or information slices, on a single slide; this is the "small multiples" method of Tufte (1990).

Complicated slides can be avoided by presenting a series of simple slides that lead to the complex result. Some busy slides can be transformed by eliminating chartjunk. An admission that a slide is "busy" is an admission of failure.

Space is a commodity to be spent wisely. The margins of a slide should be as narrow as possible. Artwork and logos of sponsoring institutions in the margins (except for obligatory introductory slides) are chartjunk. Overly large titles waste space. The deeply indented lines of hierarchal lists of bullets also waste space (Tufte, 2006); moreover, multiple indentations risk rendering the most important point to look like the most subordinate. The size and configuration of text boxes should be carefully composed to

permit the sufficient size of any accompanying image or text. Tables commonly are the most efficient method of comparing data (Tufte, 2006).

All slides (even those as seemingly routine as a thin section of a rock or a scanning electron microscope image of a mineral) should have a title or a caption, labels, scale bars, directional indicators, sources of data and no chartjunk. These features keep scientific data quantitative. Titles reinforce communication and also serve to distinguish one slide from similar ones in the presentation.

The audience needs help in quickly reading text. Black (or dark blue) font on a white or pastel background usually is the most legible. Lower case lettering makes words more rapidly recognizable. Simple (not frilly) fonts help. Fonts that border on being too small can be made more legible by making them bold. Font sizes over 40, even for titles, are rarely needed. More than 12 lines of text on a slide become illegible. Of course, multiple slides crammed with text are boring. Among the most egregious text slides are those that cite published papers in their originally printed font.

Because about 15% of the population is color blind, critical data and text should not be in red or green (e.g., Dutrow, 2007). Colored texts or symbols on colored backgrounds (other than pastels) might be legible only to the speaker.

The use of color should do no harm (e.g., Tufte, 1990). More than a few colors on a slide promote confusion. Pastels, instead of fully saturated colors, are best because they imitate nature (Tufte, 1990). Audience eye fatigue can be lessened by reducing the size of white areas on the slides; this is done by choosing pastels for the margins (background), text boxes in or near the margins, and fills for large unused peripheral areas of any accompanying graphic.

## REMEDIAL TECHNIQUES

Because it promotes Gallagher's ratio, cropping is the first and one of the most important remedial techniques. An imported figure in portrait dimensions should be cropped to landscape. After cropping, the remnant is enlarged to nearly fill the entire slide. If the image still is not legible, more cropping and enlarging are necessary. Judicious cropping also can eliminate chartjunk. Subsequently, the title can be placed in a margin or over some peripheral part of the image that is not relevant.

More than two imported images on one slide are rarely legible. Two slides with two images definitely are more legible than one slide with three or more images, and, ultimately, such multiple slides require less time to present clearly. As opposed to small multiples of related images, multiple unrelated images on a slide that is shown only briefly are chartjunk or information-overload.

In some cases, cropping and enlarging the remnant may be sufficient to generate an effective slide. Usually, however, the work has just begun. The width of lines should be proportional to their importance; the important lines may have to be traced over to significantly increase their width. For example, on a graph, the regression line (if necessary) should be the boldest; this is the "notable difference" of Tufte (1997). Likewise, bold arrows or leaders promote the rapid recognition of important details, but the arrows should not overpower the image (e.g., Tufte, 1997). Original labels and symbols can be overprinted with larger fonts, or new labels can be added. Chartjunk can be masked (covered) with the same colors used on

the slide. Illustrations (especially photographs) commonly can be enhanced by varying contrast or brightness.

## FINAL ACTIONS

After all of the slides have been composed, they should be reviewed to see which texts and images can be enlarged still more. Before giving the presentation, the speaker should preview the slides from the back of a large lecture hall, or trust Gallagher. Then practice the presentation! Effective presentation slides do not, by themselves, guarantee an effective presentation; the skills of public speaking, about which much has been written elsewhere, also must be mastered.

## CONCLUSIONS

To create effective PowerPoint slides, put yourself in the place of a viewer in the last row of the lecture hall. Like good writing, the crafting of good PowerPoint slides requires experience, imagination, and time. In any case, there is no profit to be had in lousy slides making good work look bad.

## ACKNOWLEDGMENTS

I thank speakers too numerous to list for prompting this article. A.M. Buddington provided a pre-submission review. One of two anonymous reviewers was so insightful that he/she should be a coauthor.

## REFERENCES CITED

- Cheney, E.S., 1996, Better presentations at meetings by KISSing: *GSA Today*, v. 6, no. 7, p. 15–16.
- Dutrow, B.L., 2007, Visual communication: Do you see what I see?: *Elements*, v. 3, no. 2, p. 119–126.
- Gallagher, D., 1965, On lantern slides: *Geological Society of America Bulletin*, v. 76, p. 1081–1082.
- Tufte, E.R., 1990, *Envisioning Information*: Cheshire, Connecticut, Graphics Press, 126 p.
- Tufte, E.R., 1997, *Visual Explanations: Images and Quantities, Evidence and Narrative*: Cheshire, Connecticut, Graphics Press, 156 p.
- Tufte, E.R., 2006, *The Cognitive Style of PowerPoint: Pitching out Corrupts within*, Second Edition: Cheshire, Connecticut, Graphics Press, 32 p.

*Manuscript received 27 March 2013; accepted 1 July 2013.*

.....

**Groundwork articles** are short, hot-topic or issue-driven articles that lay the groundwork for furthering the influence of earth science on education, policy, planning, and funding. Each article is peer-reviewed and cannot exceed two print pages. Learn more at [www.geosociety.org/pubs/gsatguid.htm](http://www.geosociety.org/pubs/gsatguid.htm).

**Questions?** Contact *GSA Today* Managing Editor Kea Giles at [kgiles@geosociety.org](mailto:kgiles@geosociety.org).