

As a student, my education was shaped by bright and dedicated instructors whose teaching inspired the classroom and reflected their deep commitment to helping students achieve their learning goals. Now, as I transition from student to educator, the foundational example of these teachers and mentors has had a profound influence on my desire to be an instructor committed to my students' success. **As such, I have developed a teaching philosophy that centers on individualized instruction and a strong personal investment in helping students attain their goals.**

Teaching Objectives

In order to achieve meaningful learning, I believe it is essential that students make connections between previous concepts and new information, thus integrating newly acquired knowledge to generate a more complete understanding of a topic or field of study. To help students accomplish this type of learning, **my goals as an educator are to: 1) provide a foundational knowledge of a subject area, 2) foster scientific reasoning abilities to apply this knowledge to a diverse range of problems, and 3) encourage the development of personally effective learning strategies.** These teaching objectives aim to give students the tools to think critically about the world around them and engage in meaningful learning through their lives, regardless of their personal background or goals.

Teaching Practices

The typical classroom is filled with a diverse array of inquiring minds; all with different backgrounds, experiences, strengths and challenges. Therefore, I believe it is important to gain an understanding of students' knowledge, interests, and goals prior to beginning a class. In large classes, this can be implemented as a short quiz and/or questionnaire, while in smaller classes or mentoring scenarios this can be accomplished through one-on-one conversations with students. These surveys can include short answer questions such as, "Why did you enroll in this class?" and "What is your intended career?", or asking students to rank activities that are most helpful to their learning, whether it be in-class exercises, studying a textbook, or simply listening to lecture. In this way, I get to know my students on a more personal level and I am able to tailor my teaching to their varied backgrounds and interests. This practice also encourages some beneficial self-reflection on the part of the student. **I've found that adding a personal dimension to my teaching creates a more dynamic learning environment, where students are more engaged in class and are comfortable asking questions.**

In addition, these pre-class surveys allow me to identify gaps or misconceptions in a student's knowledge base. Peer instruction is an effective approach to addressing these errors in prior knowledge to avoid building faulty or weak connections to new information. In class, I design exercises that encourage critical thinking and active discussion between classmates. For example, in my biochemistry lab sections, I have students complete quizzes individually prior to coming to class. In lab, where students work in pairs, I then task each group to write the answer to one of the questions on the board. This activity requires that lab partners explain their thinking to one another and work together to arrive at a common answer. We then discuss the answers provided as a class, which allows us to address common misconceptions and helps more strongly reinforce new information learned. I also find that polling technologies, such as i-Clicker or Poll Everywhere, are powerful tools to evaluate student learning in real-time and embolden class discussions. Out of class I continue to promote discourse between classmates by encouraging my students to work in groups to complete problem sets. These strategies give students the ability to guide their own learning, working together to identify their own strengths and weaknesses, and **strengthens their foundational knowledge to build strong connections to new concepts.**

Student assessment throughout a course is also essential to ensure successful learning. I use frequent assessment in the form of homework sets, quizzes, exams, and presentations or writing assignments to ensure that students are regularly studying outside of class and possess an appropriate understanding of the material. **My assessments challenge students to use a variety of thinking levels and apply their knowledge to a diverse range of problems.** For example, as part of an analytical chemistry lab exam, I developed a series of questions to test students' understanding of electrochemical cells. First, they were asked to give definitions of the cathode and anode. Then they were required to identify these components on a diagram of an electrochemical cell given the half-cell reactions. Finally, the students were asked to identify an unknown metal electrode using information on the voltage of cell and the Nernst equation to calculate standard reduction potential of the unknown half-cell. This exercise not only requires a basic knowledge of important chemical concepts, but also an ability to use higher order thinking skills to apply these concepts in different contexts. In addition, assessing student comprehension of the material can help guide my teaching. This can be accomplished through preparatory and review assignments before and after each class, respectively, or having students write down concepts they struggled with on notecards during class. This feedback allows me to immediately address knowledge gaps throughout the course and gauge if my teaching methods are effective.

