Preparing a Scientific Presentation

Identify your audience

- Look upon the presentation as a dialogue with audience not a monologue.
- Acceptance of the speaker by the audience is key.
- Try to find out beforehand who might be in attendance.

Structure your material

- Don't exceed the allotted time; as a rule of thumb keep presentation to 80% of allotted time.
- Be able to summarize content of presentation in two or three well-constructed sentences
- Tell 'em what you're gonna tell 'em, then tell 'em, then tell 'em what you've told 'em.
- In 45 minute talk: 15 minutes for introduction, 25 minutes for presentation, 5 minutes to summarize and conclude.
- A well-prepared abstract, an organized set of well-chosen viewgraphs, a concise `cheat-sheet,' and an outline (perhaps displayed in the corner of every viewgraph) should all help to keep you on track during your seminar.

Know your stuff

- The decision not to speak is sometimes more beneficial to a person's reputation than a lecture devoid of data.
- Accurate, complete, well-phrased descriptions of scientific information portray speaker as a knowledgeable, reliable source of information.
- In contrast, glib, inaccurate statements that appear open to multiple interpretations gradually elicit skepticism and distrust.
- Critical examination of the information is indispensable.

Rehearse

- Always rehearse a presentation.
- Prepare for each seminar for every individual occasion de novo, always with the specific audience in mind.
  Prepare-- then relax
  - To give a good presentation it is essential to be relaxed.
  - To ease into the presentation, a nervous speaker should write down a few opening sentences on a sheet of paper and read them out in verbatim in as natural and controlled a voice as possible at the beginning of the presentation up to the first viewgraph, making sure not to speak too fast.

Dress for success

- Dressing up for a scientific presentation conveys two important messages: respect for your audience and willingness to conform.

The Structure of a Scientific Presentation
Zooming in

- Zooming in is the *only* effective method to put a presentation in perspective.
- The presentation must start with the description of an important general principle, then gradually focus in from there onto the experimental (or theoretical) model that the speaker wishes to describe.
- Advantages of zooming in: (1) it emphasizes to the audience that the work to be described bears a relevance to an important scientific principle rather than being an insignificant, isolated contribution; (2) zooming in defines the intellectual borders of the presentation.
- When putting a presentation in a historical perspective, always give appropriate credit to contribution of others in the field.

Telling a story

- There is a distinct difference between summarizing a collection of facts and telling an exciting and interesting story.
- A clear thinker separates the central, relevant issues from merely supportive peripheral information and will not allow the direct line of thought to be interrupted by sidetracks.
- A story should have one focus and convey a single major message.
- To construct the plot for a scientific story, it is often useful to phrase the basic idea underlying the talk as a question.

Mainstream and Sidetracks.

- There are three simple rules for preventing the loss of momentum as results of sidetracks.
  1. Keep the number of sidetracks to a minimum and use only those that are absolutely essential.
  2. Keep the excursion from the mainstream as brief as possible, providing the minimal amount of ancillary information that is absolutely crucial for a full appreciation of the presentation's mainstream.
  3. Always make clear where the sidetrack starts and when it is complete, return to the same point of the mainstream.

Formulation and Argumentation

- The lecture must proceed as a logical unfolding of information.
- During the presentation facts must be enumerated in sequential steps, each step firmly founded on the previous one.
- Remember that your labyrinth of knowledge, with its familiar shortcuts, alternate routes and interconnections is unfamiliar to the audience listening to your story for the first time.
- To communicate effectively, avoid the use of hyperbole and jargon whenever possible!
- Speech reflects our thought processes, and an imprecise speaker is often an unfocused thinker.
- You should carefully analyze the often fuzzy borders that separate experimental evidence from speculation. The care with which this intellectual process is performed is reflected in the manner in which you formulate your sentences.
- By recognizing the limits of your experiment (or theory or explanation) and clearly defining the conditions under which your conclusions are valid, you gain the respect and credibility of your audience.

The conclusion: brief and to the point

- Zooming out can be a valuable tool near the end of a presentation, when you remind the audience
once again that the data relates back to major scientific principle with which you begin.

- The conclusion should be firm and decisive.
- The conclusion of the presentation is its most important moment. It provides the take-home message, often the only thing that will be remembered. It determines the final impression and impact that you will make on your audience. The conclusion should always be reduced to a concise statement, preferably shown as text or a simple diagram on the overhead.
- The conclusion should consist of a simple major statement, with not more than two or three connotations, if these are absolutely essential.
- The conclusion should very clearly demarcate the end of the lecture.
- The most important rule for a scientific presentation is to finish on time and on a clear and resonant note.

**Overhead Transparencies**

The three most important points for transparencies (and slides):

1. Clean
2. Simple
3. Necessary to the story line

- Transparencies should illustrate a single point and, like the presentation itself, have only one focus.
- Complex data delivered during a seminar cannot be fully appreciated unless the speaker separates them into a series of simplified constituents.
- Try to avoid showing tables.

Most audiences find equations intimidating and are likely to "tune out" as soon as one appears on the screen. [jww: If you must use an equation, define the science of all symbols before the equation.]

