What Is the First Step We Should Take to Become Great Teachers?

Craig Nelson
Indiana University

What does the scholarship of teaching suggest one should do to become a great teacher, assuming one has already mastered the content and the basic mechanics of teaching? A number of studies suggest that structured student-student learning may be the single most powerful tool we have for increasing achievement as well as equity and enthusiasm. These studies also illustrate a wide array of approaches to the scholarship of teaching and learning. L. Springer, M. E. Stanne and S.S. Donovan recently published their review, "Effects of Small-Group Learning on Undergraduates in Science, Mathematics, Engineering and Technology, A Meta-Analysis" (1997, National Institute for Science Education, University of Wisconsin, www.wcer.wisc.edu/nise/CL1/CL/ resource/scismet.htm). The average effect on achievement would move a student from the 50th percentile to the 70th percentile on a standardized test. The mean effect on persistence was sufficient to reduce attrition by 22%, with even greater effects on students' attitudes.

Similarly, R. Hake found that structured student-student interaction was sufficient in physics to approximately double the amount of Newtonian physics mastered in introductory courses across a wide array of institutions, from high schools to Harvard (R. R. Hake, 1998, "Interactive Engagement vs Traditional Methods: A Six-thousand-student Survey of Mechanics Test Data for Introductory Physics Courses," American Journal of Physics 66:64-74; www.physics.indiana.edu/~hake/index.html under SD1 labs). Most impressively, no lecturer matched the average gain achieved by courses that included at least some such interaction. Two more studies will suffice to make the point. (Numerous citations from a variety of disciplines are given by B. J. Millis and P. G. Cottrell, Jr., 1998, Cooperative Learning For Higher Education Faculty, Oryx.) T. A. Angelo and K. P. Cross report a calculus course in which writing and structured discussion were able to eliminate totally the grade of F with no reduction in standards (1998, in Classroom Assessment Techniques, 2nd Ed., Jossey-Bass; see www.psu.edu/celt/CATS.html for a quick introduction to "CATs," and NTIF V7N5's "Virtual Companion" http://www.ntif.com/html/sf/vc75.htm for a note on "Techno-CATs"). An economist reported similar results to me—no F's in three years with the students assessed against nine other sections using common mid-term and final exams. Finally, U. Treisman found that he could reduce the D and F rate for African-Americans in calculus to about 4% with heavily structured interaction, again with no reduction in standards (1992, "Studying Students Studying Calculus: A Look at the Lives of Minority Mathematics Students in College," College Mathematics Journal 23:362-372).

A number of studies suggest that structured student-student learning may be the single most powerful tool we have for increasing achievement as well as equity and enthusiasm.

For them to discuss (and builds into the wrong answers many of the ways he knows that some will have misunderstood). Structure both allows the students to focus effectively and keeps them from prematurely deciding that “nope, I don’t have any questions—it all seems pretty clear.”

Teacher’s Responsibility #3: Student Participation

Finally, it is important for faculty to take responsibility for making sure that every student participates usefully in the discussion. For two or three minute sessions, having them talk with their neighbors will usually suffice. For longer sessions, I like to make the group responsible for finding out what each person wrote down (or now thinks).

In closing, let’s look at the array of kinds of scholarship of teaching and learning represented by these reports of classroom experience. The