

10/26/05

Guest speaker: Michelle Mischke

S: How to choose material to cover?

MM: Previous experience of seminar participants?—Mostly TAing.

Why/how is it likely to be different in the future? Probably more freedom, but there are still likely to be guidelines.

Advice: teach by the guidelines first. You can't know what students don't know until you teach and ask questions of many students many times. This is worse than catch 22. Not clear how to solve this.

Try to ask students questions from many different directions.

It is hard to get to the question that opens up the can of worms. It is also hard to keep at it if students give a sign of you being irritating.

For example, how would you choose material for 7.01?

S1: Ask yourself what you want students to get out of the course (e.g. strong Mo Bio or the ability to understand and criticize science reporting on CNN).

S2: Central ideas (e.g. structure/function).

S3: Start with an outline of topics. Narrow it down within each subject area.

S4: There are two issues: bio majors need material that would keep the course interesting, while for the students who are taking the course purely because it is a requirement, a good overview is more important. So have to balance breadth and depth.

S5: Depends on what kind of a class we are trying to design (e.g. molecular vs. organismal vs. human) → start with a list of concepts and weed it down to a reasonable list.

S6: Spend the first week figuring out what students know vs. what need to teach.

S1: Should we have two courses? The course for majors would have more depth, while the course for those who are just fulfilling a requirement would have less depth. The problem is that this may leave out people who could have become majors with more exposure.

MM: Would you have different intro classes for majors and non-majors?

S7: For the non-majors course could do more real-world applications (e.g. Atkins diet, getting tired when exercising).

S6: For non-majors can take out details they don't need, like the names of the enzymes.

S5: The things everyone has just proposed would make class more interesting → would help majors as well.

S2: Majors need terminology.

MM: Do they?

After thinking about this for a long time, come to believe that it's a disservice to separate majors from non-majors. If need to separate, maybe separate by background.

Goal for the intro class—get concepts in place, separate from the terminology. Fill that in as needed. This falls apart when you have students with advanced backgrounds.

But, for everyone else, when talking to students, force them to use proper names. We are teaching a foreign language, and the key to that is practice. Make sure to work on the words after they've got the concept out.

An interesting case of this is Eric Lander. He leaves out a lot of details. Turns out the details don't need to be there for major concepts.

We focus on details because for us details make biology come alive. But they are not essential for major points.

This skill is hard to build, like learning to edit a paper. Can give details to interested/advanced students to make it interesting.

S1: For non-majors, how do you create interest in the more technical topics, like gene regulation?

MM: Hooks can be found on the web. They tend to come from the K-12 teachers, not college.

On a related topic, MIT courses are independent of the textbook. This is good, but a teacher of a course needs to consider whether there is textbook support. (This is a problem in 7.01, 7.03, grad genetics.)

****Introductions****

****Questions:****

S2: How to juggle what information you want to give them and the students' need to get a grade/pass an exam?

MM: Instructors have less of a problem with this because we are in charge of writing the exam.

S6: Are there problems with grading exams?

MM: Not a problem. Know what kinds of questions will give a distribution in terms of degrees of understanding. Follow up with disgruntled students by asking a similar question.

S4: In the exam writing, how do you balance depth vs. ease of grading?

MM: Work with TAs on the exams.

S1: How much control do the instructors actually have?

MM: This depends on the lecturers.

S5: How do you give a lecture so that students participate? How does it differ for different class sizes?

MM: With 3 students it doesn't matter if someone talks too much.

With 10, it's hard.

With 20 it's like a section. For example, you can stand such that a talker is behind you, so that you can't see them.

With 400, it's a question. You can talk on some students who you know. This format grows in participation. You can also use buzz groups.

S7: What about PRSs?

MM: They are good, if you have them.

S6: What are the differences between HS and college?

MM: Group size. Also, college kids are worried about what's on the test. They don't have much time to hang out and talk about interesting stuff. Middle school kids are the best. HS and college kids are afraid to look like they don't know something.

Q: Is this true for discussion groups?

MM: Yes. Also afraid to look stupid in front of discussion leaders, or in front of each other. They are afraid to guess and put themselves on the line.

Q: What's your view on teaching old experiments?

MM: Depends on what you are trying to accomplish. Some demonstrate concepts very well.

S2: What do you think of bio (or other classes) as a graduation requirement?

MM: Bio is more important as a req than physics.

S4: In terms of APBio vs. 7.01x, there is certainly value in learning it the MIT way.