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Scientific Presentation

Planning, Structuring and Giving Professional Presentations

*"Students shouldn't go into life without the ability to communicate.
Your success in life will be determined largely by...*

- your ability to speak,*
 - your ability to write, and*
 - the quality of your ideas,*
- in that order."***

— Prof. Patrick Winston

Goal: Present Your Work

- Explain your ideas
- Prove yourself as professionals
- Show your research



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Planning

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Step-by-step Plan to your Presentation

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Do NOT skip any steps!

Answer the Basic Questions: Contextual

- Length of talk?
- Type of talk?
- When will you speak? Which slot?
- Who are the other speakers?
- What is your status/standing?
- Any significant hierarchies present?

Answer the Basic Questions: Physical

- Offline or Online?
- Room size and form?
 - ▶ Distance to audience?
 - ▶ Mobility on stage?
 - ▶ Are you visible to audience?
- Available media equipment? E.g., for displaying slides, microphone
- Dress code?

Who is your audience?

- Expected audience size?
- General mood?
 - ▶ Fatigue of audience?
 - ▶ General opinion of your topic, e.g., bias against topic
 - ▶ Conflicts within audience, personal or professional?
- Competence of audience in your topic?
 - ▶ Relation of audience to your topic?
- What stakeholders are in your audience?
- Interests of audience?

What is your goal?

- What impression do you want to give? E.g.,
 - ▶ I am an expert in this field and this is my research
 - ▶ We made this to solve problem X
 - ▶ You should think of Y differently
 - ▶ You should all start doing Z
- What does success mean for your presentation?
- Might need to come back to this question after more research

What Should You Include?

- Research your topic, gather materials
- Consider length of presentation, competency of audience
- What is digestible for the audience?
 - ▶ What to include?
 - ▶ What to leave out?
- What is interesting to audience?

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Humans are Storytellers

"From a human perspective, there is no major difference between telling stories around a campfire and giving a talk at a conference.

Humans are best able to remember information in the form of stories."

ABT - And-But-Therefore

ABT Storytelling

■ **And**

- ▶ Set up your story
- ▶ "We know this **and** we know this."
- ▶ What is known, status quo, ...

■ **But**

- ▶ "**But** there is a problem with this."
- ▶ What is unknown, important, ...

■ **Therefore**

- ▶ "**Therefore**, this is how to solve the problem."
- ▶ Implications, what has/had to change, ...

■ Basic loop for your presentation

■ Fit your content into multiple ABT loops

Broad Intro, Tight Body, Wide Conclusion

- Intro
 - ▶ Capture audience interest
- Body
 - ▶ Focus on necessary information
- Conclusion
 - ▶ Summarize what audience should remember
- Tell them what you will tell them (Intro)
- Tell them (Body)
- Tell them what you told them (Conclusion)

Intro

- Get interest of audience
 - ▶ Audience should relate to your topic
 - ▶ Interesting video/picture
 - ▶ Connect to current events (news, climate crisis, . . .)
 - ▶ Connect to historical date/event
 - ▶ Ask a (seemingly simple) question
- Engage with enthusiasm
- Define achievements/benefits
- Hint at take-home-message
- Give overview of rest of the talk

Body

- Keep it simple with clear structure
- Per point up to 3 aspects/arguments
 - ▶ Second-strongest argument first
 - ▶ Weakest argument in the middle
 - ▶ Strongest argument last, last argument stays in mind the best
- Alternatives:
 - ▶ Chronological
 - ▶ Pro-contra
 - ▶ Thesis - Antithesis - Synthesis
- Utilize ABT Storytelling

Conclusion

- Summarize
 - ▶ Focus on your achievements
- Appeal to audience
- Give takeaway message
- First impression makes an impact
- Last impression stays in the mind of your audience

Take-Home-Message

- Audience will not remember everything you said
 - ▶ Audience remembers key points if anything
- Design deliberate takeaway messages
 - ▶ What should your audience remember
 - ▶ Can be a call-to-action
 - ▶ Repeat and hint at takeaway messages multiple times
- Consider takeaway messages for your ABT

