CENTER FOR LEARNING & TEACHING

NEW CHALK TALK

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As "New Chalk Talk" resumes its biweekly newsletter, a warm welcome is extended to our new and returning faculty. We would also like to encourage your participation in the discourse about teaching at AUC, and your contribution to our newsletter with articles and/or suggestions.

Active Learning (1)
The Peer Instruction Method

Dr. Aziza Ellozy
Director, Center for Learning and Teaching

During this year's "Teaching at AUC" panel discussion at the faculty's "Newcomers' Orientation", the talk inevitably led to the challenge of involving and engaging our students in the process of learning. Dr Robert Switzer (Associate Prof. of English and Comparative Literature), specifically asked the panelists to share the insights that they may have, or methods that they use in class, which could transform our students from passive listeners to engaged, active learners. Implicit in the question is the recognition that lecturing alone is not sufficient to bring about "active learning."

Research on learning and teaching has shown that certain in-class teaching strategies lead to active learning. The next few "New Chalk Talk" issues will be devoted to those instructional strategies which could be integrated into the lecture.

I will start with E. Mazur's recognized "**Peer Instruction" (PI) method**, which he developed and successfully put into practice at Harvard University where he was teaching introductory Physics. The method has since been used very successfully by many instructors in the sciences. I myself used the method successfully in Organic Chemistry and core curriculum science courses and found it to be very effective. Once I tried it out, I could no longer return to the formal lecture approach.

Following is a description of the method in Mazur's own words:

"My students now read the material before class. To get them to do the reading, I begin each class with a **short reading quiz**. The lecture periods are then broken down into a series of digestible snippets of 10 to 15 minutes. Rather than regurgitating the text, I concentrate on the basic concepts and every 10 or 15 minutes I project a **"ConcepTest"** on the screen. These short conceptual questions generally require qualitative rather than quantitative answers. The students get one minute to think and choose an answer. They are also expected to record their confidence in their answer. After they record their answers, I ask the students to turn to their neighbors and to convince them of their logic. Chaos erupts as students engage in lively and usually uninhibited discussions of the question. I run up and down the aisles to participate in some of the discussions—to find out how students explain the correct answer in their own words and to find out what mistakes they make. After one or two minutes, I call time and ask students to record a revised answer and a revised confidence level. A show of hands then quickly reveals the percentage of correct answers. After the discussion, the number of correct answers and the confidence level typically rise dramatically. If I am not satisfied, I repeat the cycle with another question on the same subject. When the results indicate a mastery of the concept, I move on to the next subject." (Mazur, 1997)

In summary, the PI method

- limits lecturing to about 20 minutes (which is the attention span of most students as indicated by research)
- allows students to engage with the concepts, to discuss it with their peers and to evaluate their reasoning (all of which improve comprehension)
- serves as a class assessment technique which gives the students immediate feedback and the faculty the opportunity to address concerns immediately.

Although the method has been tested mostly in science teaching, it can be adapted to any discipline.

A library of thousands of ready made ConcepTests is available for physics, biology, chemistry, astronomy, mathematics and geology. For anyone interested, examples of Conceptests can be found at: http://galileo.harvard.edu/, or in a simple Google search by typing “Conceptests “.

Sources

1. Mazur, E. (1997) *Science Teaching Reconsidered - A Handbook*, Committee on Undergraduate Science Education, National Academy Press, Washington, DC.
   Also available on-line at http://ctl.stanford.edu/Tomprof/postings/149.html

2. Crouch, C.H., Fagen, A. P. and Mazur, E., (2002) *Peer Instruction: results from a range of Classrooms*, Phys. Teach., 40, 206-209
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   http://mazur-www.harvard.edu:16080/publications/Pub_286.pdf