Teaching Philosophy – Jay H. Beder

Teaching mathematics poses special problems. Its apparent rigidity, its abstractness, its intolerance of error all contribute to the student's perception that the subject is unmanageable, that it has no room for creativity, and that it has no connection to the his or her life. Statistics, which is my specialty, holds further challenges. It has a reputation for being dull and lacking in intellectual content.

I will try to describe briefly some ideas which guide my teaching, although they have the same relation to what I do in the classroom as a musical score has to an actual performance. What really transpires in my classroom – and probably in any good classroom – is a kind of controlled improvisation.

Respect. It is an absolutely fundamental principle that all students are worthy of respect. This does *not* mean that I do not judge their work, even harshly. But I endeavor to express my judgment only through the grades I give, and to grade fairly and objectively.

About errors. I try to create a classroom in which questions and comments are encouraged. In particular, I treat errors with the greatest respect, as they are the door through which learning proceeds.

I believe that every error has within it a kernel of truth. My goal is not simply to eliminate errors from the students' intellectual repertoire, but to do so without causing them to doubt everything they know.

Students are not the only ones who make mistakes. I make lots of them. Many – perhaps most – I can parlay into teaching tools. It is a feather in a student's cap when he or she can catch me in an error, and it is often a dramatic moment for learning, not only for that student but for the class. Moreover, it shows that mistakes are acceptable and natural and do not call forth harsh judgment.

Beginning with an example. The bulk of my preparation time is involved in picking the right example – one that clearly illustrates the important issues but that does not contain too many extraneous details. By opening a topic with an example, I have prepared the student to hear a more abstract formulation of the problem and to accept new terminology. The best kind of example raises a question which (a) is reasonably compelling and (b) cannot be answered with what the student already knows.

I do not follow this procedure slavishly – sometimes it is possible, even most efficient, to jump in with a definition or principle and to follow it with illustrations. This is a judgment I must make. Certainly in higher-level classes a more abstract approach can be very effective.

The Socratic method. I use this for a very practical reason. The key issue in all my courses is not "can they follow what I do?" but rather "can they pull their own rabbit out of the hat?"

Solving a mathematical problem is a bootstrap operation. It requires a willingness to grope in the dark, to try things which may not work, to sit and ponder and guess. Even at the most elementary levels, a problem may require moving from each step to the next with no assurance that one is on the right path. My role in this respect is to get students themselves to suggest the next step – whatever it may be.

I have even adjusted my blackboard technique so that what students copy down in their notes will reflect the actual process of solution rather than "the answer."

Telling a story. Every mathematical technique was developed as a response to a problem. Ideas and themes recur in unexpected ways. This is a "higher-level" aspect of the material that creates a sense of cohesiveness to the subject, makes it compelling, and gives the student a sense that the time spent sitting in the classroom will be time well spent and even enjoyable.