

7.391 Concept-Centered Teaching Semester I

Discussion Day 1: February 15, 2006

Discussion Groups

1. Choice of 7.014 or 7.02
2. What time you would like to hold your discussion group?
3. Discuss pairing with mentor from last semester.
 - a. They will more than likely email you or meet you briefly before the first meeting
 - b. They have all run their own groups last semester
 - c. They will help with material review AND give you feedback in terms of what is working and what is not working.
 - d. They will help guide you as to HOW to teach concepts.

Activity

- Ask the students to brainstorm a list of individuals they would want included on a undergraduate biology curriculum panel
- Compare and contrast their list and the panel involved in Bio2010
- Discuss the pros and cons of each individual

Reforming Undergraduate Biology Education

I. Philosophies about the role of undergraduate biology

1. Why do students take introductory biology?
2. Should students be required to take introductory biology?
3. What do we want our students to get out of a introductory biology course?
4. How can we design a curriculum that fulfills these goals?

II. Bio2010

1. What are the proposed reforms set forth by the committee? How realistic are these goals?
2. Do you see any of the changes as more important than any of the others? Which ones and why?

3. Do you think the reforms proposed by the committee are applicable to other sciences besides biology?
4. What progress, if any, has been made already to achieve the proposed reforms?

III. Student Discussion Questions

1. Is an interdisciplinary approach to biology actually useful? How much math (calculus), physics and chemistry do students actually need?
2. Where does the pressure for teaching to MCATs come from? How does requiring a more quantitative biological approach fail to prepare students for MCATs? Should there be a separate track for pre-med students? Should the MCAT requirements change?
3. How can professors present scientific history so that the students find it accessible, i.e. the problems and people involved seem real enough to engage the students?
4. Other countries have integrated science programs that teach chemistry, physics, and biology all at the same time in high schools. Do you think this method is better or worse than that utilized in the United States? Why?
5. The College Board is attempting to redesign the AP Biology curricula to meet the reform guidelines. Is AP Biology an adequate replacement for college biology? Do you think changing AP Biology programs will affect mainstream biology? How would those changes help college preparation?
6. One of the recommendations of the committee is to engage students in independent research. How do we assure that financially disadvantaged students get equal access to research opportunities?
7. What is the difference between applied research knowledge (learning techniques and technologies) and basic fundamental knowledge of principles (learning facts and reasoning skills)? How should these be taught differently? What is the place of teaching techniques and "real-world" experiments in lecture courses? Should they be emphasized in introductory courses (at the possible expense of learning fundamental principles) or only in upper levels? In grad school?
9. How can life sciences majors acquire a much stronger foundation in the physical sciences than they now get? Is there enough room in the typical schedule of a life science major to take more courses?
10. As we all know at large research institutions, research will always be the first priority while teaching is often the last priority, how will these recommendations from the committee apply? The committee suggests that incentives should be put in place for faculty who are interested in improving teaching. Is this realistic for such

universities (when so much emphasis is put on research grants) and will it be easy to implement these incentives? Also vice versa, for small institutions with limited research opportunities.