

Maria Jantz - Teaching Philosophy

I have been passionate about teaching for as long as I can remember. I frequently came home from grade school and immediately taught new concepts like long division to my younger brother, who was sometimes but not always a willing participant. Today, I continue to seek opportunities to share my enthusiasm for a topic with someone else, and to be part of the light bulb moments when a concept clicks. These opportunities have taken many forms, ranging from speaking about my research at conferences, to a particularly interesting wedding at which I spent dinner discussing my research on bladder control with the table and heard in turn about my table mates' recent urinary tract infections.

As one old adage claims, if you understand a topic well enough you can explain it to anyone, whether they are an expert in the area or completely new to it. However, there is a lot that goes into effective teaching beyond simply understanding the topic well, and it is my goal as an instructor to continuously improve the way I shape the learning environment in my classroom and refine the way I meet educational goals. I never quite give the same lecture each year as I am constantly seeking to improve and to direct lectures towards the students in a given class. My research focuses on spinal cord stimulation for rehabilitation, and in keeping with that topic I hope to teach classes in neurophysiology and electronics at the upper undergraduate and graduate levels.

Learning Environment

A supportive and engaging learning environment is absolutely critical to help students approach new topics. In particular, I foster an environment in which students are able to work through mistakes, stay engaged and learning actively, and where regardless of their backgrounds they are comfortable in the classroom.

Students have to be able to make mistakes in a classroom because learning how to work through mistakes is how students learn to thrive with challenging environments. To help students learn from their previous work, I prioritize rapid feedback so that they don't find themselves trying to change their understanding of an early assignment during finals week. I also make constructive criticism a priority, both on assignments and during in class discussions, by first affirming a question or an idea that includes a misconception, and then addressing the underlying confusion. I build on questions by addressing background and related topics to ensure that students continue to find value in participating in discussions. This approach has worked well in the past, as professors for whom I have guest lectured have given me the feedback that even with typically quiet classes, I am good at involving students in discussions.

No one wants to be wrong in front of a class, and this is doubly true for women and minorities who may be facing stereotype threat or imposter syndrome. As a teacher, I use tools such as Think-Pair-Share, as well as anonymous opportunities for comments and discussion questions to ensure that students have an environment in which they can contribute without all eyes on them. I encourage students to seek feedback in a range of venues so they can learn in a way that is most comfortable for

them, whether that is in class, one on one with the professor or teaching assistants, or with other students in small groups or recitation sessions.

Some of the most fascinating experiences I have had in classes sprang from opportunities to apply the information I have learned, such as a neuroscience course in which I was able to slice up actual brains. I prefer to have students apply their learning as much as possible, so I give them projects that require them to choose their own direction to meet their goals, as well as learn from mistakes and stay engaged. Open-ended projects require that they test and refine their ideas based on their own challenges as well as feedback I give. For example, one of the projects that I learned the most from in college simply asked us to build something that demonstrated our knowledge of electronics concepts. My group built a robotic arm that was programmed to mimic the motions of a person's arm in real-time, and it was foundational to my ability to understand how to work with new software tools and design effective hardware. Students who are able to solve problems creatively can see several paths to solve problems, adapt the tools they have to approach new problems, use interdisciplinary approaches, and are able to work through barriers.

Although students often come to class tired or unenthusiastic, in my own learning career I have often found my interest in a class rises and falls depending on the attitude of the teacher. To keep students engaged, I keep lectures interesting by telling stories about the background behind new topics and using active learning techniques throughout classes. To connect new material to topics students are already familiar with, I assess existing knowledge through pre-tests, self-reports on surveys, and in class discussions. Professors I have guest lectured for describe me as a "natural teacher" who is "good at integrating humor into a lecture." I use interactive lecturing styles as much as possible, with questions and hints to drive the lecture along.

Educational Goals

Independent thinking requires making connections between topics and how they can be applied to different goals. I make expectations clear early and throughout the class and give a clear road map of the connections between central ideas as well as expectations for performance. Students who are able to think independently can not only regurgitate facts but clearly link concepts. To help them describe the "why" of a problem, not just the "what," I give a road map of the content before starting a lecture and continuously connect concepts to previous discussions. When explaining derivations, I focus on the goal and the intuitions behind each step, and explain ideas in many ways, including the mathematical reasoning, illustrations of data, simulations, and analogies to make sure students are able to relate to the material in many ways. When possible, I have students work through small problems themselves, then walk through the solution, as giving students a chance to think about how to apply solutions helps them digest new material. To foster an environment where students try unorthodox solutions, I ask open-ended questions that have many possible answers.

I am most satisfied with my teaching when I see students ask questions about new topics. As I grow as an instructor and mentor, I aspire to be approachable, help students explore new ideas, and to continuously seek improvements in my teaching.