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Teaching Philosophy

"Tell me and I'll forget. Show me and I'll remember. Involve me and I'll understand."

-Confucius

Student involvement and feedback are the cornerstones my teaching philosophy. As a teacher I try to not only impart the facts and rules of a subject to the student, but help them to build a set of skills they can use independently to solve problems. By teaching students to do more than just memorizing answers, they will be better prepared when they encounter chemical problems on an examination, in the laboratory, or on the job. Listening to a lecture in a classroom or auditorium does not actively impart the skills necessary to solve problems. I believe a multifaceted approach utilizing technological advancements and group problem sessions are a more effective way to achieve this goal.

Organic chemistry is a complex subject with its own language of nomenclature and mechanisms. It requires ability to draw and interpret molecular structures in both two and three dimensions. In these two aspects organic chemistry is like a language course, an art course, and a science course combined. Because of the complexity of concepts and structures, lectures alone are insufficient, as no two students learn in exactly the same manner. Some students require more in depth explanations while others need alternative ways to visualize the material under study.[1] I use computer-based technologies (PowerPoint, ChemDraw, course specific websites, etc.) to complement my lecture presentations as a method to better visualize important course content. This allows for the inclusion of 3D models and animation to further illustrate a concept, something that is nearly impossible to accomplish with a chalkboard.[2] As an educator I must continue to adapt to the way my students learn and not simply teach to the lowest common denominator.

I strive to help students build *problem-solving* skills, not simply by asking students memorize and regurgitate examples presented in lecture, but by applying earlier concepts to the current problem. I find it useful to take the time during lectures to set up a series of problems, such as the identification of an unknown structure via spectroscopic data, and work through the strategy I use for solving the problem. By doing this in a group setting, the instructor-student and student-student exchange of ideas and strategies can enhance the suite of tools that students can then use to approach other chemical problems of varying complexity.

One of the most powerful tools that can be used for teaching organic chemistry is laboratory experimentation. Experiments and in-class demonstrations when properly planned, give practical examples of the principles being taught in the course. Involving the students in these activities further reinforces their link to the subject matter and encourages them to understand the material at a level far above the lecture setting. The laboratory setting also allows for concepts from lecture to be revisited on a more individual level. I have had the pleasure on several occasions for students to be working in lab when they finally get something, or they grasp the practicality of material covered in lecture. It truly is a wonderful feeling to get such positive feedback from students.

By not simply *telling* the students the subject material, but by *showing* the students through well-prepared lectures and effective use of technology and, by *involving* the students through in

class problem sessions, demonstrations and laboratory experimentation, students will understand more of the subject, including its systematic nature. Success in accomplishing this will increase the enjoyment and enthusiasm the students have for the subject and facilitate learning of not only facts and rules, but also how to solve problems. I believe that this will serve the community well by beginning to break the myth that organic chemistry is simply a difficult subject that one must memorize in order to pass.

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[1] Pribyl, J.R.; Boder, G.M. "Spatial Ability and its Role in Organic Chemistry: A Study of Four Organic Courses" *J. Res. Sci. Teach.* **1987**, *24*, 229-240.

[2] Professor William Reusch utilized similar methods when he recently taught second semester organic chemistry at Michigan State. He found that he had more time to use "concept questions" to gather instant feed back from the class allowing him to revisit a concept immediately instead of after an exam. Overall, a poll of the student of this course, and its heavy web/PowerPoint use, indicated that approximately 50% of the students preferred the technology-based course, indicating there is a benefit to using technology. There were some that preferred the conventional chalk talk, stating that the lectures went to fast and covered too much material and there were many who were indifferent. It should be noted the majority of students were taking the course for the second time, and in their first experience, the course was taught with the more traditional chalk talk.