GovTALK | Queen's University | School of Policy Studies

5.4 Data Visualization Tools

Data, well displayed, can leverage your message by summarizing a lot of information quickly and providing a useful graphic presentation that saves time and gets to the point. It should support and emphasise the purpose of the presentation. A key rule is that the data presentation should simplify, not confuse. In all probability the display is supported by data sets that, if presented completely, would not be read and quickly lose the user of the presentation.

> Keep in mind that the purpose of visuals is not to show all the data, but to communicate conclusions and insights.

Another important condition for the use of all visual displays is that they should be professional, avoid needless theatrically, pointless animation or cartoons. Keep your emojis at home.

Below are brief discussions of display options. Knowing which use is important. The development of charts benefits from using the appropriate software tools that your organization may have already acquired for this purpose. Of course, a main source will be software such as Microsoft Excel or Apple Numbers which combine data organizing spreadsheets with the built-in capacity to convert that data into standard charts.

Source Material

Many of the examples are taken from Statistics Canada publication on graph types, now archived at https://www150.statcan.gc.ca/n1/edu/power-pouvoir/ch9/5214821-eng.htm . It remains pertinent. Similarly, the publication, **Making Data Meaningful** from the United Nations Economic Commission of Europe is also helpful.

The One Big Number

Especially in making high-level internal or external presentations, it is both useful and focuses the discussion to avoid detailed data presentation and get to a single number as the key message you want to leave with the presentation.

You should assume in doing this that your number is accurate, that it is to the point of the presentation and that it can and will be used by the listener as a communication point in the future.

Tables

Tables are the foundation of data organization and, in many cases, presentation. It is important to make tables such that the user can easily find and understand the important numbers. Labeling and layout should be straightforward and simple. Attention should be drawn to the most important points to be conveyed.

To avoid creating a crowded table, data should be presented in a concise, well-organized way to support the accompanying analysis. In general, the rule is less is more. A small, well-formatted table can provide the pertinent information that readers

can quickly absorb. Excessive data, too small and badly labelled will waste time and dilute the message.

Tables should be able to stand alone. Each table should contain adequate title and source information to allow it to be copied and pasted into another document and still make sense.

Basic Structure of a Table

Table Title					
Row Headings			Column Headings		
Footnotes					
Source					

The use of colours and shading is a matter of style, but also can readily assist in directing the attention of the reader to the most salient information or ease distinguishing rows or columns for easier reading.

Sample of good table and sample of bad.

General guidelines for good table design:

- Minimize text.
- Make sure that any long chronological displays of data do not confuse and crowd the table, creating too many columns. Consider using a line chart instead.
- Use as few decimals as possible.
- Align numbers to the right of the column, not the centre.
- Explain blank cells with either a N/A or a note.
- Avoid grey-shading alternate rows or columns.
- Use shading to point to the most relevant data, if that is desired for the presentation.

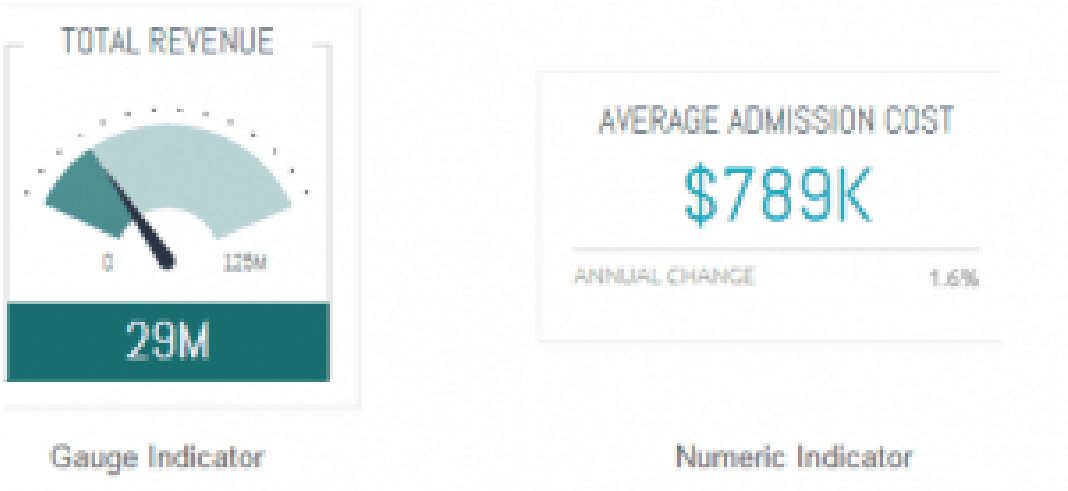
Charts

There is a wide variety of charts that can be used in making presentations. As well, many of these chart styles permit the innovative display of data as well as animation within the presentation. A basic rule is to avoid excessively complex charts, ensure that the format is useful, relevant and not distracting, and that it meets the needs of the presentation. There is a difference between being smart and being cute. Cute does not cut it in professional presentations anywhere, especially within government.

