Data Visualisation Principles

A chart is a tool that helps people see what the numbers mean. The statistician Edward Tufte set out clear principles in his book The Visual Display of Quantitative Information, first published in 1983. Later, Cole Nussbaumer Knaflic turned many of these ideas into practical advice for business in her book Storytelling with Data. Their ideas can be summed up in five principles that make any chart clearer.

1. Know the Message

Before we open any software, we decide who will see the chart and what they should learn from it. A good test is to say the main point in one short sentence. If we cannot say it, the chart will not say it either.

Example: A family wants to show its children where the monthly money goes. The parents start by knowing the message: food is the biggest cost. So they show only the five main costs, not every receipt.

At work: Lina, a sales analyst, must present the results to the managers. She knows the message before she starts: sales in the north fell for three months in a row. Now every choice in her chart can support that one point.

2. Choose the Right Chart

Each type of chart answers a different kind of question. A line chart shows change over time, and a bar chart compares amounts between groups. A scatter plot shows whether two things move together. A pie chart is hard to read when it has many slices, because people struggle to compare angles.

Example: A runner wants to see her progress over a year. She chooses the right chart: a line chart of her weekly distance.

At work: Lina's first draft shows the monthly sales as twelve separate pie charts. She chooses the right chart instead: one line chart for the last twelve months. The fall in the north now shows at a glance.

3. Remove the Clutter

Tufte used the term data-ink for the ink that really shows the data. His advice is to keep the data-ink and remove most of the rest. Heavy grid lines, 3D effects, shadows and decoration tire the eye and add no information; Tufte called them chartjunk.

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Example: A school poster shows test results as colourful 3D columns with a busy picture behind them. A teacher removes the clutter: flat bars, a plain background and no shadows.

At work: Lina's chart still has a dark grid, a colour legend and labels on every point. She removes the clutter: a light axis, labels placed directly on the lines and no legend. The chart looks calm, and the eye goes straight to the data.

4. Focus Attention

Our eyes notice some things before we even think, such as colour, size and position. Knaflic advises using these signals on purpose to show the audience where to look. A simple way is to make everything grey and to give strong colour only to the most important data. A title that states the point also guides attention.

Example: A city map shows all bus lines in grey and one line in bright red. The red line focuses attention on the route that changes next week.

At work: Lina focuses attention: all regions turn grey, and only the north line stays dark red. Her title says: north sales fell for three months. Nobody has to search for the point.

5. Tell the Story

A chart works best as part of a short story with a beginning, a middle and an end. The beginning gives the context, the middle shows the evidence, and the end says what should happen next. Knaflic stresses that the audience should know what to do after seeing the data.

Example: A charity shows its donors a chart of the wells it has dug over five years. It tells the story: the need for clean water, the wells dug so far, and what one more gift can do.

At work: Lina tells the story in three slides: the context, the falling line, and her proposal for two extra sales visits a week in the north. The managers approve the plan in the same meeting.

Conclusion

In summary, clear charts follow five principles: know the message, choose the right chart, remove the clutter, focus attention and tell the story. Tufte reminds us that ink should show data, and Knaflic reminds us that data needs a story. A good chart lets people see the point at once and act on it.

Sources

• Edward R. Tufte: The Visual Display of Quantitative Information (1983; 2nd edition 2001), Graphics Press – https://www.edwardtufte.com/book/the-visual-display-of-quantitative-information/

• Cole Nussbaumer Knaflic (2015): Storytelling with Data: A Data Visualization Guide for Business Professionals, Wiley – https://www.storytellingwithdata.com/books

• Note: the principles are explained in our own words; this summary is independent and not endorsed by Edward Tufte, Graphics Press or storytelling with data.

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