

Scientific Communication Techniques

MEES 602

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OBJECTIVE:

This seminar will provide participants with inspiration and a conceptualized framework from which to develop well-organized, meaningful oral scientific presentations.

Oral and Platform Presentations

Principles and notes for presenters

The purpose of presenting is to actuate. You want to persuade people to think or act in response to your message. Otherwise there is no point in making the effort of preparing and delivering your presentation.

Perception is often more powerful than fact. There is no mistaking the imperative of truth and the importance of unbiased observation of nature in science. However, a corollary principle of persuasion is *perception*. How an audience perceives a presenter can persuade them or dissuade them from listening, interpreting and responding. Effective presenters are aware of this power of perception and deliberately design themselves and their messages accordingly.

An audience receives, processes and judges your presentation. Presentations are perceived not only through words, but how you sound vocally, how it looks visually, and the entire package. In many respects, presenting is an art. The whole room is your canvas; the facts are the fibers of your paintbrush... and brush strokes alone do not make a masterpiece... it's how the brush strokes are applied that richness and complexity (of data) come through.. Artful combination of all presentation elements create a product of perceived value.

Questions to ask yourself when putting together a presentation include:

1. How can I limit my presentation content so that my objectives, methods, results and conclusions can be seen with clarity and ease of understanding?
2. How can I make my message more meaningful and memorable?
3. How will I relate my information to this audience?
4. What will get and keep the attention of this audience?

Presentations do not necessarily need to be meaningful for you. You already know the meaning of your message. Deliver the message from the audiences' point of view. (Another way to say this: What *you* want to present is not as important as *what the audience needs to hear* in order for your message to come across clearly, simply.) Remember that an audience will judge a presentation on the basis of *how meaningful is was for them*.

Preparing your presentation

Prepare in advance. Then practice, practice, practice. Flight time.

Prepare your talk in this order:

- 1. Your objective
- 2. Key points with supporting material and transitions
- 3. Preview and summary
- 4. Opener
- 5. Closing

Present your talk in this order:

- Introduction
 - Opener
 - Objective
 - Preview
- Body
 - Key Point 1
 - Supporting material
 - Transition
 - Key Point 2
 - Supporting material
 - Transition
 - Key Point 3
 - Supporting material
- Closing
 - Summary
 - "To do"

The Three T's:

- Preview T-1: Tell them what you are going to tell them.
- Body T-2: Tell them.
- Summary T-3: Tell them what you told them.

Ask yourself (*really*) “What do I want to accomplish by delivering this presentation?”

If a concept or visual doesn't support the objective, don't use it.

By the conclusion of this presentation, people should/will _____ (what?).

Stating an objective this way helps to focus attention on what you want your audience to do with the message. Typically, a presentation is geared at getting people to:

- Understand something, or
- Be able to do something, or
- Do it.

Platform Presentation Constructive Critique

Speaker/Seminar: _____ Date: _____

Was the presentation clearly developed (Objectives clearly stated; data presented clearly; data/results clarify/meet the objectives; conclusions consistent with the data)?

(not at all) 1 2 3 4 5 (most definitely) not applicable

Was the presentation well organized (beginning: introduction, background and significance; middle: methods and data presentation; ending: conclusions/future developments and applications)?

(not at all) 1 2 3 4 5 (most definitely)

Was the level of presentation appropriate for the audience?

(not at all) 1 2 3 4 5 (most definitely)

Did the speaker maintain eye and "energy" contact with the audience?

(not at all) 1 2 3 4 5 (most definitely) not applicable

Was the speaker knowledgeable and well prepared?

(not at all) 1 2 3 4 5 (most definitely) not applicable

Was the physical presentation appropriate: Did the presenter speak clearly and project (volume) sufficiently for the room?

(not at all) 1 2 3 4 5 (most definitely) not applicable

Did the speaker use visual aids appropriately (too many, too few? touch the screen with hand or pointer? clear and readable visuals? maintain personal contact with screen rather than audience? esthetic visuals?)?

(not at all) 1 2 3 4 5 (most definitely) not applicable

Was the presentation stimulating/enjoyable?

(not at all) 1 2 3 4 5 (most definitely)

Rate the overall presentation.