Charts are an effective way to display information, especially where there are multiple dimensions to that information that you want to display. Charts can show patterns in the data and it is these patterns that are often the most useful information for the user. Charts avoid excessive crowding when done well. Charts permit easy comparison of data, display activity relative to an expected outcome, changes over times, correlations, distribution comparisons and relative shares of a total number such as amount spent.

Single Metric Diagram

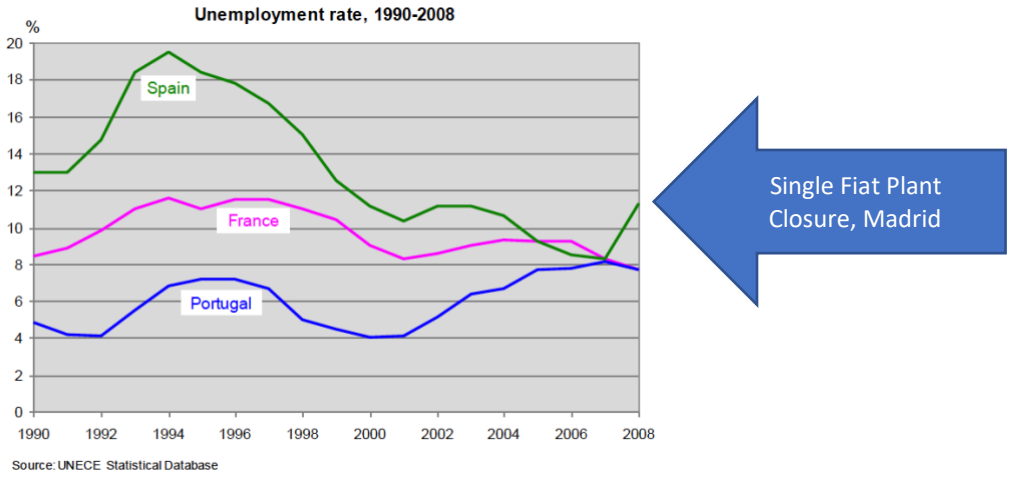
This is a simple diagram that shows progress on a single data point, usually in comparison to a specific objective for the organization or goal for the government. Examples of both gauge and numeric indictors are shown here.



These indicators are useful to show how well the organization is doing in meeting a goal. They are often used in organizational dashboards of performance indicators.

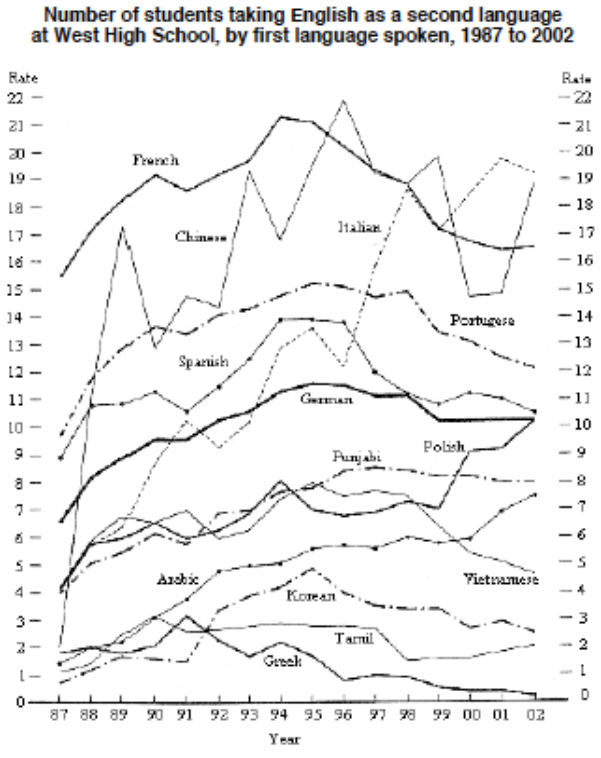
Line Chart

Use a line to show trends. Line charts are used extensively and for good reason. They can provide information over time or across categories of interest such as age groups. An example of a good line chart follows:



In this line chart, the text would have to explain the overall trends and their meaning. It would appear to point to an overall improvement in the economic situation. However, there is also an anomaly, the one trend deviation with an increase in the rate for Spain in 2008. Once again, text would want to address this or it could also be done, as above, with a brief graphic.

