Teaching Philosophy
Cristian Gurita

My teaching philosophy stems essentially from the following

AXIOM 1: A mathematics professor has to do WHATEVER IT TAKES to effectively convey to his students the mathematical ideas and concepts.

The second important idea is found in

AXIOM 2: Although Mathematics is a pure, abstract and objective field of study, doing, teaching and learning mathematics are very subjective processes. In order to be effective, a teacher has to understand and apply appropriate methods from this subjective point of view.

Teaching at a **personal, intimate level** and making the teaching-learning process a **bonding experience** between the teacher and the student (as opposed to plain, arid lecturing) is my way of being an effective math teacher. Best example: **Math phobia** is an all too common phenomenon and a teacher's first job is to help the student overcome this pre-existing fear of mathematics and then be the guide for the wonderful journey in the world of mathematics**.** It is hard to find a more subjective process than **helping somebody to defeat his/her fear,** be it of math or of something else**.**

Having a **rich experience** of teaching Mathematics at a wide range of levels, to students coming from very diverse countries and cultures, having various mathematical backgrounds, I realised that this is the only way to effectively teach math, and the only way to avoid students saying, after graduating college: "Math? I hate Math!" or, more politely: "Math has never been my strongest subject in college."

First task when teaching a class is to correctly understand the students' background, their expectations from the course and their willingness to do the required efforts. I usually do this is by having one or two very **informal and interactive** classes at the beginning of the semester when I ask for all this data together with a short non-credit or extra credit quiz and a short questionnaire.

Next, the results have to be analysed and the best approach has to be found, also taking into account the level of the class, the position of the specific course in the math curriculum.

Similar questionnaires and discussions will take place at the end of the semester, in order to assess the students' progress, and to receive feedback that is going to be used in the subsequent semesters. Moreover, during the whole semester continuous assessment and fine tuning is always one of the objectives in attention.

Once the strategy is set, interactivity remains the principal way to convey information and receive feedback. I make myself available to students during the classes, where I encourage them to ask all the questions they have and I answer them to the best of my ability (this is regularly pointed out by students in the semester-end course evaluations); before the classes start and after the classes end (ten minutes before and ten minutes after class, talking **informally** to students who are **not embarrassed** to ask any questions are the most well used minutes of the semester!) and during office hours. **Email** is another important communication tool, very useful for a continuous contact with the students. My students ask me questions through email, and they know they usually receive an answer the same day.

Creating a **good, active environment** in and outside the classroom is the one of the most important reasons for my success in teaching. Again, this is regularly pointed out in the teaching evaluations I receive.

From my teaching experience in various environments, levels, and subjects, students have diverse backgrounds, culturally as well as mathematically. Based on this fact, they perceive new knowledge from different perspectives. For this reason, I strive to explain mathematical concepts from as many different directions as possible. It is important and useful to keep in mind that each student constructs knowledge in

his/her own particular way. I strongly encourage my students to work together, this being nothing but interaction between themselves. This has been the most successful in **learning communities,** a concept which has been used in Temple University for a number of years now. In this case students in a class know each other well, since they take together a group of classes, and they are much more inclined to work together. Sometimes I break the class into small groups to explore some mathematical ideas on their own, with some guidance from me. The group learning allows them to develop their individual points of view of the material and construct their own mental models. More importantly, it emphasizes **learning** mathematics by **doing** mathematics, which can be viewed as a **closer interaction** between them and the studied object. One sentence I tell every semester during the first informal class: **"Math is not a spectator sport"**, trying to convince them that they cannot learn math just by watching me solving problems on the board. I push them into **solving problems on their own**, writing a problem on the board and saying: "Well, this problem could very well show up on the next quiz. If the quiz were today, would you be able to get 100% of the credit for it? Show me. You have five minutes." Obviously, this also gives a great opportunity of **instantly correcting** the possible misunderstandings and mistakes.

The trick is that I often and constantly **award extra credit** points to students who solve it fast, or elegantly, or using a different method from the one I showed them. Extra credit awarded wisely during the class is a great way to keep students **focused and motivated**.

Motivation plays a very important role in teaching mathematics. One of our biggest challenges as teachers is to show students that learning mathematics is important and enjoyable. I make every effort to broaden my students' perspectives of mathematics and its relevance to their fields of interest. I regularly present applications of mathematics to various areas such as economics, biology, chemistry, physics and everyday life. I am particularly interested in reaching out to those students who do not think of themselves as liking or being interested in mathematics or who are afraid of any mathematical theory, while the other group of students who need particular attention are the **well prepared students**, who need new challenges in order to progress further.

One of the best "tools" in this respect is **being enthusiastic** about the topic being presented. I have repeatedly experienced that my excitement as a teacher eventually sparks my students' interest in the subject. This is another aspect stressed out by my students in the end-of-semester evaluations.

It is very gratifying to work with students and motivate them to do mathematics. Showing them ideas, some of which go beyond the courses, and watching them take off with their own ideas has been a very rewarding experience. I am proud of my teaching record and take great care to build interest and excitement in my students. When at the end of a semester I compare what my students know with what they knew it the beginning of the semester and I see **good progress**, I know my work was well done.

We have thus proved the following

THEOREM: A mathematics professor who:

i) Acknowledges the canonical math anxiety that most students have and does all the efforts to alleviate it,
ii) Establishes a personal connection with the students, acting as a mentor and guide through the wonderful world of mathematics,
iii) Teaches in a highly interactive style, getting feedback from his students and always trying to correct on the spot the common problems that might occur,
iv) Is very enthusiastic about mathematics and tries to convey his enthusiasm to his students,
v) Makes himself available to students through all possible means

will be a highly effective teacher and his students will benefit greatly, showing the best possible progress.

COROLLARY: In particular, following these principles I have been a very effective teacher and my intention is to continue on this path, while being open to any possible improvement.