

Statement of Teaching Philosophy – Juliet Hahn, Ph.D.

Philosophy I became a chemist because chemistry is fun, challenging and exciting to me. The easy trap is to just “cover” the material without even thinking about student learning. I want to show my students how this seemingly dry stuff is actually fun, interesting and exciting. Students who are engaged, interested, and motivated, learn better than those who are bored, disinterested and absent. The most important qualities of a teacher are a real love of the subject (because if your subject isn’t interesting to you, it is really hard to make it interesting to anyone else), empathy, and an open mind (because you need to function as the human bridge between the material and the students). I have experience teaching a variety of students (economically disadvantaged, 90% white, 85% minority, honor’s, military related, first generation) in my very geographically and socioeconomically diverse former faculty positions. **It is nonsense to state that the teacher has to look like the students to obtain the best student performance.** Instead the teacher just needs to have empathy, be open minded, cares for the student and communicates interactively to fit the material to the students by adjusting pace, content and even jokes.

How to improve student performance: Many students come into chemistry classes expecting to do badly. I tell my students that if they expect to do badly in chemistry, then they absolutely will. However if they come to class with the attitude that if they work really hard, then anything is possible then anything is indeed possible. Getting 10% of the class to do excellent work is relatively easy because these students always do well anyway. Getting good/excellent performances from the majority of the students without losing the best students to boredom is challenging. If the material is presented to fit the students, any student can enjoy learning anything. My general philosophy about teaching chemistry is to make the abstract and dry concepts seem common sense, easy and (gasp) fun. For instance anti addition of halogens to alkenes is described as Vin Diesel (“Pacifier”, the halogen) sitting in a child's chair (the alkene). It is hard to forget the gigantic halogen sitting on the tiny alkene resulting in anti addition during an exam. A water sandwich of two bread slices (hydrogens) and salami (oxygen) can be used to explain stoichiometry.

Not keeping up is the reason why most students don't do well in both Organic and General Chemistry. I make my students constantly study by giving quizzes between their exams. I also emphasize understanding the material instead of just memorizing everything in sight because this is what they will leave the class with rather than the 200 equations that they crammed. Every one of my exams has a "thought" question which tests understanding rather than memorization. Although of course a certain amount of memorization is essential in learning both organic and general chemistry.

My students also know that their grade is exactly what they produce on the exams and they know that they can believe in the integrity of their grades. To ensure this, students receive a copy of the answer key that I use to grade their exams with points listed for common mistakes. The answer keys also help the students learn from their mistakes on quizzes and exams.

One semester, a majority of my students started flunking out every quiz and it was clear that if I didn't do something the majority of my class would flunk the upcoming exam. Instead of throwing up my hands and saying "... well those people are just too stupid to learn this stuff...", and either making the quizzes easier or flunking out the majority of the class, I made a deal with the students to give a quiz every week so that the students would study more and promised to drop some of their terrible quiz grades. As a result the students (and I) worked very hard and the students learned the material. The students had to own the solution for this approach to work because if the students don't try, no amount of extra quizzes would have helped. Helping all students perform at their very best is always a difficult problem.

Sometimes in these large introductory lectures, students can feel like a number in the crowd. Excellent students can lose interest by being bored and ignored. Average/bad students can become totally disillusioned and lost. Even in a large lecture, students can be made to feel as if they and I are real human beings. I can tell even in a class as large as 200 students if I see the gleam of understanding in the eyes of the individuals in the entire class with one glance. I actually listen to my students and sometimes I change things if I think that the students have a good idea. I feel like I am teaching chemistry to 50 of my friends and I almost cannot believe that I am getting paid to do something that I enjoy so much.

How to use research with students to recruit students and solve the retention problem: One of the side effects of undergraduate research is that the students get paid to do research which actually is more important than many faculty may think. I never realized the effect of money until I talked to one of my academic probation advisees. I thought initially that the student was just an unmotivated person lacking initiative because he completely missed one appointment and came late to his 2nd appointment. When I talked to him, I realized that he had come late to his appointment because he had worked all night. His grades had more to do with him falling asleep in class because of his work schedule than his intelligence, or willingness to work. Most of my former students had 2 to 3 jobs with almost a full time work schedule.

When students are paid to do research, students work on campus with a very flexible, part time job schedule. Research jobs help solve the retention problems and is a university recruitment tool for the best students. Students also are reinforced to study because of the camaraderie of the research lab group and research advisor. Part of the reason why I want my research students to feel as if they have come home when they come to my research lab is to make the students feel as if they really “belong” to the university or even as if they own a small part of the university. Research assistant jobs for students (even non science major students) can be a recruitment tool for the students to transition into well paying science and technology jobs of the future.

How to help students get good jobs: For higher level courses the curriculum should make the chemistry graduate a hot commodity on the job market by reflecting current trends. In addition the curriculum should prepare the students with a solid background and make the students into independent thinkers. Independent thinkers always do well in anything that they do. To reflect current trends, the chemistry curriculum should emphasize applications in nanoscience, biopolymers, pharmaceuticals, green and alternative energy. Industrial involvement in funding of academic research and on site industrial recruitment of new graduates should be actively pursued.

Why I am a professor: I think that being a professor is a rewarding profession because you get to influence the most important thing in the world, the minds of young people and you get to shape what the next generation will be doing with their lives. I think that students know when a professor is trying to exploit them and when a professor is truly trying to help them and sometimes just that fact makes all the difference to the student's success. I am really good at teaching students and I am really good at Chemistry Research. In order to succeed in the end, one should always do what the person is really good at doing and not give up because of a few obstacles. [I **increased classroom enrollment** in similar or parallel credit classes by as much as **10 times the normal enrollment** at 4 different universities as professor.]

Qualifications: I am qualified to teach Organic and Advanced Organic. I am also qualified to teach General Chemistry for major/nonmajors. [**Organic and General Chemistry classes make up 100% of most university science requirement for many STEM majors and even nonmajors. All students who decide that chemistry (science, engineering, and other STEM majors) is not for them make this decision based on their experience in these two classes. I can change that!**] Two of my current research projects are DNA projects and I have a long history in Bio-Organic / Bio-Inorganic Chemistry research so I am qualified to teach a Bio-Organic/Bio-Inorganic course. Also I am qualified to teach an upper level class in Spectroscopy for Organic & Organometallic Analysis & a Stereoselectivity Synthesis course.

Student Research: As a professor teaching Organic Lab & as a Principal Investigator (PI) with research students, I have had a lot of experience working with inexperienced chemists. I have had as a PI 2 to 8 mostly undergraduate student per semester working on my research projects recently. From directing research a number of years, I have learned how to have my inexperienced research students contribute to my research output instead of lessening my research output by only taking up my time. My research students will tell you that I am a research group member and friend more than I am the boss.

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