The Chart Doctor United Nations Educational Scientific & Cultural Organisation

Data visualisation mistakes – and how to avoid them

The FT's chart expert outlines some basic errors and simple fixes

Pakistan's education inequality was barely noticeable in the original chart; now its bias against girls becomes the standout story © EPA

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We would like to hear from FT readers. Which business charts rile you most? Scroll down to post your worst examples.

There is a moment in *Double Indemnity*, the 1940s Hollywood noir classic, when you finally realise that anti-hero Walter Neff's attempt to get away with murder will end badly. His colleague, Barton Keyes, suspects foul play in a seemingly straightforward insurance case.

What makes it clear that Neff is up against a master logician? Keyes has outsized charts on his office walls that project a bold message: beware the intellectual power of an executive with a firm grasp of the facts.

Walter Neff (Fred MacMurray) in Barton Keyes' (Edward G Robinson) chart-filled office

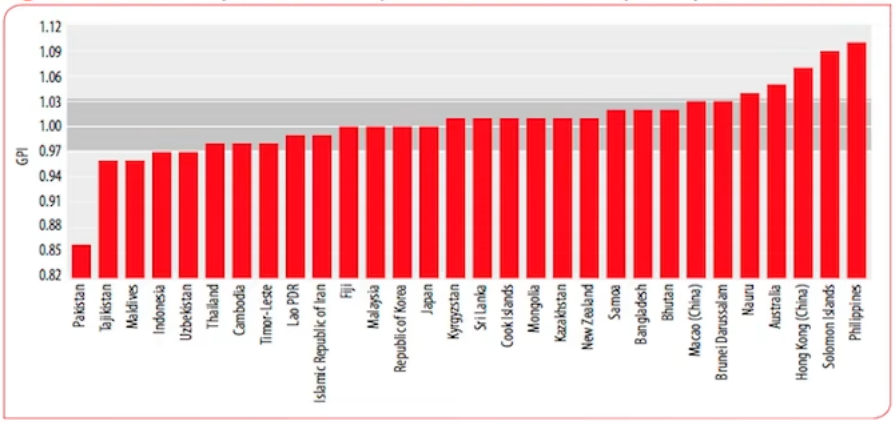
Fast forward to 2017 and the intervening decades have not necessarily been kind to the use of charts in business. My colleague Andrew Hill wrote recently about a survey of business leaders' preferred formats for insights: "None favoured infographics, which too often emphasise 'graphic' over 'info'."

Pejorative connotations of the word infographic often start from this perspective as corporate designers, desperate to dress up "dull" data, veer away from facts towards aesthetics. Reclaiming the value of charts requires a fundamental rethink.

In 2014, Unesco asked me to review graphics published in a series of reports on access to education in the Asia-Pacific region. I spent a pleasant week in Bangkok working with a knowledgable and talented team whose passion for their work was unquestionable. We spent most of our time discussing why the charts in their reports were uniformly awful.

For example, take Figure 7, the memorably titled "Gender Parity Index of the adjusted net intake rate in primary education, 2009" from the report on Universal Primary Education.

Figure 7: Gender Parity Index of the adjusted net intake rate in primary education, 2009



Source: UIS, 2011, Statistical Table 2.

UNESCO's Figure 7 from Universal Primary Education: Gender Parity Index of the adjusted net intake rate, 2009

This chart breaks one of the first rules of data visualisation. It is not self-sufficient.

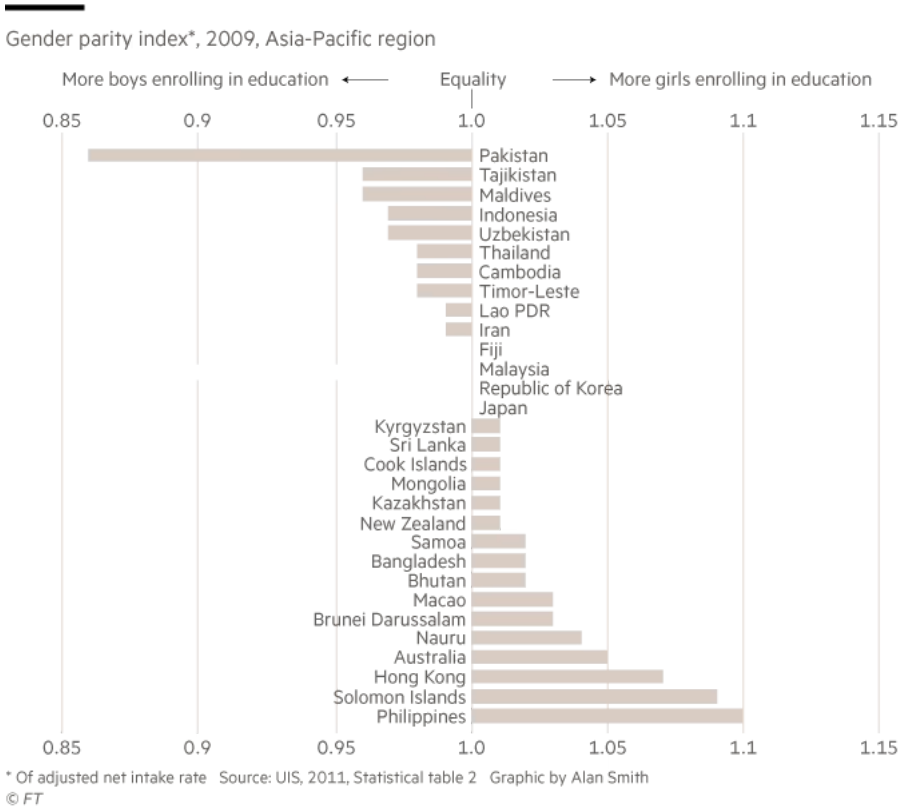
Assuming we know what the Gender Parity Index is, it is not clear what purpose the mysterious grey area in the centre is serving. Worse, this chart might injure you physically. Extended reading requires a chiropractic adjustment, thanks to the rotated labels. The liberal use of bright, saturated red matches the hue of the report's cover but is the equivalent of UPPER CASE SHOUTING.

