Effective Teaching

Academic Career Workshop for Underrepresented Participants

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Chicago, IL

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Effective Teaching Starter Questions

- What's your teaching load?
  - What if you work extra? (more pay, semesters off, etc)

- What classes do you typically teach?
  - Do you get a choice?

- Who is your audience?
  - Do they want to be there?

- What curriculum development have you done?
  - How did that go and what did you learn?

- How you balance (and connect) your research and teaching?

- What professional development have you had directly connected with teaching?

- What crucial "teaching tips" have you found valuable?
Background & Setup

- I was just like you, once!
  - Fall 1992, I was a first-time EECS GSI @ Cal
  - I was bitten by the bug

- I joined Cal faculty in 2000
  - I received “lecturer tenure”, or “security of employment” in 2006, Senior in 2012 and ACM Distinguished Educator in 2013

- Summarizing all the lessons I’ve learned into 10 minutes is very hard!!
  - I’ll go through as many as I can…
Thanks tons to thirty terrific TAs…

TWENTY TIME-TESTED, THREE-WORD TEACHING TIPS
Before the Semester

- Share mutual expectations
- Know the material
- “How Children Fail”
During the Semester (1/4)

- Preparation, preparation, preparation
- Handouts, handouts, handouts
- Know your audience

- Piaget’s adaptation
  - Assimilation
  - Accommodation

Garcia © UCB
During the Semester (2/4)

- Bloom: Tutoring + Mastery
- Get regular feedback
- Give regular feedback

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The 2 Sigma Problem: The Search for Methods of Group Instruction as Effective as One-to-One Tutoring

Benjamin S. Bloom
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Two University of Chicago doctoral students in education, Garcia (1982, 1983) and Burke (1984), completed dissertations in which they compared student learning under the following three conditions of instruction:

1. Conventional. Students learn the subject matter in a class with about 30 students per teacher. Tests are given periodically for marking the students.
2. Mastery Learning. Students learn the subject matter in a class with about 30 students per teacher. The instruction is the same as in the conventional class, except for the contents. Formative tests (the same tests used for the conventional group) were given for feedback, followed by corrective procedures and parallel formative tests for students with special difficulties. The test to determine the extent to which the students have mastered the subject was given periodically.
3. Tutoring. Students learn the subject matter with a good tutor for each student (or for two or three students simultaneously). Tutoring instruction is followed periodically by formative tests, feedback, corrective procedures, and parallel formative tests as in the mastery-learning classes. It should be pointed out that the need for corrective work under tutoring is very small.

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The students were randomly assigned to the three learning conditions, and received aptitude tests, scores, previous achievement in the subject, and initial attitudes and interests in the subject were similar. The amount of time for interaction was the same in all three groups except for the corrective work in the mastery-learning and tutor groups. Burke (1984) and Garcia (1982, 1983) replicated the study with four different samples of students at grades four, five, and eight and with two different subject matters, Probability and Cartography. In each sub-study, the instructional treatment was limited to 11 periods of instruction over a 5-week block of time. Most striking were the differences in final achievement measured by the conventional tests and the tests of the remedial group. Using the standard deviation (SD) of the remedial group as the norm, it was typically found that the average student under tutoring was about two standard deviations above the average of the control class (the average tutored student was above 98% of the students in the control class). The average student under mastery learning was about one standard deviation above the average of the control class (the average student tutoring was above 85% of the students in the control class). The variation of the students’ achievement also changed under these learning conditions such that about 99% of the tutored students and 75% of the mastery learning students attained the level of summative achievement reached by only the highest 30% of the students under conventional instructional conditions (see Figure 1.)

There were corresponding changes in students’ time on task in the classroom (65% under conventional instruction, 75% under mastery learning, and 90% under tutoring) and in students’ attitudes and interests (least positive under conventional instruction and most positive under tutoring). There were great reductions in the relations between prior measures (aptitude or achievement) and the summative achievement measures. Typically, the aptitude/achievement correlations changed from +.60 under conventional to +.30 under mastery learning and +.20 under tutoring. It is recognized that the correlations for the mastery learning and tutoring groups were so low that any meaningful interpretation of the aptitude/achievement correlations would be meaningless. The average score under these learning conditions was generally the same.

The findings are that under the best learning conditions we can devise (tutoring), the average student is 2-3 sigmas above the average control student taught under conventional group methods of instruction.

The tutoring process demonstrates that most of the students do have the potential to reach this high level of learning. I believe an important task of research and instruction is to seek ways of accomplishing this under more practical and realistic conditions than the one-to-one tutoring, which is too costly for most societies to use on a large scale. This is the “2 sigma” problem. Can researchers and teachers devise teaching-learning conditions that will enable the majority of students under group instruction to...
During the Semester (3/4)

- Recycle great ideas
- People learn differently
- Let students drive
- Find your voice
During the Semester (4/4)

- Make it fun
- Don’t just lecture
- Nurture “Learning Community”
- Nothing beats enthusiasm
After the Semester

- Consider teaching career!
- Love your job
- Mantra: “Lifelong Learning”
“And in Conclusion…”

- Teaching: honor & privilege!

- Will you carry the torch of inspiring teaching to your students?
  - Yes you will … good luck!!