(very poor) 1 2 3 4 5 (excellent)

Media elements

Supportive media elements should be graphic and creative. They should fit the setting, support the message, awaken the audience, and be used appropriately and in moderation. Visuals which portray data should show causality. Use of color should be used only to help the data speak for itself. Avoid glitz. Useful media elements include flip charts, visual boards, overhead transparencies, poster boards, props, 35 mm slides, film, audio tape, video tape, Powerpoint, and other “high-tech” computer stuff.

Slides:

Well-designed PowerPoint or 35 mm slides can do wonders for a presentation. Poorly designed slides can detract from what otherwise might be wonderful and important information. Here are a few points to keep in mind:

Avoid using more than 1 slide per minute of talk, on average. As an exception, if you find it is important to show a rapid series of slides, which might closely follow key words of a sentence or photographs showing changes in a sequence, allow for at least 15 seconds per slide (minimum time needed to digest visual information).

Use of slides generally requires that the room be darkened. This allows for heightened visual acuity of visuals on the screen. The down side of using slides, however, is that the audience is now in the dark—literally. It is your job to consider and manage the level of audience attentiveness. Consider dimming the lights rather than turning them off (this also helps to prevent the “terror squint” when lights brightly come back on). Use bright slides. The brighter the slide, the more light penetrates the pupils of your audience’s eyes!

Know how to load and reload your slide carousel rapidly and correctly. This can take practice. Practice it! Number or label your slides in the event that the projectionist should drop the carousel and the retaining ring drops off. Also, be personally responsible for loading your own slides. Check them out on a projector in your carousel, privately, prior to your presentation. Learn how to remove a “fatally dropped” slide from beneath a loaded carousel during a presentation.

Check for spelling errors. A typo projected onto a large screen is genuinely avoidable and can be a distraction. If you made your slides on a computer, run them through a spell checker. And, no matter how many times you proof them, have someone else take a look at them as well.

In the event that you have to go to bat with a slide containing a spelling error, don't point it out to the audience. Chances are that they won't see it. If it's a glaring error, obfuscating the meaning of the slide, don't use it.

Avoid using all upper- or lowercase text, except for titles. Avoid more than two colors on any text slide. Avoid mixing more than two fonts or three point sizes. Avoid extravagant fonts (i.e., use conservative fonts without serifs such as Helvetica, Arial and Geneva that are easy to read).

Don't use too much text. One rule of thumb is not to exceed 20% of the total slide area with text. Consider the 5 x 5 rule... limit the slide to 5 lines with no more than 5 words per line. Text size should be sufficient so that you can read the slide 25 cm from your eye (arm’s length).

Be consistent with your visuals - try to maintain use of a single template. For example, it is distracting to have a series of nicely colored slides, and then have several black and white (or diazo) slides thrown in the middle. If possible try to have all your slides oriented similarly, i.e., landscape, not portrait (portrait slides, amidst an otherwise landscape slide presentation, may distractingly go off the screen).

Allow yourself sufficient time to prepare your visuals prior to your presentation. Give yourself enough time (1-2 weeks) to theoretically be able to produce your visuals twice before your presentation (so that if a major mishap occurs, you can still make them again). This also affords you time to practice your presentation as a finished product.

Overhead transparencies. Although this media form has lowest “resolution” of any visual aid, it has its place. ADVANTAGE of overheads is that they are bright and therefore you do not necessarily need to turn off the lights. You can write notes to yourself on cardboard frames around the transparencies (frames are available from most art and A/V stores). You can rearrange transparencies during your talk (can't do with 2x2 slides). Overheads are easy to create and do not necessitate sending them out to a photo lab. Copy machines allow you to cut and paste pictures, charts and graphs; add some text; use a color copier and/or apply color markers to the transparency. *Overheads permit data presentation “hot off the press.”* DISADVANTAGE of overhead transparencies is that the image may not be clearly seen throughout a large audience, there is commonly image distortion, and there can be distracting glare from the sides of the transparencies. The latter can be overcome, in part, with cardboard transparency frames and masking tape to mask off the area of the projection glass which is not covered by the transparencies.

