Effective strategies for science communication

Many styles of public speaking can effectively convey complex ideas and data to an audience, and no one can pretend to have hit upon the ideal formula for scientific presentations. However, a few basic concepts are universal to nearly all of the best seminars, job talks, group meetings, etc. I've outlined these here, and suggest setting good habits now will serve you well throughout your career.

I. Before you begin, consider the comfort of the audience
- A. Room too dark? Too light?
- B. How loudly do you have to speak for people in the last row to understand you clearly?
- C. It's not a bad idea to begin by asking if people can hear you. This assures the audience that you care about their time, and their ability to receive the important message you want to convey.

II. Your first couple of minutes are critical.
- A. People decide whether they'll listen to anything else you have to say early on.
- B. Establish confidence, clear sense of direction, and enthusiasm.
- C. Practice this first two minutes. The rest of the talk should not be overly rehearsed or it could sound "canned."
- D. Encourage audience participation (such as questions). An engaged audience will listen to you more carefully.

III. Your first few minutes should sell the question, challenge, or purpose that the rest of your talk will address.
- A. How you answer "So what?" is perhaps the most important information to your audience.
- B. The big picture goals of your research must be stated early.

IV. Next, provide an outline for your presentation
- A. Break the talk up into bite-sized pieces.
- B. Short talks require only a quick sketch of the direction.

V. Focus on ideas, models, experiments, hypotheses.
- A. Use data to support or nullify these concepts.
- B. Select data carefully.
  1. Do not show data from every experiment.
  2. Data must be clearly presented.

VI. Repetition and timing are key.
- A. People learn by hearing the same concept a few times, as repeating yourself reinforces your message.
- B. Pace your talk to emphasize your key points.
- C. Summarize the current slide and provide a quick introduction to the next slide, before you click the changer; this gives you a chance to repeat the highlights without belaboring them.
- D. Your audience will appreciate a logical progression of ideas that seem to flow from one concept to the next.

Effective strategies for communication of science, cont.

VII. Pay attention to slide design.
- A. Use color to emphasize your ideas. Color should be used sparingly (for example, coloring every letter a different color will not help the audience understand your points).
- B. Chose a single large size font.
  1. If you mix font sizes, the audience will only read the big font.
  2. Fonts with serifs are easier to read; non-serif fonts look cleaner.
  3. Fill your slides and avoid large blank areas.
  4. Title your slides with the conclusion you're trying to convey.
  5. Avoid non-data ink (*e.g.,* don't use the Powerpoint borders and other garbage).
  6. Use text slides sparingly.
     - a. No one wants to read them.
     - b. Especially avoid simply reading your slides to the audience. Summarize, expand and otherwise improve on their message.

VIII. When writing on a board, follow a few conventions.
- A. Erase the board completely before you begin.
- B. Start writing in the upper left.
- C. Practice this skill. Also practice drawing chemical structures clearly.

IX. Avoid these annoying habits.
- A. Use of filler sounds, such as "Uhm," "Aah," "Let's see," etc.
- B. Giggles, silly remarks. Remember you are there to inform the audience, not joke around and entertain them.
- C. A monotonous speaking style.
- D. Going overtime. People get restless and uncomfortable even if you are brilliant.

X. Answer questions fully or risk appearing evasive.
- A. Listen very carefully to the question. Repeat the question back to the question asker, if necessary to verify what information is sought.
- B. After answering, check with the questioner that you've addressed the correct question.

XI. More tips.
- A. Don't begin with an apology (no matter how hungover you are).
- B. Move your eyes around the room.
- C. Emphasize your points by changing your voice inflection, volume and cadence.
- D. Walk around a bit to further emphasize key points.
- E. Speak normally.
- F. Stay hydrated when you travel to present your science. Take care of your vocal cords.
- G. Read the following books:
  1. Tufte, E. *The visual display of quantitative information*. Graphics Press.
  2. Tufte, E. *Envisioning information*. Graphics Press.

XII. Practice and experience will pay off, if you strive to self-evaluate and improve.
- A. Teaching is an excellent opportunity to practice good communication skills.
- B. Watching a video of yourself can reveal both good and bad speaking habits.