2.3.2 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 "electrical fields strength E" wherever you see it...", 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, where 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** or **Powerpoint foils**!

➤ *Readability*. Whatever is written, must be readable from *all places* in the audience!

- *Never* use typical typewriter fonts and size, i.e. font size **10** to **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.

  but always use high contrast,

  because otherwise you can't read it

- If you *have to* go to a smaller font because otherwise it won't fit on the foil, you have *too much* stuff on your foil.

  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.

More to Text and Tables

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. "$\cdot\ 10^6$") 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 and Pictures

Major Rule; disobediance casues sudden death (= ail grade in our seminar):

> # A picture from any kind of microscope
> # has a readable scale embedded in the picture!

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. Note that green is tricky!
- 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.