Space considerations and utilization. Arrive early. Check out the room and facilities. Take a look at the A/V equipment and be sure that it is working. Stand at the podium and look out at the space which will soon be filled with your audience. Anticipate problems which might occur. Find the light dimmers and figure out how to use them. If there is not an A/V person supervising the room, figure out the sound system. Check out the microphone to feel and hear what you sound like in that room (if practical and permissible). Locate the bathrooms and water cooler. These little exercises may help you feel more confident in your ability to utilize the "presentation space" and handle unforeseen mishaps during your talk (or that of one of your colleagues). End on time (early enough to *finish* answering questions within the allotted time slot).

Poster Presentations. Posters offer a unique venue to present information on a more intimate basis. Posters differ from written manuscripts in that they do not contain all the detail of methodology and richness of supportive literature. Posters should present a story outline of a research project in an easily digestible format.

Ideally, posters should have a minimum of text; just enough to tell the story, but not so much as to make the reader stand there and read on and on. Ultimately, posters allow for interested persons to read, and then ask questions during allotted times. This is where posters have advantage over platform presentation... one-on-one interactions with persons who have already targeted your area of science!

Concepts for poster design:

1. The physical poster should be easily portable, but durable. After all, you will have (or at least should have) spent sufficient time to make it look good, and you don't want the materials to warp, peel or bubble after just one use. Perhaps the material can be displayed at a second venue.
2. Use easy to read type, such as Helvetica, Geneva or Arial. Avoid fancy/serif fonts or italics (except for species names, etc.). The main body of the poster (not just the section titles) should be readable from a 2 meter distance. This notion also helps limit the total amount of text used. Again, this is not a manuscript, it is a short story with supporting graphics. Bullets and short phrases are effective. Use large graphs, tables, flow charts, diagrams and photographs. Keep captions short and informative.
3. In addition to content outreach a poster is an aesthetic and a work of art. Look at the "big picture." Ideally (in the opinion of this author), poster text should not exceed 40% of the entire printed poster space; supporting graphics fill in the other 60%. Use the pictures, figures, graphs, etc. to help tell the story. Don't restate textually what is already in the figures.
4. Be prepared to present. You should know about the poster set up for your presentation prior to making your poster (i.e., the size and type of the display space). Do you need push pins or Velcro? Other organizational considerations (similar to written presentations).

TITLE SHOULD BE BOLD CAPS AND 96 POINTS
Sub-title and Affiliations Can Be Smaller Type
J.R. Presenter and G.D. Meetings
VA-MD Regional College of Veterinary Medicine

Abstract
Use a font without serifs such as helvetica or geneva. All text should be readable from 2 feet away.

Introduction

Materials and Methods

Results and Discussion

Figures 1 and 2.
Allow graphs and captions to tell the story. Integrate graphics with text. Try and achieve good visual flow.

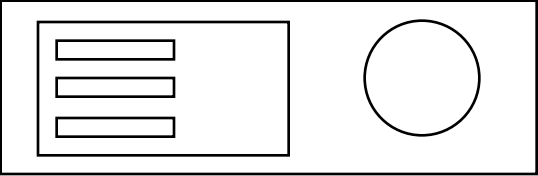
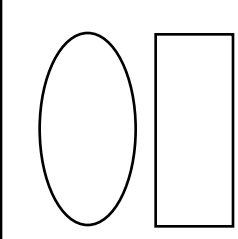


Table 1. Keep tables simple, easy and visually clean.

Figure 2. Short, descriptive captions work best.



Conclusions
Consider using a bulleted list:
• This is the evidence.
• Here is how you know.
• Now you can think this way.

References
Essentials only
Acknowledgements

Elements of a scientific paper (and how to write a good one)

Title, Abstract, Introduction, Materials and Methods, Results, Discussion, Literature Cited and Acknowledgments

TITLE: The words that represent the message.

The title should be descriptive, and concise and to the point. Considerations include use of key words and main thrust/results of paper. Avoid abbreviations, trade names and formulae. Avoid speculation. Eliminate flabby, vague words and phrases. Do not sacrifice clarity for brevity. Specificity in a complex title may be gained by use of a subtitle. Consider spelling out your take-home message. Try a sentence title (including subject and verb) or ask a question.

ABSTRACT: What it's all about.

