



MANAGEMENT INFORMATION SYSTEMS

GORGEOUS DASHBOARDS

The range of possible formats for data display can be bewildering. Yet it need not be. In the following extended review, **Jonathan Teller** focuses on a recent book* which gets to the heart of how to present the maximum information as effectively as possible.

The many tools now available for presenting accounting and performance data in formats other than tables of numbers give us multiple dilemmas. We may want to use graphs, but which graph type is the most appropriate? How should it be laid out? Should we use colour, 3D etc?

The decisions become even more complex when we want to create a 'dashboard' - something built for the purpose of presenting several pieces of information using different graphs, all on one screen, with possibly overlapping messages.

Fortunately Stephen Few's book, *Information Dashboard Design – Effective Visual Communication of Data*, is a gorgeous but practical guide to producing dashboards that convey a lot of information as quickly as possible. (The book follows on from Few's earlier books and from those of Edward Tufte, starting with the latter's *The Visual Display of Quantitative Information*.)

Information Dashboard gives plenty of examples to illustrate both good and bad practice, with particular emphasis on the latter: learning from the poor examples may well be the best way! The illustrations also provide some really useful ideas on how information can be presented to maximum effect.

DASHBOARDS DEFINED

So what exactly is an information dashboard? The business intelligence software industry has used the term to convey

the idea that it is possible to drive an organisation in the same way that it is possible to drive a car, with key performance indicators (KPIs) allowing the organisation to make the constant adjustments needed for a successful journey.

Stephen Few's own definition is: 'A visual display of the most important information needed to achieve one or more objectives; consolidated and arranged on a single screen so the information can be monitored at a glance.'

THIRTEEN COMMON DASHBOARD DESIGN MISTAKES

One particularly useful part of the book's advice is an exploration of common dashboard design mistakes (many of which also have a more general relevance to charting). Some frequent mistakes are as listed below.

1. Exceeding the boundaries of a single screen

The objective of the dashboard is to present data at a glance: if the display needs either scrolling or switching between two or more pages then that objective is compromised. The viewer needs to focus on the information being provided before reaching for the mouse.

2. Supplying inadequate context for the data

Numbers need a context. For example, 'the year to date sales' data is much more useful if accompanied by information about targets, previous year or trends.

3. Displaying excessive detail or precision

Numbers often only need to be shown to the nearest thousand or million. Displaying a multi-million figure to two decimal places will just distract the viewer, make the number harder to absorb, and reduce the time available for considering the data's implication.

* *Information Dashboard Design – Effective Visual Communication of Data*, by Stephen Few, published by O'Reilly, ISBN: 0-596-10016-7



Jonathan Teller is a member of the faculty committee.
jonathan.teller@jtanalytics.co.uk

4. Choosing a deficient measure

The viewer should not have to carry out calculations to understand the meaning of the information. The example used in the book is a graph that compares actual and budget revenues. The viewer really wants to know the variance. This can be calculated from the graph but it could be explicitly shown as, say, the budget as a base line and actual as a % variance. Thought needs to be given to the viewer's needs.

5. Choosing inappropriate display media

Few's message here is that it is very easy to choose the wrong format for displaying data. A pie chart might look impressive but often struggles to present information accurately and quickly. A bar chart could present the same data and allow the viewer to understand the data with one glance. Sometimes a table of text is at least as effective as a graph. (It is worth noting, here, that Few has written another book, *Show Me the Numbers: Designing Tables and Graphs to Enlighten*, which considers graph types and their appropriate purpose in more detail.)

6. Introducing meaningless variety

Striving for variety in the types of graph used can be a mistake. Such variety means the viewer then has to work hard just to understand the layout of the alternative designs, when their effort would be better directed at understanding the data being displayed. Although using the same graph type for several separate items might appear boring, the data will be more effectively displayed as a result.

7. Using poorly designed display media

This builds on the earlier common mistake of choosing inappropriate display media, ie using the wrong graph type. That particular fault is often further compounded by poor design – eg poor layout, colours that are too bright, the needless use of colours that do not convey additional information, 3D graphs that end up hiding some of the results, and the unnecessary use of grid lines. All of these and more are down to our lack of training in design. This is an issue that the book attempts to correct in subsequent chapters.