Keeping Interest High

- Create identification
 - ▶ **Not** you vs the audience
 - ▶ You and the audience as **we** and **us**
- Embody optimism, motivation and enthusiasm about your work
 - ▶ Be excited without being overwhelming
- Create tension
 - ▶ Use volume and pitch
 - ▶ Let something **happen**
- Surprise your audience
 - ▶ Present something unexpected
 - Did you know that . . .
 - ▶ Refute something well known and ask questions

Fully Engage Audience's Brains

- Left hemisphere
 - ▶ Rational, analytical, the What
 - ▶ Text, sequence, details
- Right hemisphere
 - ▶ Emotions, intuition, tension, unexpected, the How and Why
 - ▶ Context, big picture, intonation, questions, examples
 - ▶ Illustrations, analogies, images, situations, comparisons
- Let the audience think and feel your topic

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Design Goals

- Support the speaker
- Guide attention of the audience
- Make content digestible

Considerations

- Every element on slide takes away audience attention
 - ▶ Only show what is necessary
 - ▶ Use sequential revealing
- Audience can read or listen
 - ▶ Keep bullet points short
 - ▶ Use bullet points to keep audience on track
 - ▶ Do not just read off text from slides
- Visualize
 - ▶ Use or create fitting images/visualizations
- Do not distract
 - ▶ Movement on slides distracts audience
 - ▶ 95% of the time, better to avoid looping animations
- Purpose of slides
 - ▶ Understandable without speaker (to some degree)

Form

- Free to use any tool
 - ▶ We focus on \LaTeX
 - ▶ Powerpoint, Sozi, Keynote, . . . all possible
 - ▶ Not all tools produce good slides
- Section overview on (almost) every slide
- Page number and total pages
- Hierarchical bullet points
 - ▶ Avoid multi-line bullet points if possible
 - ▶ Keep structure homogeneous
 - ▶ Consistent capitalization
- Visualizations/images can take entire slide
- Duplicate slides are better than going back
- Avoid too much text on a slide

References

- Non-trivial claims require references
 - ▶ Cite sources for claims on same slide as claim
 - ▶ Give title and year of source, can also include author
 - ▶ Not just [1]
 - ▶ Controversial claims require stronger sources
- Image sources must be given
 - ▶ If image is not self-made
 - ▶ Source below image to separate from other sources
 - ▶ For stock images, check attribution rules
- Reference section in the back
 - ▶ Show to audience upon request

Slide Titles

- Slide title is always read first
 - ▶ Be conscious about title
 - ▶ Be explicit about slide purpose
- Assertion-Evidence technique
 - ▶ Assertion as slide title
 - ▶ Evidence as slide content
 - ▶ First show answer, then explain evidence
 - ▶ Combine with ABT
- Capitalize all important words in title

Images on Slides

- Ensure images have good resolution (not pixilated)
- Ensure text on images is readable
- Ensure image is not too complex
 - ▶ Audience needs to digest image
 - ▶ Not all paper images are good in presentations
- Guide audience through your image
 - ▶ Give enough time to view and understand
- Be able to explain all parts of image
 - ▶ Do not use or edit out parts that are not needed

Tables on Slides

- Are effectively equivalent to text
 - ▶ Audience needs time to read and parse table
 - ▶ If audience wants to do that at all
- Use graphs instead when possible
- If must use table
 - ▶ Use highlighting for relevant parts
 - ▶ Only show relevant rows/columns
 - ▶ Preferably use graph and have table as backup slide

Code on Slides

- Can be done via screenshots
 - ▶ Font size may be inconsistent with other code samples
- Or as code listings
 - ▶ Let presentation tool render code
 - ▶ Requires support for language highlighting
 - ▶ More effort but preferred over screenshots
- Code is text
 - ▶ Make it easy to digest
 - ▶ Use highlighting and comments
 - ▶ Guide audience through code

Formulas on Slides

- Math formulas are hard
 - ▶ Especially for non-math audience
- Guide audience slowly through formula
 - ▶ Connect to argument
 - ▶ Provide takeaway message
- Try to avoid if possible
 - ▶ Use qualitative arguments instead