Concisely state the problem being studied, the methods used, the principle results and main conclusions. Avoid speculation, abbreviations and references. The text should be able to stand alone and be understood. Try for less than 200 words. Use active voice* [e.g., The chemical reaction raised the water temperature (active voice shows that the subject performs the action, but is not the object or receiver of the action, and is listed first relative to the subject of the verb), versus "the water temperature had been raised by the chemical reaction].

Abstracts are catalogued in databases and used for on-line searches; this may represent the entirety of your paper to persons searching a database. Also, the abstract is the first portion of the manuscript read by readers (after the title); it should be well-written and indicate that the attached paper is a good one.

INTRODUCTION: What did you studied and why.

State the general area of research and why it is of interest. Make a problem statement. Why is the research intrinsically interesting or of relevance to researchers in other areas? Are findings of others being challenged or developed? What is your experimental approach and rationale? Cite review articles early in draft to give appropriate background information (do not write your own review article in this section). Keep to the point - avoid side issues.

MATERIALS AND METHODS: How you did it.

Include all essentials of experimental design. Include all critical details of procedure. Use appropriate headings (and subheadings) to guide the reader. Identify statistical methods used. Avoid use of jargon. Remember, the reader should be able to use your methods (including methods which you have cited) to reproduce the experiment!

Use of previously published methods: identify protocols and procedures; give reference.

Modification of published methods: reference and give details of modification.

New method: give full details.

* Use active voice consistently throughout manuscript.

RESULTS: What you found.

For each result, choose one of three alternatives for presentation:

1. Tables: for precise numerical data.
2. Figures: where trends are more important than numerical data; for pictorial data.
3. Text: when you can state results briefly.

Summarize individual data; give mean and measure of variability (e.g., standard error). Keep figures and tables to a minimum. Summarize data from figures and tables, do not repeat it. Tables and figures (with their captions) should be self-explanatory.

Guidelines for tables: Provide a clear, informative title. Make column heading clear and give units of measure. Provide legend if necessary. Check and recheck all data and calculations. Conform to journal instructions and layout.

Guidelines for figures (in addition to above): Make sure photographs, drawings and artwork are of the highest quality for reproduction. Do not present straight line functions (can be summarized in text). Strive for simplicity and clarity. Make sure lines, labels and symbols are large and heavy enough for reproduction and reduction. Do not let graphics obscure the data. Show all variables. Show relationships and causality. Use smallest effective differences to graphically show comparisons. Use directly labeling instead of legends if possible.

DISCUSSION: What it means.

Present relationships indicated by the data. Point out exceptions and unsettled details. Compare and contrast your findings with those of others. State conclusions and implications of data. Conclusions should follow logically from the data presented in the Results section. Follow parallel structure with all information presented in the Abstract, Introduction and Results sections. Deal honestly with inconsistent or unclear observations. Clearly identify speculations and hypotheses based on the data, but maintain objectivity.

LITERATURE CITED

List references from the manuscript that are *in print* or *in press* (cite work *in preparation* or *unpublished data* in the text). Check all references twice for accuracy both in the citations and in the body of manuscript. Do not cite a paper if you have not read it. Use proper format for citations according to journal style.

ACKNOWLEDGMENTS

Give brief acknowledgment to those who have contributed or significantly inspired the research.

Action verb list

Use of action verbs helps to activate a resume and/or other written correspondence. Many similar word meanings can easily be resourced in the thesaurus of most word processing packages.

