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

Philosophy I became a chemist because chemistry is fun, challenging and exciting to me. 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. (absent student = game over, teacher can't do anything to help the student)** 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. The teacher's job is 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% black, 30% hispanic, honor's, military related, first generation) in my geographically & socioeconomically diverse former faculty positions. What makes a teacher really click for a particular group of students is that the **teacher fits herself to her students** by communicating interactively to **fit the material to the students** by adjusting pace, content & even jokes.

How to improve student performance: Many students come into chemistry classes expecting to do badly and fulfill their own prophecy by putting in no effort. There are a few pre-nursing students who come to class without pen & paper, spend the entire class time watching cell phone cat videos & somehow expect to do well in the class. For most students if the students come to class with the attitude that if they work really hard, then anything is possible (provided reasonable background & intelligence) then anything is indeed possible because effort is very important in succeeding in Chemistry. Getting 10% of the class to do excellent work is easy because these students do well anyway, almost independent of the teacher. 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 & dry concepts seem common sense, and (gasp) fun. For instance for Markovnikov's addition to alkene (Organic) I use the idom "Them that has, gets (H)" or "Rich get richer (in H)" A water sandwich of two bread slices (hydrogens) & salami (oxygen) can explain stoichiometry (General Chemistry). Understanding is easier when related to common sense ideas. Anything to make classes fun is really important.

Not keeping up is the reason why most students don't do well in both Organic & General Chemistry. A bridge from High School (lots of exams) to College (typically 3 exams a semester) is helpful in student's successfully transitioning. I make my students constantly study by giving quizzes (typically 6 short quizzes a semester) between their exams (typically 3 or 4 hour exams a semester). I also use "clickers" so that I am collecting & grading homework every class. Alternatively I have used "Homework In class" (HI :) where students turn in daily paper worked problems for grading in the absence of "clickers". With powerpoint lectures "clickers"/HI :) are actually absolutely essential. 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 crammed reactions. Actually memorization with understanding is a lot easier than brute force memorization but some memorization is of course essential to learning Organic & 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, I post answer keys online with points listed for common mistakes. The answer keys also help the students learn from their mistakes.

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 challenging problem.

Sometimes in large introductory lectures, students can feel like a number in the crowd and can become disillusioned and lost. 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. "Clickers" provide immediate additional information about student learning. I actually listen to my students and sometimes I change class rules and procedures if I think that the students have a good idea which will assist learning.

How to use research with students to recruit students and solve the retention problem: Paid undergraduate research can be important to student retention and recruitment for the best students. 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.

Even if students are doing research as volunteers, small things like providing a desk that the students can come to when on campus helps my research students feel as if they have come home when they come to my research lab. Having students feel as if they really "belong" to the university or even as if they own a small part of the university is a very powerful retention strategy. Sometimes a student just feeling that there is a mentor who wants them to succeed is the difference between student failure and student success. However of course research assistant jobs for students (even non science major students) can be a recruitment tool for the best STEM students to transition into well paying science & technology jobs.

Student Research: As a professor teaching General/Organic Lab & as a Principal Investigator (PI) with primarily undergraduate research students, I have a lot of experience working with inexperienced undergraduates. I have trained on average 5 undergraduate researchers per semester in tenure track positions. From my experience directing research, I have learned how to have my inexperienced research students contribute to my research output rather than just draining my research time.

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 & training and on site industrial recruitment of new graduates should be actively pursued. **Student training is a crucial part of economic development because industries develop in areas with a ready, educated workforce.**

Why I am a professor: Being a professor is a nontraditionally rewarding and undervalued profession. Professors influence the most important thing in the world, the minds of young people and get to shape what the next generation will be doing with their lives. Students know when a professor is exploiting them & when a professor is truly trying to help and sometimes that makes all the difference to the student's success. I am really good at teaching students and I am really good at Chemistry Research. I am an extremely hardworking, idealistic, honest excellent chemist. [I **increased classroom enrollment** in classes by as much as **10 times the normal enrollment** at a number of universities as a professor.]

Teaching Qualifications: I am qualified to teach Organic and General Chemistry Lecture & Lab. (**Organic PHD, graduate credit hours: Inorganic-21 hrs, Analytical -12 hrs**) 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. I have also taught an undergraduate one semester Biochemistry Lecture and a graduate BioOrganic Lecture class. I am also qualified and have taught upper level and graduate classes in Organic Spectroscopy, Advanced Organic & Organometallics (Inorganic). [**Organic and General Chemistry classes make up 100% of most university science requirement for many STEM majors and even non majors. All students who decide that chemistry (science, engineering, pre-pharmacy, pre-med, pre-nursing and other STEM majors) is not for them make this decision based on their experience in these two classes. I can change that**!]

sample video lecture at https://www.youtube.com/user/JulietHahnPhD (view playlist)