Backup Slides

- Extra slides after final slide
- Used when
 - ▶ Time is left from expected presentation time
 - ▶ Questions from audience were anticipated
- Recommended having at least a few backup slides
 - ▶ If you get nervous, you speak faster
 - ▶ Might need more slides to fill out time

Ending a Presentation

- Summarize what you have told them
 - ▶ Focus on your own contributions, decisions, opinions
- Do not end with
 - ▶ "Questions?"-slide
 - ▶ Showing references slide unprompted
 - ▶ "Thank you (for listening)"
- Instead end with
 - ▶ Summary/Contributions slide
 - ▶ A quote from a prominent person
 - ▶ A salute: "I'd like to get back, it was fun."
 - ▶ A joke, leave the audience with a good feeling
 - ▶ A call to action: "With that being said you are now able to . . ."
- Losing the habit of saying "Thank you" is the hardest part

Slide Design

- Slide backgrounds
 - ▶ Image backgrounds often make text harder to read
 - ▶ Keep it to mono coloured or simple designs
- Usage of colors
 - ▶ Audience members may be color-blind
 - ▶ Check your color schemes
 - ▶ Make images/text understandable without coloring
- Positioning of images/text blocks
 - ▶ Yes you might need to iterate using `\vspace*{-1em}` until it fits
- Not more slides than minutes

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What to Say

- Tell the story with slides as your support
- Use slides as checkpoints
- Summarize what is important before moving on
- Announce what is coming up
- Comment and make it a little prettier, use adjectives
- Keep sentences simple and easy to follow
- Recall structure through agenda slides and references to previous parts
- Don't drown people in details

How to Speak

- Speak loud and clear
 - ▶ Project your voice
- Adjust your speed
 - ▶ Not too fast
 - ▶ Speak slower for international audiences
- Emphasize important points

You are the Person to Talk to about Topic X

- Make yourself bigger
- Point toes towards audience
 - ▶ Face audience with torso
 - ▶ Straight stance, good posture
- Friendly open face
- Purposeful movements with beginning and end
- Bring out hands while talking
 - ▶ Use gestures (towards slides)
- At start, stand in front of audience
 - ▶ Only then move behind podium

Gotchas

- Don't look at your slides too much
 - ▶ Focus on audience, make eye contact
 - ▶ Pick 2 to 3 people as anchors to look at in audience
- Walk to front and only then start speaking
- Wait for applause to die down before leaving the stage
- Avoid nervous movements
- Don't hide your hands
- Don't hold things you do not need
- Don't be too serious
- Don't cross your legs

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Feedback

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Giving Feedback

- Acknowledge the presenter's strength
 - ▶ Constructively point out areas that could be improved
 - ▶ Suggest approaches for improvement
- Take notes using slide numbers for specific feedback
- Focus on most significant points first
 - ▶ Adjust feedback to what is relevant for the presenter

Aspects For Feedback

- Was the takeaway message clear?
- Was the talk engaging and interesting?
- Were the slides well-designed and helpful?
- Was it easy to follow what the presenter was saying?
- Was the topic covered in appropriate depth?
- Was the given time well managed?
- What is the overall impression of the presentation?

Receiving Feedback

- Do not get defensive and be open-minded
- Ask clarifying questions
- Understand or ask for steps to implement an improvement
- Take notes

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Closing Remarks

- You are now empowered to give high-quality scientific presentations
- Spread your stories and ideas
- Always stick to the plan and respect the basics
 - ▶ Experiment a bit to find your own style
- Review these slides as needed
- To learn more see *The Craft of Scientific Presentations* by M. Alley

References

Alley, Michael. *The Craft of Scientific Presentations: Critical Steps to Succeed and Critical Errors to Avoid*. New York, NY: Springer, 2013. ISBN: 978-1-4419-8278-0 978-1-4419-8279-7. DOI: 10.1007/978-1-4419-8279-7. URL: <https://link.springer.com/10.1007/978-1-4419-8279-7> (visited on 03/14/2024).