

Lecturing Heuristics

Patrick H. Winston

*Artificial Intelligence Laboratory
Massachusetts Institute of Technology*

ABSTRACT

A handful of heuristics makes it possible to improve lectures, make better presentations, survive oral exams, and land jobs. This is a list of my favorites.

PRELIMINARY PLANNING

Lectures

- If practicable, arrange for a room that will be comfortably crowded. Near-empty rooms suggest unexpectedly and embarrassingly low attendance. Those who are there will think that those who are not are having more fun.
- Realize that the nature of an audience changes with its size. With twenty-five or fewer people, discussion is possible. With more seventy-five or more people, a performance is expected, and an audience can turn vicious if it does not get one. Start your teaching career by teaching small classes.
- Realize further that your mood will be determined by a few key people. A smiling nodder will make you feel good, and you will do better. People reading newspapers will make you feel bad, and you will do worse. If someone is doing something that makes you feel bad, tell them so and ask them to stop. Be firm, explaining your firmness is for the good of the class as a whole.
- If possible, schedule your lectures for 10 or 11 a.m. Most people are awake by then and few have gone back to sleep. Just after lunch is the worst time to lecture—a few people are bound to go to sleep no matter what, thus depressing you. Late afternoon is also bad since some people will be running out of energy and others will be itchy to get off to some squash game or something.

Invited Talks

- Get a feel for what is coming. Find out how many people there will be and how much they know. Find out who has talked before if you are part of a series.
- Look at the hall early so that you can ask for something you need or adjust to any unexpected problems.

- Never agree to speak after-dinner unless your talk is astonishment oriented. During an after-dinner talk, you should try to deliver one joke every seven minutes.

THE APPETIZERS

The Outline

- It is hard to get a lecture or invited talk started and stopped smoothly. In starting, the problem is to attract attention and get people quiet. If you just start talking, your first words will be lost. Start by writing a few words of outline on the board. This both gets things started and provides an outline to refer to during the rest of the talk.
- Never start with a joke. People are looking for their pencils and getting accustomed to your voice. Jokes always seem to do poorly in the first few minutes.

The Promise

- Tell your audience what great things they will understand or know how to do as a result of your talk. “Look at the full moon. Why does it seem flat?”
- Tell your audience what fun thing you have planned for the end of your talk. Promise a videotape, demonstration, or handout.

KEY HEURISTICS

- Cycle over the difficult ideas. Provide an overview in at most five sentences. Then you can proceed to expand on theory, show an example, work a problem, or whatever.
- Use verbal punctuation to help people follow your development. “This is a bad representation for three reasons: first, it makes nothing explicit . . . ; second, it is a bad representation because . . . ; and third . . .” Kennedy used verbal punctuation effectively in the 1960 debates with Nixon even though he numbered his points “One . . . , two . . . , three . . . , three . . .”
- Use near misses and exceptions to sharpen the concept. “This is an arch; this is not an arch; this is almost an arch . . .”
- Realize that 20% or more of the audience at any given time are off in another world. Ask real and rhetorical questions to bring them back.
- Suggest simple experiments people can do later with curious, unexpected results. Make it fun for people to talk about your stuff.
- Look people in the eye. Find the person that likes your stuff and look at that person often. This establishes that you are not a robot.
- Be with the people. Walk toward and away from the audience as well as left and right to help break down the implied barrier. Avoid rooms with a platform.
- Deflect obstructionists. Tell them you will deal with their question after class because it is a detail, tangential, has a long answer, has already been explained, or you have to think about it. In any event, do not annoy the others by getting sidetracked into something.

THE TOOLS

The Hall

- Have a room that just holds your audience.
- Have the lights full up.

The Board

- Practice board work. Neat drawings, particularly in color, create the impression that the speaker cares. Use color. Care.
- Make lists. Have the audience help.
- Point at the board a lot. This may be good even if the things you point at are unrelated to what you are saying.