How could this be turned into a useful chart?

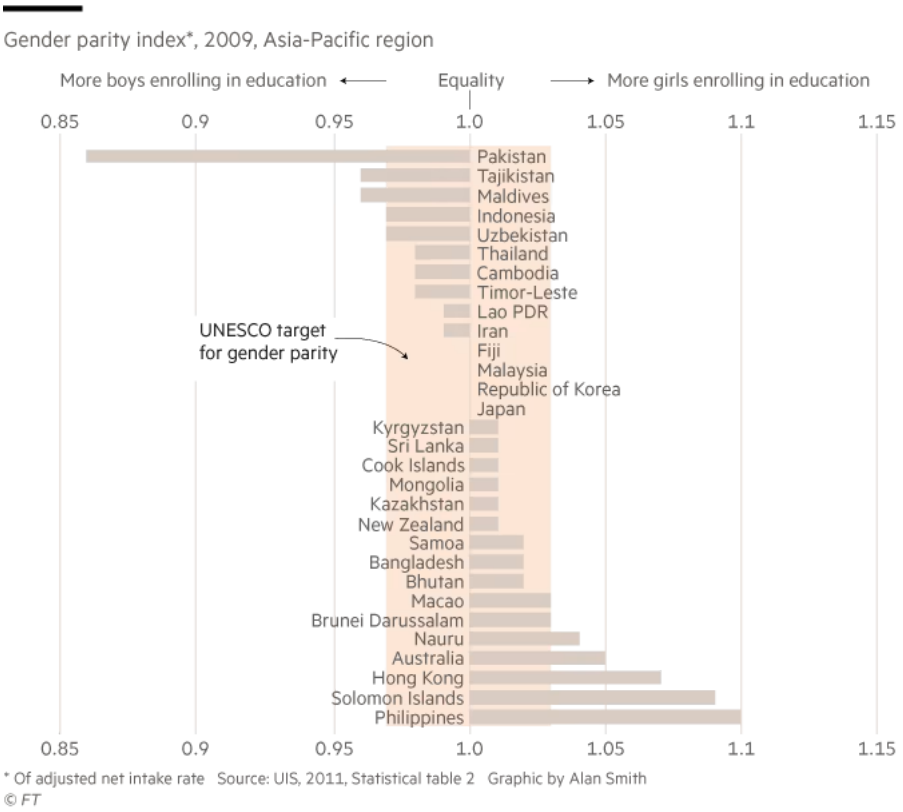
First, scaling. Why does the GPI start at 0.82 and finish at 1.12? There is of course just one reason — it is the default of the software used to create the chart.

The GPI is actually a measure of gender bias in access to primary education, with a value of 1 denoting no bias (equality) between boys and girls. So we should really anchor the bars to 1 and represent deviations from this central point by pushing the values above and below 1 in opposing directions.

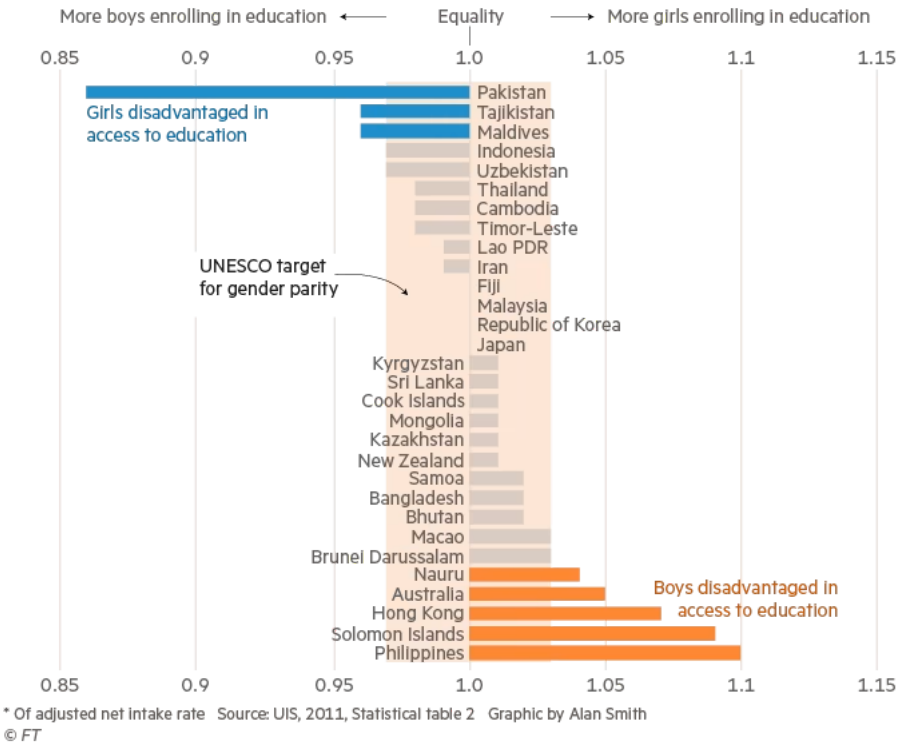
This allows us to re-orient the chart, making the country labels easier to read. Simple text labels help confirm the shape and direction of the data to the reader.