Strong Verbs	Similar Meanings	Strong Verbs	Similar Meanings
Accelerated	hastened, expedited, anticipated, quickened	Founded	established, instituted, originated
Achieved	accomplished, attained, reached	Generated	made, produced, proliferated, engendered
Administered	governed, controlled, dispensed	Handled	directed, controlled, managed, operated, conducted
analyzed	investigated, studied, researched, examined	Headed	led, directed, guided, managed
Arranged	classified, catalogued, indexed, systematized, coordinated, organized	Implemented	equipped, effected, fulfilled
Built	constructed, fashioned, erected	Improved	reformed, revised, perfected, enhanced, elaborated, rectified, cultivated, strengthened
Completed	finished, concluded	Improvised	invented, devised, extemporized
Conceived	devised, grasped, realized, understood, imagined	Increased	augmented, enlarged, extended, expanded, strengthened, advanced, enhanced, amplified
Conducted	expected administered, handled, officiated, enacted	Installed	inducted, inaugurated, invested
Confirmed	established, strengthened, ratified, sanctioned, endorsed, proved, upheld, substantiated	Invented	devised, conceived, originated, imagined, improvised, created, forged, designed
Consolidated	joined, combined, affiliated, syndicated, merged, pooled, fused, incorporated	Launched	started, initiated, inaugurated, embarked
Contacted	touched, met, adjoined	Led	conducted, directed
Contracted	diminished, reduced, condensed, compressed, restrained, tightened	Managed	administered, conducted, controlled, directed
Controlled	commanded, governed, regulated, directed, mastered	Maintained	supported, carried, possessed, upheld, kept
Converted	changed, adapted, reorganized, remodeled, regenerated, transformed, rendered, applied	Negotiated	accomplished, arranged, bargained
Created	fashioned, organized, constituted, produced, propagated, devised, designed, conceived, invented, envisioned	Operated	conducted, managed, directed
Cut	carved, dissected, trimmed, diminished, reduced, curtailed, shortened	Organized	systematized, coordinated, classified, structured, arranged
Delivered	discharged, released, conveyed, granted, pronounced	Originated	invented, started, began, initiated, inaugurated
Demonstrated	substantiated, proved, exhibited, displayed	Oversaw	managed, supervised, directed
Designed	planned, projected, diagrammed, patterned	Performed	enacted, executed, fulfilled, achieved, operated, conducted, worked
Developed	evolved, matured, caused, diagrammed, patterned	Planned	designed, projected, proposed, devised, invented, created, prepared, systematized, organized, arranged
Directed	guided, led, regulated, governed, conducted, headed, managed	Prepared	planned, arranged, completed
Doubled	two-fold, duplicated, increased	Presented	awarded, endowed, gave, assigned, delivered, bestowed
Edited	revised, arranged, digested, adapted, composed, complied, issued, published	Produced	exhibited, created, originated, fashioned, manufactured, constructed, fabricated, built, established, constituted, instituted generated, developed
Eliminated	removed, excluded, eradicated, extracted, suppressed, clarified, simplified	Promoted	advanced, improved, elevated, supported, encouraged
Established	confirmed, secured, set, created, stabilized, appointed, enacted, instituted, organized	Provided	furnished, supplied, stocked, filled
Exhibited	showed, displayed, presented, demonstrated	Purchased	bought, acquired, secured
Expanded	widened, enlarged, extended, increased, stretched, magnified	Recommended	commended, advised, suggested, advocated
		Reduced	diminished, lessened, curtailed, lowered, alleviated, subdued

Renewed	revived, restored, renovated, replaced, replenished	Supported	upheld, sustained, backed
Researched	investigated, studied, explored	Taught	instructed, coached, educated, implanted, instilled, guided, directed, trained
Revised	altered, corrected, edited, re-wrote	Transferred	converted, displaced, translated, transitioned, exchanged
Serviced	aided, helped, provided, supplied, afforded, furnished	Transformed	changed, altered, converted, interpreted
Sold	marketed, dispensed	Translated	transferred, deciphered, decoded, interpreted
Solved	explained, interpreted, answered, resolved, deciphered	Trimmed	cut, equalized, lessened, balanced
Sparked	inspired	Unified	consolidated, combined, joined
Strengthened	intensified, fortified, increased, supplemented	Verified	substantiated, confirmed, proved, identified
Structured	organized, systematized, arranged, built	Won	beat, conquered, mastered, gained, obtained, achieved, accomplished, succeeded, triumphed, acquired
Succeeded	advanced, won, prospered, benefited, prevailed, surpassed, overcame, mastered, surmounted	Worked	employed, labored, functioned, acted, operated
Supervised	oversaw, controlled, directed, managed, steered, led		

Some concrete nouns and positive modifiers:

ability
actively
capacity
competent
competence

consistent
effectiveness
pertinent
proficient
qualified

resourceful
substantial
technical
versatile
vigorous

Speaker Exercise Workshop

OUTLINE SHEET

(use key words -- do not write out your talk)

Introduction: Title, significance, say what you will say.

Main Body of Talk: Say it in an organized manor.

Conclusion: Bring "Big Picture" together; closure.

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