Developing and Delivering Scientific Presentations – Some Hints

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Digitalisation and the Rebound Effect seminar, 24 September 2020
Good seminar presentations – why should we care?

- **Presentation skills** are required in professional life
  - present yourself, your research, your company, an idea, a product…
  - you will often (implicitly) be evaluated based on a presentation

- In the context of this seminar, learn how to present **scientific content**

- Also learn
  - how to digest **different knowledge** sources and make a consistent picture out of it
  - to present the result in a **structured** way, adequate for the audience
  - to make and defend **your point** in front of a group

Source: Prof. Friedemann Mattern (ETH), How to give good seminar presentations
Developing and delivering scientific presentations

1. Choosing the content
2. Preparing the slides
3. Delivering the talk

Icon credits: Maxim Basinski, Joris Hoogendoorn, Gregor Cresnar
1. Choosing the content
Intellectual challenge – choosing and organising the content

• Try to convince, not to persuade

• Read and use the literature in a critical way
  – authors are almost always right

• Read and use different sources
  – typically, scientific articles are more reliable than information on the Web

• Ponder about what you want to say
  – ideally top-down
  – not at the computer, but a sheet of paper

Source: Prof. Friedemann Mattern (ETH), How to give good seminar presentations
While deciding upon the content, think about following questions

• For whom is the presentation?
  – target audience
  – its expectations and prior knowledge

• What is the main message(s) you want to convey?

• What is the purpose of your presentation?
  – Teach, inspire, sell, convince,... ?

• (in the context of this seminar, these answers are easier than in general)
You should know so much more than what you present

- Deep understanding of the topic required

- But also understand what you do not understand (or is generally not understood)
  - and ideally address it openly
  - it is not a sales pitch!
    (at least not generally and certainly not entirely)

- Also know where the literature disagrees (often in our seminar: categorises differently)
  - explain it
  - if necessary, take a (well argued for) position

- Does not work last-minute (sorry, fellow procrastinators!)
Developing and delivering scientific presentations

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2. Preparing the slides
Frustrating linearity of a presentation vs. complexity of reality

**Reality is complex and interconnected**

**A presentation is linear**

- Some tools might help to alleviate this a little
  - e.g. Prezi

- Remains, however, a fundamental limitation of presentations

- ... and also of any book, report, etc
  - there, however, less critical
  - reader may go back and reread, stop and ponder, take a pen and follow the thoughts, ...

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Inspired by Prof. Markus Püschel (ETH), How To Give Strong Technical Presentations
Typical structure of an academic presentation

- **Title**
- **Teaser**
- **Background** (omit if possible)
- **Motivation**
- **Problem statement**
- **Methods**
- **Results**
- **Limitations**
- **Future Work** (does not always apply)
- **Discussion**
- **Conclusions**

Inspired by Prof. Markus Püschel (ETH), Small Guide to Giving Presentations
Context of the seminar

Contribute to **understanding the complex relation between** the ongoing **digitalisation** and societal energy consumption, given the urgency of the climate crisis.

- We need to halve our emissions every decade
  – and be basically emissions-free by 2050-2060

- Digitalisation is a blanket technology protruding all aspects of society and economy
  – can have profound impact, in both directions

Image source: (Rockström et al. 2017): A roadmap for rapid decarbonization, Science, 355 (6331)
Text versus images on slides

Often occurring mistake: lots of text

- You cannot read and listen at the same time
  - text on slides and referent’s voice competing for the verbal channel

Ideally

- Slides with little text
  - leaving the verbal channel free for your talking

Source: Prof. Markus Püschel (ETH), How To Give Strong Technical Presentations

Icon credits: icons-land.com
Handling the medium

- ‘Teleprompter’
  - really bad

- ‘Slideument’
  - (better)

- Presentation
  - (ideal, but not always possible)

Source: Prof. Markus Püschel (ETH), How To Give Strong Technical Presentations
We consider two heating strategies