8. Encoding quantitative data inaccurately

The clearest example of this is when the base line for a chart should be zero but instead starts at a value that is nearer the lowest value being compared. This can exaggerate the relative difference between the values being displayed, giving the wrong impression.

9. Arranging data poorly

Important data ought to be prominent. Data that is to be compared needs to be arranged to encourage comparison.

The most important area on the screen is the top left hand corner. However this is frequently used for logos and messages rather than displaying the most important data. (A later chapter in the book also explains that the eye and the brain can delineate areas on the screen, so bright prominent headings are unnecessary and detract from viewing the actual data.)

10. Highlighting important data ineffectively or not at all

This is a variation on the 'poor design' mistake. Either all data is displayed with equal prominence so that the most important value has to be searched for; or peripheral aspects of the dashboard, such as control buttons, are given more prominence than the data.

11. Cluttering the display with useless decoration

Logos have already been criticised, for their tendency to occupy the important top left hand corner of the screen. Other unnecessary elements include spirals (to make the screen look like a page in a book), watermarks and other decorations. The recommendation is to limit the contents of the screen to items that have direct relevance to the data being displayed.

12. Misusing or overusing colour

Colour use must be carefully thought through. It needs to be meaningful (if it is to be used at all), while not disadvantaging those who are colour-blind.

13. Designing an unattractive visual display

Fundamentally the display needs to be attractive so that it will encourage the viewer to read it on a regular basis.

SIMPLIFY, SIMPLIFY, SIMPLIFY

Having highlighted what not to do, Few offers some tips for successful dashboard design. Principal among these is to keep things simple. On this score, some of his key general suggestions for dashboard design include:

- aim to minimise everything that is displayed. For example the use of Gestalt concepts* means that lines used as borders or separators can often be left out. Keep 'non-data pixels' to a minimum;
- as a rule, summarise data: only present or highlight the exceptions; and
- create dashboards for their specific audience. Viewers need only to see their relevant data. There is no gain in using sophisticated tools such as linear correlation coefficients if they do not understand them.

SPARKLINES AND BULLET GRAPHS

A chapter on effective display media considers the many elements that can make up a dashboard (including several graph types) and how they should be used. Two less well known graph types are 'sparklines' and 'bullet graphs'.

* These relate to our innate tendency to simplify multiple inputs into a whole that is more meaningful than the sum of its parts.

FIGURE 1 AN ILLUSTRATED BULLET GRAPH

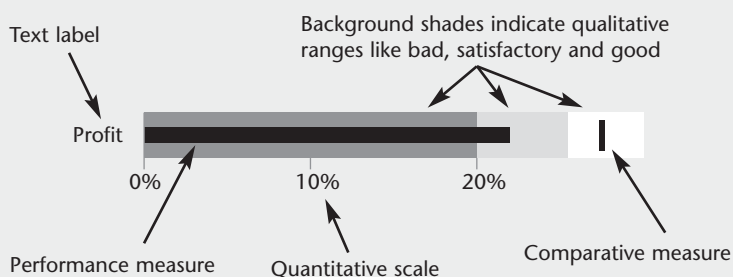


FIGURE 2 SALES DASHBOARD



Sparklines were introduced by Tufte and are intended to sit alongside numbers in a table providing trend information (as in 'Key metrics YTD' in Figure 2, above). In a spreadsheet they might appear in the cells adjacent to a column of numbers giving an instant feel for the trends for each of the numbers.

Bullet graphs are Few's own invention and are intended to encapsulate a number of pieces of information about a measure in a neat package that starts as a sophisticated bar. See Figure 1, opposite.

FINALLY – THE GOOD AND THE BAD

In the last chapter Few brings much of the book together by presenting several examples and critiquing them. One such example is a sales dashboard designed by him and similar to the one we have created in Figure 2.

Note the following points about the dashboard's design:

- minimal use of colour;
- most important information shown in the most prominent area, ie the upper left quadrant;
- multiple bullet graphs allow the display of a great deal of information in a condensed form;

- text in a table is legitimate;
- white space used to delineate and group data; and
- hardly any unnecessary clutter such as instructions and descriptions that will not be needed for regular users.

FINANCE & MANAGEMENT FACULTY

This article was first published in *Finance & Management*, the monthly magazine of ICAEW's Finance & Management Faculty. The faculty helps members in business to perform at their best. For more information on the benefits of membership see icaew.com/fmjoin