

Teaching Philosophy

I have always loved to teach. As a five year old, I played school with my stuffed animals. However, it took me a very long time to realize what teaching was, as I first needed to experience what it meant to learn. I think that people are at their best when they are learning. Learning is more empowering than physical strength, money, or status. As they learn, people break down limitations, whether physical or societal. In order to help people find this power, we must teach them to be flexible and critical thinkers and support them in becoming life-long learners. Therefore, my teaching philosophy is centered around increasing students' opportunities and helping them break down societal boundaries. My love and understanding of mathematics makes it a perfect context in which I can do this.

I am convinced that I must focus equally on the aims and the process of learning mathematics. In fact, I believe that the distinction between the two is artificial. To learn mathematics, students must do mathematics. Both problem solving and reasoning are central to mathematics and to mathematics education. But, educators cannot regard problem solving and reasoning as the only goal; nor can they view these processes solely as a means of teaching a specific set of mathematical concepts. To me, problem solving and reasoning are both the aim *and* the process. Students must learn problem solving by and through solving problems. Likewise, they must learn to reason by reasoning.

As a teacher I have four major aims. First, I strive to guide the formation of individuals who are able to reason critically and logically about mathematical concepts and procedures in their careers and daily lives. Second, I aim to help my students become self-reliant and confident in their abilities to generate new knowledge and to communicate it to others. In life, students will face problems for they may not have adequate knowledge. They must use what they know in order to construct or re-construct this knowledge and then use it to approach problems. They must be able to communicate their reasoning to peers, either to facilitate collaboration or to communicate a solution strategy. Third, I strive to foster in my students a powerful and accurate intuition for relevant mathematical concepts and procedures. Intuition, the strongest form of understanding, is formed when concepts become highly and intricately interconnected through experience and reflection. Fourth and last, I support students as they develop a solid "I wonder if" impulse. I help them challenge themselves and others by asking, "I wonder if I changed this condition," or, "I wonder if I asked a different question."

My conviction that mathematics is learned through problem solving and reasoning informs how I teach and set up the social and physical environment of the classroom. Regardless of the learners, whether they be kindergarten students or in-service teachers, I make an effort to continually have an accurate picture of the students' current knowledge by creating a discourse-rich classroom where the students are doing and talking about mathematics. By expecting the students to communicate their reasoning, I draw out their preconceptions, habits, and idiosyncrasies. For students to create new knowledge, their learning experiences must start with their current level of understanding. It is my job to provide them with opportunities for growth. Informed by consistent formative assessment, I carefully select rich problem solving tasks which challenge and extend students' knowledge while providing them opportunities to create accurate knowledge about the concepts they need to learn in the course.

As a teacher I strive to develop tasks which have multiple solution strategies, none of which are obvious to the learner. Struggling with such tasks creates an opportunity for students

to communicate their reasoning to peers and to discuss commonalities and differences between solutions. This approach supports the development of connections between conceptual, procedural, and factual knowledge within and outside of mathematics. Learning tasks should provide a moderate challenge for all students and should not be a mere application of a technique just presented. As Catherine Twomey Fosnot said, we should support students in their climb to learn mathematics rather than dropping them at the top of the mountain and depriving them of the opportunity to learn how to climb. The more challenges a student conquers, the more confident and self-reliant she becomes in her current knowledge and ability to formulate new knowledge.

Practice plays an important role in my teaching. But, I intentionally avoid the kind of mindless repetitive practice which stops the momentum of the learning process. Practice provides an opportunity for thoughtful reflection, either individually or collaboratively. I design practice activities to keep students looking for patterns, simplifications, and connections. Practice activities should not stop the learning process, but rather preserve the learning momentum and solidify students' schemata.

Students should be responsible for their learning and for their reasoning. They should be responsible to themselves by constantly assessing their understanding and reasoning. Through classroom discourse, I encourage students to learn to evaluate their own reasoning and that of others. I provide regular self-assessment opportunities, and when appropriate, incorporate them into tests and assignments. Most of my courses also incorporate reflective writing which I read and comment on but do not evaluate.

Knowledge does not empower individuals in isolation. They must know how to communicate this knowledge to others. I provide ample opportunity for students to justify and communicate their mathematical reasoning and concepts to their peers. This occurs not only when students share solution strategies but also when they work together on a problem. I expect students to learn to communicate orally and symbolically (through the language of mathematical notation). I also challenge students to write about mathematical concepts, procedures, and facts as they are learning them.

Robert Moses, a civil rights activist, goes as far as to say that mathematics (specifically, algebra) is a gateway to social justice, just as voter registration was for African-Americans in the 1960s in the South. I am not convinced that mathematics education is the silver bullet against all societal ills; however, I agree that mathematics literacy is crucial to survival and success in our mercurial technological society. By openly engaging with our students in problem solving and reasoning in mathematics classrooms, we can teach them to become flexible and critical life-long learners.