Reading and Understanding the Scientific Literature: ACE 10 Course: Biochemistry 435 Advanced Topics

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Reading and Understanding the Scientific Literature

ACE 10 Course: Biochemistry 435 Advanced Topics
Edward N. Harris

Learning Objectives

Writing: Students will generally be writing in a scientific format for the first time. This may be very different from prior writing in the university. This will come from discussions in the classroom sessions and from feedback on the course paper chapters that are submitted during the progress of the course.

Oral Communication: This is reinforced by the presentation of relevant papers from the scientific literature during most of the class periods. Students need to learn to master the content of such papers, prioritize the important elements, and present them in a coherent fashion. The student effort receives intrinsic feedback during the process by questions and comments from the instructor and from the other students.

Critical Thinking: Critical thinking can only be done once a student has mastered a significant amount of foundational literature. Students at the start of the topic will have little ability to carry out critical thinking about the course theme. As students read more of the primary literature and seek out other references to flush out certain aspects and to reconcile contradictory reports, they will be encouraged to reflect on the epistemology of the conclusions.

Ethics: Each section of the class involves one class session related to an ethical issue. This usually involves a case study that is read prior to the class and a group discussion. In some cases, it is productive to have students attempt to present differing viewpoints, but in for other topics, students seem able to grasp the diverse social impacts.

How are the learning objectives embedded in the course? This course focuses on the broad discipline of biological chemistry that cuts across the various life science disciplines. Students receive a few lectures of introduction, and then start reading journal articles selected by the instructor. Then, most of the remainder of the semester is comprised of students searching the primary literature and collecting relevant articles with information to build a coherent paper that proposes the direction of future research in one aspect of the general topic. Students learn to make presentations of their selected papers and reflect on how the data reported represents an incremental increase in knowledge and understanding. The individual sections of this course are taught by different instructors, thus the topics do vary.

Broad range of topics for each section of BIOC435

Improving ACE 10 Learning

The Dept. of Biochemistry is always seeking to maintain a high quality of instruction with their undergraduates. The BIOC435 course was originally intended to expose students to the primary scientific peer-reviewed research articles and foster literacy across a broad range of topics. The observation from all of the instructors is that despite the core-curriculum from the prior 3 years of instruction, including ACE 1-9, student preparation for this course is quite variable. Several improvements have been made including:

- Teaching students how to read a research article: This means breaking the article apart with the students and putting the parts back together one at a time.
- Instruction of new material begins with reviewing some of the material that the students learned in BIOC431/432 for familiarity.
- The use of new teaching methods in the classroom such as Just-In-Time teaching (JITT) or peer instruction (PI)
- Development of BIOC205, a new pilot course for biochemistry majors that utilizes the scientific literature to demonstrate how basic research enhances human therapies.