Occupancy state
We consider two heating strategies

- Reactive: Re-heat (if necessary) as soon as occupancy is detected
We consider two heating strategies

- **Reactive**: Re-heat (if necessary) as soon as occupancy is detected
- **Oracle**: Heat taking future occupancy into account
We consider two heating strategies

- Reactive: Re-heat (if necessary) as soon as occupancy is detected
- Oracle: Heat taking future occupancy into account
Then what about this example slide of mine from a lecture? (seems to contradict all we’ve discussed so far)

Indirect rebound: two out of many mechanisms

Income and substitution effect

- In the beginning, the budget line allows
  - \( B/p_1 \) train rides,
  - \( B/p_2, \text{old} \) car rides,
  - or combinations along the blue budget line

- The maximum utility is at the blue dot, with around 4 train and 2 car rides

- In an (extreme) example with car rides becoming twice as efficient, the new red budget line
  - allows \( B/p_2, \text{new} \) car rides (double as many)
  - still \( B/p_1 \) train rides

- Achievable utility grows to the red dot, with around 3 train and 5 car rides
  - Income Effect (IE): the growth in achievable utility
  - Substitution Effect (SE): the partial substitution of relatively cheaper car rides for now relatively more expensive train rides

• Different context
  - lecture slides also serve for later reference
  - e.g., for exam preparation

• Are browsed through at an entirely different pace
  - for such a slide, several minutes
  - with numerous animations
  - and spontaneous audience interaction

• But even for a lecture slide, I dislike it 😊

• Unlike lecture slides, good presentation slides are not self-contained
Consistency of style

• Either you start all first-level bullets with a capital letter
  – and perhaps all second-level bullets with lowercase

• Either all British English (BE)
  – digitalisation, analysing, modelling, colour

• You may prefer to finish bullets with a dot.

• Gender neutrality in English
  – instead of “the user holds his or her device”
  – use the plural “users hold their devices”

• or you might use all lowercase
  – Or even all bullet levels with uppercase
  – but it should be consistent throughout your presentation

• Or all American English (AE)
  – digitalization, analyzing, modeling, color

• Or you might like it more without
Slide layout

• Rule of thumb: **one train of thoughts** per slide
  – Bullet points / key phrases instead of sentences

• **Slide title** should summarize the content of the slide
  – In a meaningful and self-contained way
  – Sometimes people only read the title of a slide (→ newspaper headlines)

• For academic presentations **avoid logo, name, date, etc.** on every slide
  – This is not a sales pitch
  – Adds background noise
  – Risk of drawing off attention from content
  – but **DO use slide numbers** (essential in all academic communication)

• **Font:** sans serif
  – e.g. Open Sans Light, Arial, Tahoma
  – never a font with serifs, such as Times New Roman
  – few fonts, few sizes, few colours

• **Font size**
  – 12pt, 16pt, 18pt, 20pt, 24pt, 28pt
  – must be always readable
    (also in graphs, e.g., axes labels)

• **Do not overload the slides,** exaggerating with
  – bullet points (max. 7 main items per slide)
  – too many/flaishy animations

• **Do not show too many details at once**
  (see negative example on next slide)

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Inspired by Prof. Friedemann Mattern (ETH), How to give good seminar presentations
Random Forest classifier, 38 BT features & 15 WiFi features

Compared to GPS+accelerometer only, BT+WiFi proximity patterns improve the classification
For train, BT+WiFi alone better than GPS+accelerometer by themselves

Random Forest classifier, 38 BT features & 15 WiFi features

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Compared to GPS+accelerometer only, BT+WiFi proximity patterns improve the classification

Random Forest classifier, 38 BT features & 15 WiFi features

Compared to GPS+accelerometer only, BT+WiFi proximity patterns improve the classification for all modes

Random Forest classifier, 38 BT features & 15 WiFi features

Compared to GPS+accelerometer only, BT+WiFi proximity patterns improve the classification for all modes. For train, BT+WiFi alone better than GPS+accelerometer by themselves.

