

Stacy Musgrave

My favorite part about doing mathematics is experiencing that “Aha!” moment when I realize the solution to a troublesome problem. When I teach, I make it my primary goal to share that experience with the student. I find this particular experience—that of success in spite of challenges—is critical to the educational process. As so many students come to college with 12+ years of negative attitudes about mathematics and their mathematical abilities, I believe my main function as a math educator is to foster an appreciation for mathematics while improving confidence and fostering curiosity.

As one who has always appreciated mathematics for its puzzle-like nature and abstraction, I challenge myself every semester to share the beauty of mathematics-for-the-sake-of-mathematics with my students. In my calculus class for non-technical majors, for example, I make sure to include proofs throughout the semester to expose students to the elegance of mathematical writing and logic. Students put down their pencils and we walk through the proofs together, evaluating the motivation for which assumptions are needed to begin, moving from one step to the next while drawing parallels to the way one would write an essay. As communication is always a huge part of my emphasis in every class, I use such parallels to remind students that math is a subject that must be communicated like any other. While the style may vary, the goal of clear delivery remains the same.

No matter how elegant the proof may be, however, a student who lacks confidence in their abilities will immediately shy away from something as seemingly intense as a mathematical proof. Because of this, I strive to encourage students to identify their strengths and expand upon those to achieve success. Since everyone is good at different things, I treasure group work as a means of letting each student shine in their own way. By grouping students to collaborate on worksheets, warm-ups and the occasional quiz, I can encourage students to contribute in their own ways—whether it is praising their organizational skills, thanking them for challenging a classmate’s strategy, encouraging their ability to think creatively or holistically about a problem, or suggesting they explain their process to a classmate. I likewise step aside during office hours and allow students to converse with each other about problems, usually acting as referee to maintain balance of who takes turns solving problems and offering

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explanations. Identifying each student's strengths and promoting them amongst peers allows each student to have positive experiences with mathematics in class or office hours, which is something I feel translates to increased contact with mathematics outside of class, and greater willingness to attempt novel mathematical challenges.

Questioning is one desirable outcome of increased confidence. I make a point of explicitly thanking students for asking questions. This increases participation and yields the desired effect of having a classroom of active learners. Student questions are so important because they offer insight into understanding or misconceptions students may have, provide a gauge for how effective my delivery of the material is, and help determine the most productive use of class time. It is so important to me that I make sure students can ask questions through various means. While in class questions are encouraged, I also make a habit of passing out index cards on which students are asked to write down something they learned during lecture as well as a question. I use these note cards to help plan the next day's lecture, making sure to address questions and use the ensuing discussion to lead into the next lesson. I also distribute surveys a few times during the semester to elicit feedback for the course, as well as to remind students to question—material presentation, content, instructional choices. All questions are welcome as they pertain to improving the student learning experience.

As a career student, I regularly stumble upon challenges in learning and discover new approaches to familiar material. The constant reminder of struggling to learn something new keeps me empathetic towards my students. New perspectives keep me excited about what I am teaching and help me maintain the necessary caution with my presentation of material and assumptions about student thinking. I enjoy how much I learn from my students, and this give and take relationship keeps me saying "Aha!" even in the classroom.