Next we can re-introduce the mysterious grey shaded area. It is actually Unesco's performance target. This is essential information because it allows us to place each country's performance in context.



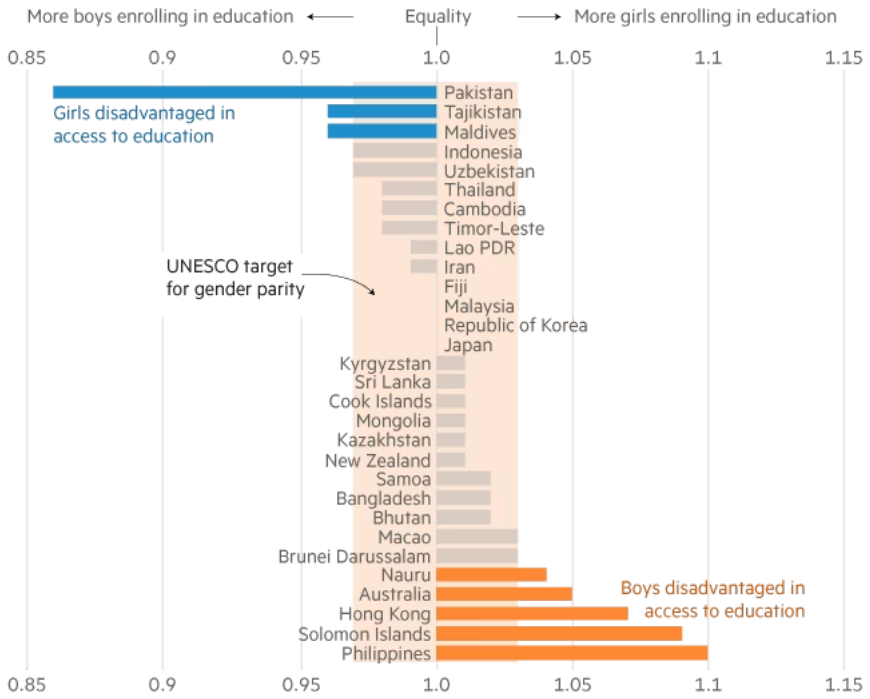
We can bring back colour, this time to draw attention only to the countries that are not meeting the Unesco target. Distinct colours make it clear there are two different reasons for not hitting target. On-chart annotations concisely reinforce the main message.



Finally, clear titles help non-specialist readers tune in to a chart. Technical details can be relegated to the subtitle and footnotes — such as the source. It is important information, but not necessarily the first thing the reader should see.

Gender equality in primary education is not yet a reality for all

Gender parity index*, 2009, Asia-Pacific region



* Of adjusted net intake rate Source: UIS, 2011, Statistical table 2 Graphic by Alan Smith

If we compare the original and the rework, it is difficult to see how we are looking at the same data. Where Pakistan was previously barely noticeable, now its bias against girls becomes the standout story.

In fact, it is only by reworking the chart that we can see it is of any use at all. Many charts cannot be transformed in this way. Adopt a “fewer but better” mantra when it comes to incorporating them in reports.

With well-selected charts taking care of the key questions of “what?” and “how much?”, the text in a report can focus on the follow-on questions, such as “why?” and “so what?” By conceiving words and graphics simultaneously, reports can be restructured into readable and confident narratives.

The willingness shown by Unesco to critique and improve its materials is also important. No amount of external consulting will achieve lasting improvements in quality unless the desire to improve is at the heart of an organisation.

This may sound deceptively straightforward but communicating with data is a skill that has fallen through gaps in academic curriculums. Few receive formal training.

In January 2018 we are inviting readers to the Financial Times for a one-day introductory Chart Doctor workshop on effective data presentation. More details and booking information are available via Eventbrite.

In the meantime, we would like to hear from FT readers about the business charts that rile you most. We have opened up comments below for you to upload your own favourite bad graphics. Do your worst.