Some general rules

- Lettering on viewgraphs and slides can never be too big.
- Uniformity of style throughout the presentation accentuates and underscores the flow and coherence of the talk.

Rules for figures

- Graphs should contain clearly labelled axes.
- The less busy a figure appears, the more justice it does to the information it attempts to communicate.
- Delete all information from the figures that is irrelevant to the presentation.
- A figure can be enhanced by a line or two concisely describing the conclusions to be drawn from the figure.
- If the same figure has to be used more than once, use a duplicate rather than disrupt the momentum of the presentation by having to hunt for the early viewgraph.

**Poster presentation: the young scientist's debut performance**

- Consider a poster primarily as an opportunity for exchange of ideas and dialogue, rather than merely a forum for data presentation.
- The poster should be aesthetic and clean. Simplicity above all.
- The poster should tell a story. Include only material relevant to the story line.
  1. Choose brief and informative title.
  2. In upper left hand corner, provide concise introduction that indicates why work presented is
important within context of a major scientific principle.
3. Describe approach in an engaging, condensed style without excessive detail.
4. Organize presentation of data in a logical, coherent sequence.
5. In lower right hand corner, state small number of well-phrased conclusions and a major, concise summary statement.

- Remember that it is not the number of people who come to view your poster, but the quality of interactions with them that determines its success.

Last points

- Carefully double-check sequence and orientation before presentation; even more important if you are using slides.
- Anything out of the ordinary usually gives a presentation that special memorable touch, setting it apart from others.

Delivery

Voice Control and Eye Contact

Effective use of the voice, eye contact, posture, gestures, and enthusiasm distinguish a routine presentation from a memorable one.

- The characteristics of delivery in terms of voice control can be separated into several interrelated properties: sound, volume, speed, and rhythm.
- Articulation and eye contact are the two most important components of voice presentation. Take the time to articulate every work of each sentence clearly, while maintaining eye contact with your audience.
- As with written text, the end of the sentence designates the "stress" position. It is here the audience expects to be provided with the most important information.
- Nervous, hurried speech often leads to inaccurate articulation. Take your time and do not speak faster than your normal conversational speed.
- Monotony is the greatest enemy of a scientific presentation.
- Plain silence is preferable to mere noise.
- Slowing down is a remedy for 90 percent of most speakers' problems.
- Looking straight at members of the audience establishes the notion that you are talking to them, not just in front of them.

Foreign speakers who have severe language problems giving a scientific presentation should:

- Rehearse and practice the presentation often, preferably with a friend who is a native English speaker, and almost learn it by heart.
- Structure your viewgraphs in such a way that the images are able to convey most of the story by themselves, even if you are hard to understand.

Posture and gestures.

- Stand straight up.
- Do not be stationary--change positions occasionally and move around the podium/platform.
- Avoid distracting mannerisms like swinging the pointer aimlessly around.
- Speaking with a hand in your pocket looks sloppy and unattractive.
- Gestures can underscore spoken language.
Enthusiasm: the indispensable ingredient.

- Genuine enthusiasm accounts for 90 percent of a speaker's success.

Answering questions.

- The speaker should attempt to control the crowd, permitting question as the speaker's convenience.
- By making it politely clear that the audience should not interrupt, the speaker will discourage impulsive *ad hoc* questions and can focus on the presentations. In doing so, you will also establish control and authority. [jww. This is tricky than it seems since an inexperienced speaker may have omitted an essential piece of information the audience need to understand the talk. A clarifying question promptly answered may save such a situation.]
- Always answer questions briefly and to the point.
- It is in many cases advantageous to repeat the question before answering it. In addition, repeating the question gives you the chance to *rephrase* the question.
- It is always a good idea to be polite and gracious.

The most important advice to remember is,

- communicate with your audience and
- convey enthusiasm about your work.

**Summary**

1. Three devices can put a presentation in the desired perspective.
   
   a. Indicate the scope of the presentation by an informative title.
   
   b. "Zoom in" to the topic during the introductory segment of the presentation and "zoom out" near its end.
   
   c. Decide on the underlying question that the presentation seeks to address; then divide that question into a hierarchically organized array of subquestions, and develop the presentations as a series of answers to these questions.

2. The mainstream of the presentation should address a single focus issue, tuned to the interests of the audience. Sidetracks from this mainstream should be brief and should always return to the same point in the mainstream where they started. Omit information not directly relevant to the focus of the presentation, and avoid backtracking.

3. The statements constituting the mainstream of the presentation should delineate a clear, logical line of thought. Formulate explanations of scientific concepts and experimental (or theoretical) methodology unambiguously, without professional jargon.

4. The presentation should end with a clearly formulated, concise conclusion. When the take-home message has been delivered, stop.

Note: The book "Dazzle 'em with Style: The Art of Oral Scientific Presentation" is a required text in Physics 596; all students must buy and read it. This summary is intended only for students in that course to re-emphasize central points in the book. Any other use is unauthorized and violates the copyright law.
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