Finally, I believe it is important as an instructor to help students become motivated and skillful self-learners. Encouraging students to develop their own scientific inquiries is one way to achieve this goal. In our analytical chemistry lab course, we had groups develop independent projects using previous techniques learned in the course. Project ideas included quantitating chlorophyll in different plants using absorbance measurements and detecting the activity of glucose oxidase via oxygen quenching of luminescent ruthenium complexes. Students were challenged to develop procedures for these experiments and analyze the results, culminating in a final powerpoint presentation of the project. Throughout the process, we worked closely with the students to guide them through the research process, from developing testable hypotheses and thoughtful experiments, to clear and organized communication of the results. These independent projects allow students to pursue topics which interest them and fosters appreciation for the scientific process. Furthermore, I am committed to helping students develop personally effective learning strategies. For example, I am inspired by instructors who schedule one-on-one meetings with students who fail the first exam, in order to discuss ways in which the student can adjust their study habits to improve class performance. **These practices help students gain skills essential to being a successful scientist, while engaging and motivating them in their own learning.**

Taken together, my teaching practices reflect my belief that learning should be a student-guided process. Because each student is unique in their learning style, I aim to give students the ability to define their own path towards mastery of a subject. **Encouraging students to take a more active role in their learning and allowing them to pursue their interests helps them to build deeper connections to new topics and creates a positive perception of learning that they can transfer beyond the classroom.**

Teaching Experiences

Throughout my undergraduate and graduate career, I have worked as teaching assistant in a variety of lower and upper level lab courses. As an undergraduate at the University of Virginia, I had the opportunity to teach physical chemistry and analytical chemistry lab sections. My experience as an analytical lab TA was especially enlightening and influential, as I was involved in an extensive course redesign, helping to organize and design new experiments and prepare homework, quiz and exam materials. In both classes, we emphasized development of real-world research skills through independent projects and improvement of written and oral

communication through research article-style lab reports and final presentations. As a graduate student, I have taught upper level students in a biochemistry lab course. In this class I was given the opportunity to review topics in short pre-lab lectures and develop quizzes to assess student understanding of the material. By interacting with my students on a personal level I created a comfortable learning atmosphere, demonstrated by students' willingness to come to me with questions both during and outside of class. As a result, I was able to witness a remarkable growth in their knowledge and learning throughout the semester.

I have also been fortunate to serve as a mentor to several undergraduates in research lab settings at UVA and UNC. As in the classroom, I emphasize creating a foundational knowledge base of skills and concepts, progressively building upon that base to generate a more complete understanding of the research area as the student works towards their own independent, creative projects. I also strongly encourage development of communication skills through applications to fellowships, writing research reports and manuscripts, and presentations at group meetings and conferences. In addition to developing my students' skills, I seek to offer advice and support as they work to accomplish their personal and professional goals. **My strong commitment to my students' success is reflected in their accomplishments.** These include departmental awards for research excellence, fellowships for conducting summer research, inclusion as co-authors on published manuscripts, work on independent first-author projects, and admittance to graduate or professional programs. All six of the students I have worked with have expressed gratitude for my efforts toward their scientific development, and as a result I was recognized with a student nominated teaching award at UNC.

Beyond the lab, I also aim to serve as a mentor to underrepresented students as they navigate the challenges of pursuing advanced education. Despite the enormous potential that these students often possess, far too often they end up abandoning their scientific pursuits either due to teaching methodologies that fail to educate or engage students in science or a lack of supportive mentors and role models. To remedy this problem, I have served as a Hispanic/Latino Peer Mentor at UVA and I am currently working as president of the UNC chapter of the Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS). Through efforts such as these I hope to establish a community of scholars that can support each other through peer mentorship and outreach to aspiring scientists. We all stand to benefit from a more culturally and thoughtfully diverse community. Thus, **I plan to continue to dedicate my career to facilitating the success of a diverse student body through my teaching and mentoring efforts.**

Teaching Development Plan

As I look to the future, I am excited for the opportunity to continue to learn and to grow as an educator. I believe every class period is an opportunity to gain feedback and fine tune my teaching methods. Providing students a means to provide anonymous comments, either through online media or note cards provided in class, I hope will allow me to dynamically address challenges to students' learning throughout a class. I also plan to continue researching teaching strategies through attendance at professional development workshops and conferences.

Conclusion

Through my teaching, I hope to instill in my students the same enthusiasm for science and learning that I possess. I find that connecting with individuals in the class, and tailoring instruction towards their varied interests and backgrounds, is especially effective in cultivating this enthusiasm. I believe Campbell's student-centered mission and small student to faculty ratios are particularly well-suited for implementation of this teaching philosophy. As I pursue a career in teaching, I plan to continue to learn and grow alongside my students, exploring teaching strategies that most effectively shape the next generation of scientific innovators.