But certainly not every arrow and box needs to be animated by itself. Find a balance between overwhelming and boring your audience.
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Find a balance between overwhelming and boring your audience
Acknowledging external material

- Make a clear difference between
  - your results, and
  - those of others

- Acknowledge everything included with copy-paste
  - images
  - graphics
  - text (even a single sentence)

- Acknowledge on the same slide
  - not lost in a mass of acknowledgements in the end
  - bottom right, grey is one option

- Plagiarism has many forms
  - copy & paste without explicit citation
  - paraphrase of text without reference
  - unacknowledged adoption of ideas, structure, design, ...

- .. an even more important topic for the written report
  - will be discussed separately

Inspired by Prof. Friedemann Mattern (ETH), How to give good seminar presentations and Prof. Markus Püschel (ETH), How To Give Strong Technical Presentations
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Preparation is key, start is important

Preparing and starting
• Be perfectly (and timely) prepared!
  – read the material weeks ahead
  – ponder on the content you would like to present
  – develop a top-down structure of your talk
  – have a first version of the talk ready a week ahead of time
  – practice the presentation (alone, with partner and colleagues)

• Know pretty precisely what you want to say for the first 2-3 slides
  – almost word for word
  – to take the edge off and get you rolling

Start with an outline?
• A matter of taste

• Do not spend too much time explaining the outline
  – High risk of boring your audience
  – List few, self-explaining items

• A (negative) example:
  ➢ Introduction [Necessary?]
  ➢ Topic 1
    ➢ Subtopic 1 bla bla [Avoid nested bullet points in the outline!]
  ➢ Topic 2
  ➢ ...
  ➢ Topic 7 [too many items!]
  ➢ Summary [Necessary?]
During the presentation

• **Most of the time, look at your audience**
  – Not at slides, laptop, window, ...

• Do not focus on a single person (e.g., the most important person in the room)
  – unpolite towards the others
  – annoying for the recipient → counterproductive for you

• Speak
  – slowly (enough), loudly (to fill the room), fluently
  – free (do not memorise the talk), make pauses

• Remember to **breathe**
  – a trick that forces you to: from time to time, stop to take a sip of water

• **Engage** with your audience
  – eye contact
  – questions
  – provocations, contradictions, surprises (risky, but effective teaching/learning method)

• **Motivate** your audience
  – by conveying your own enthusiasm
  – try reflecting in your tone the relevance of what you just present

• **Be happy and calm**
  – and remain authentic

• Be ready to dynamically skip slides when running out of time
  – planned in advance, jump directly to new slide
Almost done!
• Do not leave important questions unanswered at the end of the presentation
  – Open issues should be explicitly addressed

• Provide a summary of the presentation’s main message

• Try to close the circle
  – Link the results at the end to motivating questions at the beginning

Summary
• Start by thinking about the content you want to convey
  – Read the materials (if not your own work)
  – Whom are you talking to?
  – How much time do you have?
  – What do you want/need them to learn?

• Plan the structure of your presentation
  – Top-down
  – Address limitations, uncertainties, doubts, etc

• Design clean slides
  – That do not overwhelm or try to sell, but convince

• Be happy and calm
“Once you learn the rules, you can (cautiously) break them”
... and develop your own style

Van Gogh as we know him

V. Van Gogh: Thatched Cottages in Chaponval, 1890
(Kunsthaus Zürich, own photo)

Early Van Gogh

V. Van Gogh: Carpenter’s Workshop as seen from the Artist’s Atelier, 1882
(Rijksmuseum Amsterdam, museum photo)
More info and much of the inspiration for this presentation

• Prof. Friedemann Mattern, *How to give good seminar presentations*
  – partly organised differently
  – more emphasis on images, schemes, graphics, and
  – organising the information for easier digestion (in particular slides 29-30)

• Prof. Markus Plüschel, *How To Give Strong Technical Presentations*
  – partly organised differently
  – in-depth discussion of the structure of the presentation (slides 25-42, i.e. pages 13-21)
  – links to many further sources

• Now let’s get rolling!