

Week 9

Final Paper and Presentation

9.1 Lecture 13: Oral Communication Skills

- 2/28:
- Today: Best practices for oral presentations with graphic support.
 - This is the last live lecture for the term.
 - Common scientific oral presentation formats.
 - Oral presentation with visual support.
 - To an audience (5-200 people) with minimal disruption.
 - The formality of your presentation scales with the size of your audience.
 - You want to quickly, and efficiently, get a few scientific points across.
 - Slide deck for quick presentation of quantitative results.
 - Poster presentations.
 - Designed for one-on-one discussions.
 - Open-ended.
 - Extemporaneous style for both (we are not reading from a script directly; we adapt on-the-fly to the audience's reactions and the presenters before us).
 - The common starting point for all communication.
 - Audience, message, and media (as per Lecture 10).
 - In our case, we know the audience, we're somewhat familiar with the media, and the message will be the challenge.
 - Media: Oral vs. written communication.
 - The main elements are like the written report, but timing and oral delivery add challenges.
 - The presenter's challenge: Time constraint on information presented.
 - The audience's challenge: Can't control rate of presentation to match their comprehension, and can't re-read slides.
 - Planning the oral presentation.
 - What part of my story can I tell in the allotted time?
 - Much less oral content than the written report!
 - Thus, make use of the visual support to communicate information quickly.
 - Be clear and concise.

- We have to hone the message and can't discuss stuff in as much detail as in the written report.
 - Hint: They're not gonna be checking sig figs; we just need to convey that we know the essence of the experiment and that we've done our lab well.
- Build a detailed outline of the presentation.
 - Organize around a message.
- Planning the presentation.
 - Tell a story — don't give a report.
 - There should be a narrative structure (with a beginning, middle, and end) to our presentation.
 - Engage the audience, and adapt to how they're reacting.
 - Recall that there's maximum audience attention at the beginning and then it drops off; make a lot of use of your opening slides! Attention may pick up again toward the end.
 - Arrange ideas in a logical sequence.
 - Don't necessarily spend the most time on what took you the most time in lab! Oftentimes, that stuff is dull and you should spend zero time on it.
 - Thus, don't necessarily go in a chronological order.
 - Emphasize key points as you make them.
 - Provide explicit transition points.
- Structuring the presentation.
 - This will track the written report, but don't necessarily treat these as headings!
- Introduction slide.
 - Most important slide (everyone is paying attention, spark their interest).
 - Introduce yourself and your collaborators.
 - Give the big picture (introduce the central question or topic *in one sentence*).
 - Acknowledging our TA might be a good idea.
 - Outlines aren't necessary here (maybe in longer presentations, though).
 - See example in Tokmakoff's slides!
- Background slide.
 - Questions to address.
 - Why is this topic worth investigating.
 - Where this content plays a role outside of this class.
 - Why we're interested.
 - DO NOT use equations in oral presentations, according to Tokmakoff's colleagues.
 - So be aware! Treat it like a graphic. If the equation *must* be there, you have to talk people through it like a graphic.
 - Go through this pretty quickly!
- Experimental methods.
 - Explain the links between our questions and the answer, and how our lab work got us from A to B.
 - Explain the techniques in a bare minimal sense to get the message across.
 - If you can find a way to eliminate technical details, then do that!
- Results and discussion.

- Present the most important examples of things we measured and how it points to our conclusions.
- What observations did you make along the way and *explain any insight you gained*.
- Conclusion.
 - Summarize the original question and state whether or now we answered it.
 - Relate back to the community. What further questions are raised?
 - Spend the first third of your talk doing something that every person in your audience will understand.
 - Second third: Stuff that half the audience understands.
 - Last third: Stuff that no one (even the speaker) understands.
 - That's tongue and cheek, but the point is that you should end on further questions (i.e., stuff that no one understands) that you'd like to see investigated in the field.
- Q & A.
 - Anticipate questions not covered in the presentation.
 - Bring extra (supporting) slides.
 - Hopefully, we'll be able to construct answers without needing a supporting slide.
 - We will be asked questions at the end!
- How to design effective slides.
 - Limit the number of slides!
 - They are for visual *support*, not to give your presentation for you.
 - Each slide should convey the message quickly and easily.
 - The average attention span per slide is 8 seconds.
 - Simple heading.
 - Clear statement of the message.
 - Minimal supporting text.
 - Use graphics liberally.
 - No clutter, though! Remember white space.
 - Use animation where needed.
 - When we have multiple elements and it's useful to introduce material stepwise.
 - When we have a bunch of elements, we can lead them through it one step at a time instead of having them be overloaded.
 - Graphs for quantitative info.
 - Tables are deadly; what are you trying to compare with it if you're going to include it!
 - Minimize text.
 - Paragraphs, complete sentences, etc. are very distracting.
- Graphics.
 - The same design principles we discussed previously, but with some adjustments for the format.
 - Keep them simple.
 - Use a consistent format.
 - Title all charts, tables, and diagrams.
 - Use clear, explanatory labels.
 - Everything must be legible from the back (sans serif, 24-32 pt). Tokmakoff believes that PowerPoint template defaults are too big.

