

Teaching statement - Michael Hott

Teaching is a way for me to engage with a community, and to pass on useful skills I learned myself from studying mathematics. These skills include correct use of logic, mathematical understanding of our surroundings, as well as appreciating the beauty of mathematics. To me, the beauty of mathematics lies in being able to abstract universal concepts (e.g., originating from physical laws), treating them on the abstract level, and deducing implications for real-world applications. This allows students to look at problems from a mathematical perspective, and to learn how to classify and then solve these problems. I strive to present scientific progress as a joint effort throughout history and the entire world. In my classes, I emphasize that the understanding of concepts is a life-long lesson and that they should not view grades as a means of personal validation, as these do not necessarily reflect a student's understanding. Moreover, it is important to me that students learn to view their non-understanding not as personal failure but as an indicator that there is something nontrivial to understand, and that this naturally varies from one student to another. I emphasize that understanding mathematics is not an innate ability, but a yearlong process of positively engaging with the material, in a safe environment. Finally, I consider only an inclusive classroom a healthy classroom. In an inclusive classroom, everyone regardless of their intersectional identity gets access to a friendly learning environment helping them achieve their individual goals, and is equally validated within the learning environment.

I have been a teaching assistant for upper-division mathematics courses for engineers and math majors. Coming to the US from Germany in 2016, I was used to traditional classrooms, in which I mostly lectured and regularly stopped to gather students' understanding. As a result, students in my first class described me as distant and my class as too difficult. I consulted with peers and my thesis advisor about this, and I learned to record my notes taken in class and making them available afterwards, and I have been keeping this tradition ever since. This received very positive feedback.

I want to see students work through problems based on their own intuition as it gives me an insight into their thought process and it helps me offer them individual guidance. In my office hours, I let other students answer questions of other students. Only if they struggle to come up with a solution, or if I believe that there are some non-crucial steps that all students should be aware of, I offer additional explanations. This allows me to walk students through content in an individualized way. I also take notes during my office hours, as students have appreciated more available examples.

It is important to me to have all students follow along with the course material. So, if it is week 7, but a student asks me about a concept from week 2, I will connect what we are now doing back to what we learned in week 2. For this, I usually invite other students to remind the class of those concepts. I also thank the student who asked the question for the question, as the entire class benefits from a refresher, and it helps understanding the overarching picture.

More generally, I invite students to ask questions and I welcome mistakes or incorrect answers, as it is a great learning experience for everyone in the class. It helps students who already understood the concept deepen their understanding and students who are struggling with the concept learn different perspectives.

Before my quizzes and exams, I remind students which concepts to focus on and I point

out important steps in my provided solutions for homework problem sets. I let students know that I offer points for all concepts relevant to the exercise that they demonstrably understood. Before exams, I organize review sessions in which students get the chance to ask me to go into detail in any of the relevant concepts. The review sessions are designed in an interactive way where, with my guidance, students get to explain the concepts to each other. After every quiz and exam, I collect the most common mistakes and present what went wrong in the beginning of the following class. The next time I teach a course, I plan to also offer points for weekly attendance in my office hours, and to also make student presentations part of their grade.

I invite students to come speak with me during my office hours. I let them know that I am available for inquiries of any sorts. When I notice that students are falling behind in the material or struggling with the quizzes and exams, I reach out to them and ask them if they need additional support.

Last summer 2020, in a grad student lead course, we talked about strategies on how to create more inclusive classrooms. We talked about building rapport with the students by arriving early in the classroom and doing small-talk, learning students' names, and using anonymous polls to gauge students' understanding and to motivate them for participation. This makes student feel more at ease in my classroom, and helps providing an individual experience. The next time, I teach, I plan on implementing these and other strategies that I have been reading about on [1].

I consider designing more inclusive classrooms as an endless opportunity for improvement and as an ongoing conversation. I want to engage in these conversations and learn on how to further encourage, facilitate and motivate mathematical curiosity.

References

- [1] Center for research on learning & teaching, University of Michigan, *Inclusive Teaching Resources & Strategies*, <https://crlt.umich.edu/multicultural-teaching/inclusive-teaching-strategies>