The Viewgraph Projector

- Decide what you want to say on a slide and say less.
- Avoid small print that no one can read. Before you use slides, look at a test slide from the back of the room.
- If you must use slides as more than condiments, hand them out in the beginning. Slides always go by too fast to take notes.
- Never read a slide's text out loud. Reading a transparency will drive about 20% of your audience nuts. Paraphrase instead.
- Never cover up part of a transparency. The cover-up technique will drive about 10% of your audience nuts. Use overlays instead.
- Stand near the projected image. Do not force viewers to divide their attention.
- Do not let anyone darken the room. The darker it gets, the less alert people will be.
- Prepare drawings carefully. Neat drawings, particularly in color, create the impression that you care. Use color. Care.

Props and Videotapes

- Use props liberally. If you are talking about vision, show a set of pictures. If you are talking about force sensors bring one. Unroll a giant check-plot of an IC if you have been working on design aids.
- Avoid videotapes until the end of your lecture or talk, especially if they force you to darken the room. Darkening a room will put some people to sleep, never to reawaken until it is time to march out.

Your Voice

- Some people phrase all sentences as if they were questions, with the pitch rising at the end. This makes them sound tentative and unsure of themselves. Others fade, with their pitch

dropping at the end. This makes them sound bored. Ask someone to listen to your next talk with a view toward determining if you err on either side.

Your Style

- Have an eccentricity. Make it fun for people to talk about you. Chew tobacco or wear a rope belt. Erase with both hands. Tousle your hair. But note that extreme eccentricity is bad form for younger people. Something cute and endearing in an elderly full professor may be pretentious in an youthful assistant professor.
- Observe the speakers whose style you like. Create your own blend, adapted to your own taste and talent.

THE DESSERT

- Do not talk more than an hour. This is the attention span most people have been trained for, like rats. If you must speak a little longer, say so in the beginning so people can pace themselves. Take a break in the middle if you must speak much more than an hour.
- Stop when you are done. Do not babble on if you have nothing to say.
- Top things out. Observe that the promised understanding or how-to procedure has been delivered.
- Show a flashy videotape. Mention early that it is coming so that people will have something to look forward to.
- Hand out gifts. This is the time to distribute handouts, so that people cannot fidget with them while you are talking. Your overheads, if you use a lot of them, are the obvious exceptions.
- Tell a joke.
- Do not say “thank you for listening.”
- In general, realize is hard to end a lecture or talk. In the lecture setting, previewing the next lecture always seems to lose—people start dashing for the door like the lemmings rushing for the sea.

THE ORAL EXAMINATION

Presenting your Work

- Practice. Arrange for other graduate students to give you realistic mock examinations. Try to find mock examiners who have taken the same examination already. Demand that they be tough so that the actual examination will be a snap by comparison. Your boyfriend or girlfriend or wife or husband will be uselessly easy on you.
- Use your entire armamentarium of good speaking heuristics. Cycling in on what you have done is especially important. Start with a one sentence explanation, then give a one paragraph explanation, and finally proceed with the detailed explanation. Otherwise you run the risk that the examiners will sidetrack you with questions before you have a chance to show your hand.
- Tell the examiners whether you have addressed an issue, solved a practical problem, extended the reach of a method, proved a theorem, analyzed some data, devised an experiment, or whatever. That way they will know what sort of work you have done, and more importantly, they will know that you know too.
- Situate your work. Explain how it fits in with your field hierarchically, historically, and geographically.
- Provide a logo and a slogan that can help your listeners to mentally index and retrieve you and your ideas.
- Provide a one-page summary handout. It will help prevent the examiners from going off on a tangent, and if they do, they will still have a record of what you wanted to say.
- Memorize a few key sentences. You want to get the beauty out beautifully.
- Sit down. If you are nervous, and there is a chair with a table handy, use them.
- Try to convey a sense of quiet confidence in what you have done. Avoid extreme arrogance. Absolutely, positively, avoid timidity.

Answering Questions

- Talk. Usually someone will warn you if you are wandering off the track if they know you are.
- Confess. If you are absolutely stuck, say so. Usually someone will give you a hint or get you off the hook through a new line of questioning. Do not confuse confession with apology, however.
- Exhibit a knowledge of standard problem solving heuristics, mentioning the ones you are trying. Simplify the problem. Try working out a special case first. Draw a diagram. Specify an analogy. List the assumptions. List the ideas and tools that seem relevant.