

# Random Thoughts . . .

## YOU GOT QUESTIONS, WE GOT ANSWERS

### 1. Miscellaneous Issues

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**E**arly in 2012 we had the pleasure of giving a teaching workshop at New Mexico State University, where Tara Gray has created the most extensive and widely attended faculty development program we have seen. After the workshop, Tara organized a group of attendees who over a five-week period read some of our papers and formulated questions about them, starting with “The Top Ten Worst Teaching Mistakes”<sup>[1]</sup> and “Death by PowerPoint.”<sup>[2]</sup> The questions that follow were stimulated by those readings.

#### 1. *My teaching preparation takes a lot of time. How do I keep it from getting in the way of my research without sacrificing teaching quality?*

Make sure you’re not overpreparing. *Your target should be two hours of preparation for each hour of class.* If it’s taking you much more than that, you’re probably trying to jam too much information into your notes, which you then have to pump out like a fire hose in lectures to get through your syllabus. You consequently have no time for questions, interesting digressions, and activities; the course is ineffective; your evaluations are low; and you spend so much time preparing your lectures that little is left over for doing research (not to mention having a life). A much better approach is to write a comprehensive set of learning objectives, make sure your lecture notes contain only the material the students will need to know to meet the objectives, and provide supplementary references so the ones who want more information know where to go for it.

The first time you teach a course you’ll almost certainly have trouble consistently meeting the 2/1 rule of thumb, and you may sometimes push up to 3/1 or 4/1, which is acceptable. If it’s much more than that, however, you’ll need to back off to keep your research on track. For suggestions on

minimizing the time burden of new course preparations, see “How to prepare new courses without losing your sanity.”<sup>[3]</sup>

#### 2. *What advice do you have for integrating course handouts and class activities with PowerPoint slides?*

Rich’s course handouts—which the students buy as a coursepack after he has taught the course several times—contain his lecture notes with gaps at strategically chosen points, supplemented by figures, tables, and reference lists. The gaps may be skipped steps in derivations and problem solutions, axes without curves, and questions with blank spaces for answers. He has the class read straightforward parts of the notes themselves, which they can do much faster than it would take

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him to go through those parts on the board or in slides, and when he gets to the gaps he either lectures on them or (better) has the students work individually or in small groups to fill them in.<sup>[4]</sup> All he ever does with slides are things he can't do any other way, such as showing pictures, complex diagrams, animations, and links to videos and simulations, but slides may also be used effectively to highlight main points.

### 3. *How do you maintain both structure and variety?*

They're not incompatible. Your course outline should be highly structured, so that you know what learning objectives you'll be addressing and what content you want to cover at each stage of the course. You can then provide variety in how you cover it, using a blend of lecturing, individual activities, and group activities in class, and a mixture of closed-ended and open-ended problems, brainstorming, troubleshooting, and critical and creative thinking exercises in class activities and assignments and on tests.

### 4. *What suggestions do you have for faculty who want to establish relevance in their classes?*

Stay with that goal! Relevance is critical to the success of a course. If students can't relate course material to things that interest them or the careers they're preparing themselves for, only the ones motivated primarily by grades will do their best to learn it, and the course will be ineffective for others with just as much ability.

To help your students see the relevance of course material, you first need to figure it out for yourself. Before you launch into a long theoretical or analytical or memory-intensive presentation, ask yourself how you would answer a student who asks "Why should I care about this stuff?" What important engineering or scientific or social problems will the material help them solve? What familiar phenomena does it explain? What disasters might have been averted if it had been used? And so on. If you can't think of anything, ask colleagues. When you have answers, present them in class before you start on the material, and keep referring back to them as you proceed. If neither you nor your colleagues can think of a thing that makes material relevant to students' interests or goals, why are you teaching it?

### 5. *What do you do when you try something new and it doesn't work?*

First, congratulate yourself for having the guts to try something new—many faculty members never do—and then try to figure out what went wrong and what you could do differently to make it work better. Next, go to a colleague who is an excellent teacher or to someone in your Teaching and Learning Center, discuss the situation, and get his or her ideas and incorporate them if they make sense to you. Finally, take

whatever you end up with and put it in your lecture notes so you don't repeat your mistakes next time you teach.

### 6. *When students need to learn a lot of terminology and other basic facts, what instructional or teaching method would you recommend?*

Give the students a study guide for the test on that material and list the terms and facts they'll need to learn from their texts or course handouts, and ask for definitions and explanations of some of those terms and facts on a closed-book portion of the test. Once you've handed out the study guide, you don't have to waste a lot of class time droning through the definitions, and you can use the time you save to go through higher-level material in lectures and provide practice and feedback in activities. Before the test, you might also form teams and run a Jeopardy or Quiz Bowl contest with the material in question as the subject matter.

### 7. *What suggestions do you have for new faculty with multiple new courses and insufficient time to prepare them?*

Remind your department head of all the proposals and papers you're trying to write and ask to get your schedule changed so you can teach courses you've previously taught or multiple sections of one new course instead of all those new preps. He or she may say no, but it doesn't hurt to ask. Then, read Reference 3. One of the suggestions in it is to go to a colleague who is a good teacher and has taught one of your new preps and ask if he or she would be willing to share the course materials (syllabus, lecture notes, assignments, tests, ...) with you. The answer will almost invariably be yes. You can use those materials as a starting point for constructing your own, which will cut down significantly on your preparation time. If you're really desperate, you can use the materials with only minor changes the first time you teach the course and start making serious revisions later when you have a little more breathing space.

Questions about other papers in the NMSU reading list will appear in future columns.

## References

1. Felder, R.M., and R. Brent, "The top ten worst teaching mistakes. (a) Mistakes 5-10," *Chem. Eng. Ed.*, **42**(4), 201 (2008), <[www.ncsu.edu/felder-public/Columns/BadIdeasI.pdf](http://www.ncsu.edu/felder-public/Columns/BadIdeasI.pdf)>; (b) "Mistakes 1-4," *Chem. Eng. Ed.*, **43**(1), 15 (2009), <[www.ncsu.edu/felder-public/Columns/BadIdeasII.pdf](http://www.ncsu.edu/felder-public/Columns/BadIdeasII.pdf)>
2. Felder, R.M., and R. Brent, "Death by PowerPoint," *Chem. Eng. Ed.*, **39**(1), 28 (2005), <[www.ncsu.edu/felder-public/Columns/PowerPoint.pdf](http://www.ncsu.edu/felder-public/Columns/PowerPoint.pdf)>
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4. Felder, R.M., and R. Brent, "Active learning: An introduction," *ASQ Higher Education Brief*, **2**(4), August 2009, <[www.ncsu.edu/felder-public/Papers/ALpaper\(ASQ\).pdf](http://www.ncsu.edu/felder-public/Papers/ALpaper(ASQ).pdf)> □

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