Advanced

8.1. Tips for Visualization

Don't Know How

- You cannot come up with an idea for visualizing a certain subject because it is very general or very abstract?
  - Consider illustrating the *consequences* of that topic for a specific example.
  - Take *one* part for the whole and illustrate what happens then.
  - *Forget it*. Illustrations that are obviously only included for illustrations sake, but do not really help to make your point, are counterproductive!

Checklist for Visualisation

- Go through the following points for every illustration you consider:
  - Which idea should be communicated?
  - What kind of format is optimal (photography, graphic pictures, diagrams, tables...)?
  - Is the illustration supporting the idea or is it included because you have it, or it's such a neat picture?
  - Is the illustration stimulating? Intellectually or emotionally?
  - Does the illustration allow you some leeway for explaining? A totally self-explaining illustration is a bad illustration.
  - Is the illustration with your explanations clear and understandable?
    (If you have to say: "..and also ignore the table in the lower hand corner and mentally substitute magnetic field strength ***B*** for wherever you see electrical fields strength ***E***...", it is a lousy illustration!
  - Does the format match the purpose?
    A three-dimensional perspective drawing that clearly took hours to make is not a good match for illustrating simple things were one dimension would have been all that is needed.
  - Is the illustration within your general level of sophistication?
    A black-and-white table quickly copied on a foil will look totally out of place if everything else is colourful and very sophisticated. It also works the other way around. Try to keep one (your!) standard throughout your presentation.

Texts and Tables

- There are a few very important points about how to write on viewgraphs!
- ***Readability***. Whatever is written, must be readable from *all places* in the audience!
  - *Never* use typewriter fonts and size, i.e. font **10** or **12**.!
  - Minimum letter size on a viewgraph is ca. **5 mm**; this corresponds to a font size of *at least* ***14 bold***, better ***18***.
  - There are reasons for
    Black on white.
    Make sure to provide enough contrast between the letters and the background.
  - If you *have to* go to a smaller font because otherwise it won't fit on the foil, you have *too much*. *Never*, really *never*, put more on a foil as will fit with font ***16***, at the very minimum font **14**.
- *Clarity*.
  - If the audience has to exert it's mental capability to try to understand what it sees on your illustration, they will not listen to what you say!
  - The biggest enemies to clarity are *volume* and *precision*! Complete and precise information (with all the little disclaimers, validity ranges, boundary conditions and exceptions to the general rule) belong in the handout, not on the viewgraphs!

- Guide the attention to the core information! Generally, the audience should be able to grasp the contents of a viewgraph within **30** seconds. There may be exceptions if you work with the illustration, e.g. by overlaying it with other viewgraphs.
- 'Stay within one format! Use the same colours or symbols throughout you presentations for the same effects.

Attractiveness

- The choice of fonts and colours, of line sizes, frames etc. determines to a large extent if your viewgraph looks attractive.
- Of course, beauty rests in the eye of the beholder, but there is a general consensus.
- Use colours *sparingly* and do not cover every square cm of the viewgraph with something.

Text Foils (see also Skeleton Foils)

There is a clear headline at the top

Rule of Thumb: **25** words or **7** lines per topic:

- This will keep it readable.
- It forces you to be concise.

Lower and upper case letters:

- Simple! UPPER CASE LETTERS ARE HARDER TO READ

Telegram style is what's needed:

- Keywords instead of sentences.
- Complete sentences will tempt you to read them out loud.
- *Never ever* read out loud what is written on your foil. Your audience will not include analphabets!

One thought per topic!

Structure and *emphasize* with colour.

- But don't get too colourful: Two to three colours are sufficient.
- Mark *essentials* with colour.

Have essentials, if possible, at the top or bottom of the foil.

- This goes against common feeling, but is a well known composition principle in art.

Tables

There is a clear headline at the top!

Orders of magnitude and units.

- Try to have units "understandable" to your audience. For physicists and material scientists, e.g., use **eV/atom**, for chemists **kJ/mol** for the same thing.
- Give no more than three digits if possible
- Units and multipliers (e.g. "**· 10^6**") belong in the *heading* of rows and columns.

Structure of a table

- Vertical structures are easier to comprehend.
- Keep the decimal points aligned.
- Use the structures your audience knows and expects.

Emphasizing some points

- Mark *directly* with **bold letters** or in *colour* whatever you want to draw attention at upon presenting the table
- Underline or mark *during the presentation* when you want to make a point that is not directly obvious.

Diagrams

- *There is a clear headline at the top*!
- *Quantity of information - some general rules*
  Of course, in scientific presentations you may have good reasons not to stick to these rules. But make sure, they are *really* good reasons. Not having enough time or energy to redraw an old diagram with too many graphs is not a good reason!
  - **15 - 20** data points - no more!
  - At most **4** graphs in one coordinate system
  - No more than **3** columns in column diagrams
  - At most **6** sectors in cake diagrams
- *Lines and areas*
  - Use strong primary colours for lines and pastels for areas.
  - Make your graphs in strong lines, differentiate by strong colours.
  - If colour is not available, differentiate by thick and thin lines, not by point-dash sequences.

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