An example of a bad line chart follows:

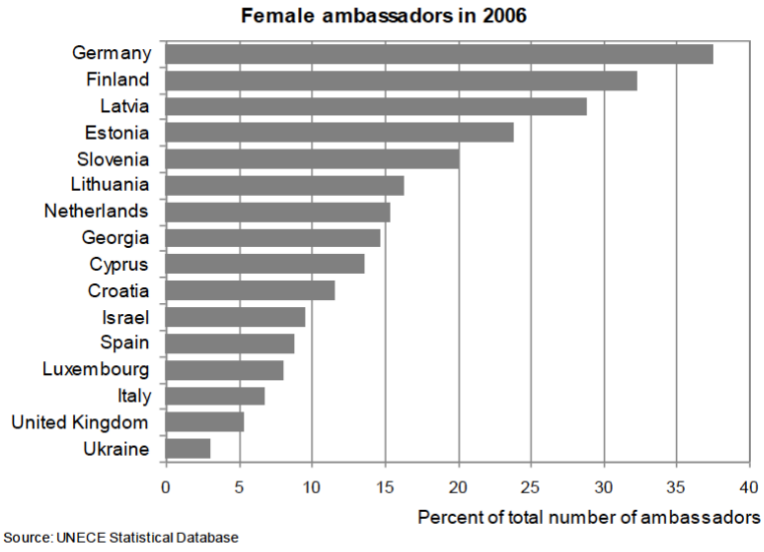


Source: Statistics Canada, *Learning Resources: Using graphs*[5].

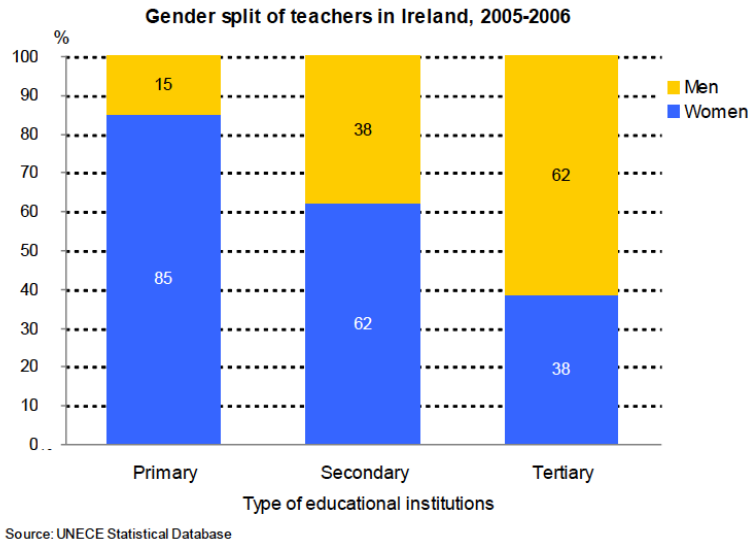
Put simply, there is just too much going on here for the user to understand what the message might be. Faced with a challenge to communicate such information, it is useful to go back to the user, her needs and the purpose of the briefing. For instance, in this case, based on just looking at the information, the point for the user may be that the relative proportion of the students from different countries taking English as a second language has been relatively stable over time with the exception of certain increases and decreases and then report on them, where they are significant. A table might actually do a better job in this instance, but only for the significant changes.

Bar Charts

This commonly used chart provides a simple means to compare data for different categories, groups or periods. Bars can be either vertical or horizontal. The information can be hierarchical, i.e., displayed highest to lowest or vice versa or random, depending on the message you want to send. A good example of a bar chart follows:



A variation of a bar chart is the stacked bar chart which adds information by displaying it in the bar itself. This is a common use but one that can, if overused, can be too complicated or confusing. Here is a good example of a good use of a stacked bar chart:



Pie Charts

Pie charts are popular. However, they only work effectively for showing large difference in proportion, most notably percentage. The more complex the information, the less meaningful is a pie chart. Therefore, as a general rule, if there are more than six categories in the variable that is being reported, a bar chart makes more sense and is easier to follow. Further, labelling of the sections can be a source of confusion and needs attention. Use of legends only slows down the reader. Ideally, pie charts are used for simple displays of a small number of variables. The example below is typical of a good use.