

Evidence of Teaching Interest and Abilities

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My approach to the courses that I teach, develop, and support, are guided by my teaching beliefs: I strive to foster the habits of mind, the knowledge, the curiosity, and the skills that students need to be enlightened citizens in a society that needs mathematicians. These values guide my ongoing efforts to 1) foster a student-centered learning environment, 2) cultivate critical thinking skills and curiosity among students, 3) offer frequent feedback to students through formative and summative assessments, and 4) to identify ways to continuously improve the experiences of my students through informal evaluation and research. These efforts help me address the individual learning needs of my students, help them become aware of their own knowledge gaps, and guide them towards a path of being independent learners and enlightened citizens that seek to understand the world through a mathematical lens.

Fostering a Student-Centered Learning Environment

As an instructor, my role tends to be more focused on asking my students questions than on providing explanations for them. To teach from this perspective, I foster student-centered learning environments that require that my students be responsible for their own learning. For example, I create opportunities for collaborative learning through the provision of small group-work activities and asking students to share their work with others. These activities help them co-create their understandings of mathematical concepts through dialog and reasoning. Student collaboration and other forms of student-centered activities during lectures, studios, office hours, and all my student-instructor interactions, affords me with opportunities to target areas where they may have difficulty understanding. I also feel that this approach also helps foster constructive learning communities and guides my students towards being more independent learners.

Developing Critical Thinking Skills and Curiosity

Mathematics students, especially at the undergraduate level, are developing synthesis and critical thinking skills. I foster this understanding in my students by asking them to connect several interrelated concepts within the course throughout their learning activities. This helps cultivate the idea that mathematics often requires more creativity and patience, rather than memorization and routine, and especially helps students prepare for upper year undergraduate courses, graduate level research, and in rewarding careers that require that they use these skills in their specific discipline. One way I encourage this development in calculus, linear algebra, and differential equations courses is by ensuring their lecture and learning

activities, quizzes, and tests all require they demonstrate their ability to propose creative and conceptual (rather than procedural) solutions to mathematical problems. For example, in an online differential equations course I am teaching this semester, I created a project where students are given the freedom to propose solutions

I ask my students to make conjectures and build a logical progression of statements, and to explain their reasoning with multiple representations: using their own words and diagrams rather than with only algebraic representations. For example, in the online differential equations course that I am currently teaching for 155 students, my students submit weekly written homework sets that require that they sketch phase diagrams and show their steps in multi-step problems.

Inspiring a curiosity for mathematical discovery is an important aspect of my teaching and course design, because it is yet another strategy that helps motivate and enable students to become independent learners. By seeking to understand their current level of understanding of my material, I give my students problems that **challenge** them. And I am an instructor that approaches learning with **enthusiasm** - all students are more able to develop an interest in mathematics when their instructor carries an enthusiasm for the material and for collaboration. And I inspire enthusiasm for math in my students by asking my students to explore how the material they are learning can be applied to **real-world problems**. This strategy helps inspire enthusiasm by giving relevance and context for the material they are learning. As another example from the Differential Equations course I am currently teaching, my students are choosing a real-world problem to model from the SIMIODE website (<https://www.simiode.org/resources/modelingscenarios>) and posting their reports on our course forum as part of a small mini conference for our course.

Frequent Assessment Based on Learning Objectives

Frequent formative and summative assessments based on **clearly articulated learning objectives** guide students through my courses. Immediate and individualized feedback that online homework systems that I have experience with (such as WeBWork, MapleTA, MyMathLab, and ALEKS) provide my students with a means of mastering course content through offering them multiple attempts to submit their work. I assign more challenging **group work** and **written assignments** that help students develop a deeper understanding of course concepts and the criteria by which they will be judged in high-stakes assessments such as quizzes and exams.

Ongoing Evaluation and Research

Ongoing evaluation and research on the courses I develop and facilitate has helped

me ensure continual improvement of my teaching practices and guide them towards meeting the evolving needs of my students and to institutional and departmental goals. To facilitate this development, I have developed and administered pre/post surveys based on validated survey instruments, led focus group discussions, and used quantitative measurements to assess how students engage in their courses. I have led a qualitative analysis of student discussion during recitations, which helped myself, and the teaching assistants at my institution, gain a better understanding of effective teaching practices through community, discussion, and analysis. Presenting and sharing my results with other educators through presentations and publications further develops me develop my courses through reflection and input from others.