What Is the Most Difficult Step We Must Take to Become Great Teachers?

Craig Nelson
Indiana University

Although I have known many quite good teachers, I would only regard a couple of them as truly great. One of these, Tracy Sonneborn, once said of research that it was the closest thing he knew to prolonged orgasm and that as soon as he found anything that was more fun, he was going to switch. Tracy’s guest presentations in my classes brought such a gripping intensity and evocation of insight to the classroom that it seemed as if the students were suspended a few inches above their seats.

Tracy’s comment is core to what has been for me the greatest paradox in learning to teach better. I regard the content I choose to teach as mostly quite fascinating, very exciting and fundamentally important. And it seems to me that this sense of fascination, excitement and importance is the core of much of what students respond to most positively in my teaching. But they are also the core of the biggest problem I have had to struggle with in my teaching—the tendency to try to teach much more than can be learned and, thereby, to also lose the students so deeply among the details that they fail to grasp the larger picture. In much of academia, a tendency to try to cover too much is encapsulated in traditional curricula and courses—in the academic cultures we are inducted into as part of our undergraduate and graduate training.

Bulimic Learning

Because we find the material so fascinating and important we often learn it ourselves almost instantaneously and may have trouble recognizing the extent to which we “cover” too much content. Because we find the material so fascinating and important we often learn it ourselves almost instantaneously and may have trouble recognizing the extent to which we “cover” too much content.

learning, in fact shocking, result . . . was that the majors completing their course did not perform significantly better than the corresponding cohort of nonmajors” (M.D. Sundberg and M.L. Dini. 1993. “Science Majors v Nonmajors: Is There a Difference?” Journal of College Science Teaching, Mar/Apr 1993: 299-304). They suggest that we should reduce the information density in majors courses so that it matches which that we have usually regarded as appropriate only for nonmajors. Similarly, Russell, et al., compared lectures in which 90% v 70% v 50% of the sentences disseminated new information (remaining time in each case was used for restating, highlighting significance, giving more examples, and relating the material to the student’s prior experience). Students given the lower level of new content learned and retained the lecture information better (I.J. Russell, W.D. Hendricson & R.J. Herbert. 1984. “Effects of Lecture Information Density on Medical Student Achievement.” Journal of Medical Education 59: 881-889).

I have found it hard to fully implement the obvious conclusion because that means letting go of much of the content that I love so dearly.

However, a similar conclusion, “less is more,” follows from much of the other scholarship of teaching and learning. For example, if students learn more when we incorporate active learning into our lecture periods or replace the lectures with active learning classes, then we obviously must cover less material in order to teach more (I summarized key pieces of this literature here earlier, NTTF 10(1): 7-8). Similarly, if we are to concentrate on higher order critical thinking, as I advocated here
previously (NTLF9(5): 7-8), we have to reduce coverage to allow time for thinking. And to get effective commitment, we may have to use cases or even service learning—an approach well exemplified by Jane Harris Aiken’s “Striving to Teach ‘Justice, Fairness and Morality’” (1997, Clinical Law Review 4: 1-64; see my summary here earlier, NTLF 10(2): 10-11).

**Tools to Help Restrain Coverage**

I have developed a few tools that help me do this. One is to use reading study guides. When I assign a chapter or article, I usually write out the key questions I would like the students to be able to answer as a result of doing the reading. This is helpful in several ways. First, chapters in texts often cover much more material than students can meaningfully learn—I didn’t realize this clearly until I found that I could write as many as 150 short essay questions from some single chapters I was assigning. This caused me to ask what, exactly, I wanted the students to get.

The typical way to constrain the scope of the content in many fields is to limit exams to the material that the teacher can articulate in lectures. This leads to rapid delivery, to high densities of sentences that disseminate new information (compare above) and to a tendency to allow little or no time for processing or questions. Giving the students a selective set of questions over the readings and telling them that the relevant questions on the exam will be drawn from among those questions means that I only need to treat in class those aspects of that material that are difficult for the students to learn directly from the reading. The study questions also facilitate effective small-group studying outside of class.

A second powerful technique is to explicitly designate one of the class periods each week for extended, structured, small-group work. This requires me to select particular material, readings, exercises, problems or cases for deeper processing.

I also have found it very useful to explain to other faculty what I am trying to do and the extent to which I do or do not have any evidence of how it is working. This is often most useful with faculty from other areas, as they are more likely to ask questions that reveal my tacit assumptions.

**Focusing on Process**

My encounters with my colleague Tracy Sonneborn’s teaching arose from a case where I was presenting the results of one of his elegant studies of multiple sexes in protozoa (where mating type A can mate with B, or C, or ... but not with other A). I asked him if he could come to my class to present his own work for as little time as he wanted to give. He said that he was too busy, as it would take him a whole day to prepare. I emphasized that I didn’t need a literature review, just a quick summary of one nice study.

He said that I didn’t understand, that it would take him a day to prepare, but that (to get me out of his way) he would do it next year. I remembered and, although he protested again about the day of preparation, he came to class.

Rather than presenting the final elegant experiment and its results (which usually had taken me about 10-15 minutes in class), he started with what they had known initially and asked the students what they would have hypothesized and what experiment they would have designed.

He then agreed and presented the results of that experiment. He noted that the results did not support the hypothesis but did provide new information and asked what they would now hypothesize and how they would test the new hypothesis. This continued for several rounds until a hypothesis emerged that was supported by the data (and eventually published). In 75 minutes he interactively taught about 15 minutes worth of conclusion and more than 75 minutes on the process of science! Funny thing—the process was much more exciting than the conclusion.

Another funny thing—Tracy’s course for nonmajors had a reputation for stealing the best majors from other departments and converting them to biology majors. Maybe there is another way to use our enthusiasm than to dump vast quantities of conclusions on the students?

Contact:

Craig E. Nelson  
Biology, Jordan Hall 142  
1001 E. 3rd St.  
Indiana University  
Bloomington, IN 47405-3700  
Telephone: (812) 855-1345  
E-mail: nelson1@indiana.edu

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