Teaching Statement

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"If A equals success, then the formula is: A=X+Y+Z. X is work. Y is play. Z is keep your mouth shut." – Albert Einstein

Carpe diem

As a way of introducing my teaching philosophy and experience I would like to answer the following question: How have good teachers influenced my views on teaching?

I remember two professors for their strong commitment to teaching. I had the privilege of having an emeritus professor in my first college year. He displayed *The Euclid's Elements* in our geometry class through meticulous drawings by using ruler and compass on the chalkboard, he scored these constructions with the number of times that these instruments were used on them. It was an approach that was different, yet it caught our attention and gave us appreciation toward the subject; it had a positive effect on us. We were engaged in long discussions comparing our constructions, and occasionally pleased by achieving lower scores that translates in an elegant and efficient construction.

Some years later, I was introduced to foundations of mathematics by another experienced professor. I was intrigued by thinking of mathematics as an object of metamathematics, and at realizing the existence of several logics beyond the classical. It was a course that motivated me to focus on mathematical logic as the main subject of my Master's degree.

I have perceived from the above examples that a good professor can *open minds* and mathematics can be the bridge for a dialog between a teacher and his students, but this communication requires an implicit agreement of its parts. An agreement that convey: firstly, the teacher's effort to present mathematics with examples that provide concrete contents to formalisms, helping students develop their own intuitions on them. Secondly, students' engagement with the learning experience. Needless to say, we must bring students to perform mathematics, teaching them how to articulate arguments mathematically, providing them with the necessary elements to discover solutions; necessary steps to become a more effective teacher. In addition, as it certainly would be the case, we will have mathematics majors among our students, so it becomes necessary to deliver to these students with a little bit more of substance, as it can be to stimulate their rigor on proofs and depths on abstractions through some challenging problems.

Experiences

I have more than six years of teaching experiences, of which five have been as a primary course instructor. I taught in very different environments and taught different subjects, ranging from lecture-based courses to classes where the format is oriented towards group work. Course where technological materials were required and courses with more traditional format.

This has been a fulfilling experience that I began in my country of origin Chile, and continued in the United States at places like *Wesleyan University, Manhattanville College, and New York City College*

of Technology[1]. What follows summarize different teaching periods that embody my experiences.

Currently, I have been appointed as a *Lecturer Instructor* at Manhattanville College and New York City College of Technology, where I taught elementary courses. Beyond the obvious different between these experiences, I felt spanning my teaching in two significant directions, the first by teaching an introductory course in computer science, and secondly teaching a remedial mathematics to a particulary weak group of students. I have used somehow different approaches in my teaching, the first course so called *Introduction to Data Processing* I combined the use slide show presentations and demos with chalkboard, the second course *Elementary Algebra* I design additional materials and activities like *"Sample Solutions.ªnd "Work in Class"* to the ones already provided by the coordinator of this class. Specifically, *Work in class* are sessions where students are asked to split in small groups with the purpose to solve exercises from topics previously exposed in such lecture. However, I found very useful to set up a electronic `Blackboard`[2] making course materials and communication fully accessible to students in both places.

Wesleyan University, where I studied for a doctorate gave me an opportunity to be part of a working team of senior and junior faculty, as a graduate student for two semesters, having a small class size with at most twenty students. As an instructor, I taught sections in one of the components of the *Harvard Consortium Style Calculus* sequence, which emphasizes interactive learning and group work. I prepared materials available to students on my personal web page [3] as a way to support my teaching, providing course handouts, homework assignments and some supplementary exercises.

I was appointed as *Associate Instructor* in two small private universities after my Master's degree. I had smaller sized courses and autonomy in designing those courses, stressing their content toward their target majors, as they were business and agronomy. I consider this period as a time where I learned first hand what professionals and students from different fields might need from a mathematics' curriculum.

As an undergraduate student and as a graduate student in Chile I had the main part of my experiences, starting as a grader and problem solver lecturer for Calculus courses based on *Tom M. Apostol's* classical books, and continuing as lecturer of introductory courses. Those were my first years in front of a class; a period when I gained confidence from students' feedback, often a good reflection of what were my strengths and weaknesses as a teacher.

Performance

A regular exercise in my lecturing is to relate what will be cover at current lecture with previous and further lectures do cover, resulting in students a sense continuity in the course. I do also spare some minutes trying to inquire from my students some of their impressions after class; this gives me necessary information to determine if something has been particularly difficult to them, so I can reinforce it on the next class if necessary.

At introductory courses it has always been challenging to build students' basic understanding of what a proof is, I do advocate providing some elementary logic lessons as a way of achieving this goal. In addition, to bring a class together when students have different backgrounds and skill levels also present a challenge, I have seen in my experiences that team assignments can help us to have a better integration for these kinds of groups.

[1] Wesleyan University, Middletown, CT; Manhattanville College, Purchase, NY; New York City College of Technology, Brooklyn, NY

[2] http://www.blackboard.com/

[3] `http://cmartinez.web.wesleyan.edu/Math117(03).htm`

As part of the Harvard Calculus project, I have encouraged students to see Calculus as a language that allowed us to model a physical or economical phenomenon as some usual examples, but in the same way to develop some intuitions for the numerical values of functions. It is at this last point that the use of a graphing calculator or some educational software can be extremely instructive to establish the relationship between function notation and its graphical representation. I do particularly stress this by examples that can challenge their understanding. In one occasion, I gave to solve $\lim_{x\to 0} \frac{(x^2+0{,}00001)^{1/2}-0{,}00001^{1/2}}{x}$ during class, an exercise that allowed me to generate discussion among students; a first group of students proceed by estimations that leaded them to the right answer $l = 0$. A second group approached the problem by using a graphing calculator to plot the function $(x^2 + 0{,}00001)^{1/2}$ instead; at first sight they saw that its graph had a sharp corner at $x = 0$ and therefore not differentiable, a conclusion that contradicts estimations. They were puzzled and enchanted by this apparent contradiction; the problem was solved by zooming to an appropriate scale where the corner smoothes out. As a moral, a simple exercise that encapsulated a simple fact, technology will be useful as much as we do know how to interpret it in a meaningful way

Final Remarks

Through these years, I have become aware of the diversity reflected in the classroom, being the classroom a vivid environment where teaching will be affect by it. Students have a wide range of personal and academics backgrounds, different motivations and expectations levels, all of which we should consider before trying to build on top their learning process. The diversity extends beyond these issues, is present even in a student's approach to mathematics, it is therefore necessary to interact between abstract thinking and visual thinking, algebraic skills and geometric skills.

It is my hope and effort that my classes invite students to become active participants of a learning experience and stimulate their engagement to do so.