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Beyond Lecturing

By JAMES M. LANG

ON COURSE

Advice on teaching in the college classroom.

Raise your hand if you've had the following experience.

You spend a week lecturing students on course content, and their nodding heads and furious note-taking throughout suggest that they are tracking along. At the end of the unit you give them a homework assignment or an exam designed to test their ability to apply the principles you have taught them in a new context -- an important measure of whether they have really learned the material, versus simply memorizing facts and figures.

As you grade their work, and are dismayed at the results, the sinking feeling in your stomach churns its way into anger: We spent a week on this, and nobody had any questions. If they sat there nodding like they understood the material, why can't they solve these problems? In your anger and despondency, you draw one of three conclusions:

- A. Students these days are dumb and getting dumber.
- B. It's time to pack in the Powerpoint and take that stress-free job you have always wanted trading stocks in the corporate world.
- C. Maybe, if you try it again next semester, it will work a lot better.

(I'll confess that my hand is raised and waving wildly at the moment.)

The correct answer, of course, is:

- D. You need to step out from behind the podium on a regular basis and ensure that your students are doing more than listening to lectures in your classroom.

Anytime I have seen answer D proposed to faculty members -- the vast majority of whom do at least some lecturing in the classroom -- a chorus of angry responses follows, defending the art of lecturing and denouncing efforts to eliminate it from the classroom. After all, professors have been lecturing for as long as academe has been around. Most of

us learned from a previous generation of lecturers, and many students are still learning from lectures.

True enough, and I am not suggesting they be eliminated. I believe lectures have an important place in the classroom, I lecture in my own courses, and I enjoy listening to lectures.

But I am going to argue that lecturing should never constitute the sole teaching technique in a course, or even perhaps the dominant one. More generally, I would argue that no single teaching technique should constitute the sole pedagogical method in the classroom, and that the most effective teachers are those who use multiple approaches: lecturing, group discussion, problem-solving sessions, small-group work, and more.

We all probably preferred one method of teaching when we were students -- and for many of us who went on to advanced degrees, we preferred reading on our own and listening to lectures -- but we also know that we can't generalize universally from our own experience. What worked for you might not work for all of your students, and the best solution to that problem is to vary your teaching methods, to ensure that as many students as possible can connect with the material in some way.

Lecture remains the dominant or exclusive mode of teaching in many college classrooms today, which is the only reason I'm picking on it -- if we all taught in small groups, I would argue just as vehemently for us to bust up those groups on a regular basis and get back behind that podium. Every teaching method carries with it inherent problems, which is why we have no universal teaching format, for good or ill.

You can discover the problems with lecturing from even the briefest glance at the extensive body of research that has been done on learning and lecturing.

McKeachie's Teaching Tips, by Wilbert McKeachie, a classic guide for new teachers which has gone through many editions (I'm quoting here from my battered copy of the ninth), describes the most commonly cited fact about lectures: Research has found that after a lecture "students recalled 70 percent of the material covered in the first 10 minutes, and only 20 percent of the material covered in the last 10 minutes" (so if you insist on continuing to lecture all the time, make sure you speak *really loudly* during the last 10 minutes).

One study found that if a professor speaks 150 words a minute, students hear about 50 of them; another study determined that students are tuned out of a 50-minute lecture around 40 percent of the time.

The problems caused by *not* lecturing, though, might be equally troublesome. Students need a strong factual and conceptual foundation in order to work effectively in groups or hold intelligent discussions or solve problems, and lectures may build that foundation more effectively than textbooks. Most lectures function to provide the course content, which students won't get as easily from a discussion, or some other more interactive

teaching method. I hear this objection especially from scientists, for whom the complexity of their material -- and the scientific illiteracy of many students today -- necessitates time covering course content through lectures.

So I looked around to see whether I could find a scientist who had discovered a method for moving beyond lecturing alone, and I found one in the September 2005 issue of the *Journal of College Science Teaching*.

T. Michelle Jones-Wilson teaches biochemistry at East Stroudsburg University of Pennsylvania, and shared her experiences with integrating other teaching techniques into the lecture in an article entitled "Teaching Problem-Solving Skills Without Sacrificing Course Content: Marrying Traditional Lecture and Active Learning in an Organic Chemistry Class."

She began rethinking the role of lectures in her teaching soon after her first semester in the classroom, when she was teaching organic chemistry at Ashland University and found herself distressed by the results. During her lectures, she writes, "students appeared to understand the material. However, their homework problems, quizzes, and exams showed a general lack of root comprehension. The average student was able to mimic sample problems but did not have the ability to apply the ideas to new problems or situations."

Her diagnosis? In the lecture-only model, "comprehension lies outside of the classroom." Students develop true comprehension, she argues, when they apply the concepts to solve problems or answer questions, and in the traditional lecture classroom that happens outside of the classroom, when the instructor is not available to help or give feedback.

So she designed a new format that she uses in many of her classes. The students read the material in advance and class time begins with what she calls a "highlights" lecture for the first 20 minutes. Students then break into groups of three to five to work on the assigned homework problems, while Jones-Wilson circulates and offers help when needed (the problems are too complex for the students to finish in class); at the end of the session, she reconvenes the class to address common problems through a closing lecture segment.

In the four semesters following her shift to that new format, she has found that mean percentile scores on a standardized organic-chemistry test have increased by as much as 27 points. She also found that she could actually cover more material than she had when she relied on lecture alone, and her student evaluations improved.

Perhaps most telling, she notes, when she had to cancel a class unexpectedly, she learned later that more than half the class had showed up anyway to work on the homework problems in groups.

If students are showing up to your classes even when they know you're not coming, stick with it -- you're doing something right. Otherwise, consider an alternative like the one

Jones-Wilson describes, or find your own ways to break the exclusive hold lecture has on your classroom.

A Brief Follow-Up

I had several responses from readers of [last month's column](#) on "the promising syllabus" who offered alternatives to the practice of reading aloud the syllabus on the first day of class. Apparently, many faculty members find that as boring as I do, and -- rather than simply complain about it, as I did -- they have hit upon interesting alternatives.

One technique I really liked and plan to use in my own courses, came from Michael Gennert, chairman of the computer-science department at Worcester Polytechnic Institute. He described his opening class in this way: "I usually hand out a course description sheet that includes what the course covers, the required background, instructor and TA office hours, labs, homework and project expectations, exam dates, grading policy, and honesty policy. Then I tell students to find a partner -- and wait for them to do so, because someone is going to want to be a loner -- and ask them to work together to find three questions they want to know about the course that aren't on the sheet. Then I ask for, and try to answer, their questions."

The benefits, he continues, are multiple: "They're awake, working collaboratively, taking responsibility for asking something, talking to each other and me, and engaged."

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