- Practice the presentation.
 - Rehearse!
 - Practice several times. Then practice again.
 - The first few presentations will help work out the kinks in content, organization, and delivery.
 - Practice also assures that it doesn't sound scripted, that the content embeds in your head, and that it doesn't sound scripted.
 - Practice out loud with the equipment you will use.
 - Practice with a colleague or friend for feedback. Can help catch...
 - Content issues, typos, missing labels, and inconsistencies.
 - Do you rock, squirm, gesture too much.
 - Recording yourself can also be very helpful.
 - Time yourself — don't go too long or too short!
 - Make sure you're not a second over your time. There are plenty of conferences where they'll just yank you off.
 - If you're too short, you'll feel like you haven't told the full story.
 - Think about what questions your audience will likely ask.
- Delivering the presentation. On presentation day...
 - Arrive early to gauge the room and audience.
 - Be aware of seating, acoustics, and lighting.
 - Bring all the equipment you need. Check it and voice.
 - Anticipate problems.
 - What will you do if your equipment fails? Anticipate *everything* failing.
 - How should you stand?
 - Don't block the screen.
 - Stand at a 45° angle to the audience.
 - Maintain eye contact with gestures to visual support.
 - Don't turn your back to the audience.
 - Keep your weight evenly dispersed on both feet.
- Connect with your audience.
 - Put yourself in the audience's place.
 - Use everyday language and terms.
 - ...
- Gesture and movement.
 - Make nonverbal behavior deliberate; avoid extraneous motion.
 - Some walking and gestures ad variety.
 - Too much is distracting.
 - Use a pointer to draw attention or identify specific items on the slide.
 - Don't "stir the soup" with your pointer.
 - When there are multiple presenters, practice positioning and handoffs with partners.
 - You have so little time as it is; everything should be smooth so you don't lose any.
- Q & A.

- Make sure you understand the question.
 - Feel free to ask the questioner for clarification.
- Keep your answer short and to the point.
 - Don't use backup slides unless necessary.
 - Tokmakoff may specifically ask for these!
- It's ok to acknowledge gaps in your expertise if you have to.
 - Explain what you do know in this case.
 - You can say something along the lines of, "That's a great idea to try. We went sort of in that direction, but got X results and decided to stick here. Here's what we did..."
- Voice.
 - Volume.
 - Project to the back of the room and spend a lot of your eye contact on the back of the room.
 - Rate.
 - Speak at an appropriate rate for audience comprehension.
 - Slow down for complex or important content.
 - Silence is great for grabbing attention back.
 - You can keep just rolling along through minutia and then pause... that will draw the audience back.
 - Emphasis.
 - Style.
 - Pitch.
 - Keep the pitch of your voice at a natural level.
 - Avoid "uptalk" (the pitch of your voice going up at the end of a sentence).
- Handling anxiety.
 - Remember to breathe.
 - Practice and prepare: This helps your confidence and commits much of your presentation to memory.
 - Write out your speech and memorize the introductory (first few) sentences. This grounds you and starts your momentum.
 - Focus and center yourself.
 - Don't view the situation as formal; view it as a conversation.
 - You can feel like you're having a conversation with a particular person in the audience.
 - No one is perfect — a conversational style makes it easy to move past mistakes.
 - What if you freeze up or forget part of your speech?
 - Pause, take some deep breaths, reorder your thoughts.
 - If paralyzed, stop speaking and refer to your outline to reorient yourself.
- Takeaways.
 - Audience, message, medium.
 - Clarity and concision.
 - Connect with your audience.
 - Patience.
 - Practice until you're bored to tears of practicing.
 - A minute of speaking equals an hour of preparation.
 - Pace yourself.

9.2 ECHEM Full Report Notes

- 3/2:
- Plot one cycle of the CVs, one of the middle cycles. Adjust by 0.65 for SHE to mercury. Do for all three electrodes. Onset potential is where the curve starts going down.
 - Take a current vs. voltage plot and divide the y -axis by area to “normalize” it and change to current density.
 - Tin was not stable under the reaction conditions. Therefore, its surface area and chemistry would have changed throughout the run.
 - How do you quantify catalytic activity?
 - Normalized is more valid because it gives information about an *intensive* property of the material, not the *extensive* correlation.
 - What other types of normalization are there vs. geometric normalization? Literal surface area? BET surface area?
 - We can do an internet search to see what else has been done.
 - We can integrate the peaks on a CV to see how much charge is being passed. So we can compare the catalysts based on the amount of charge being passed; charge vs. material plot.
 - How do we build a Tafel plot/what is the overpotential?
 - The overpotential occurs at 0 on the SHE. However much negative past 0 in the converted data is our overpotential. But instead of plotting the negative log CA data vs. these “raw” negative overpotentials, we’ll plot vs. the “volts past zero.”
 - The pH of 0.1 M H_2SO_4 is calculated by assuming 100% dissociation, i.e., $[\text{H}_3\text{O}^+] = 0.2 \text{ mol L}^{-1}$. Thus, $\text{pH} = -\log(0.2) \approx 0.7$.
 - Onset potential of the Pt CV is about 0.05 V.
 - At this pH and potential, it appears that we’re just crossing the (a) line in the Pourbaix diagram.