

Teaching Philosophy

Alberto Chiecchio

Math is about creativity as much as it is about rules. This is the main principle by which I teach. To emphasize this idea, I structure the lectures in an interactive format, involving the students as much as I can. This not only encourages learning, but stimulates critical thinking, as it tends to change their notion of Math as a rigid, and thus boring or scary, topic. Moreover, it conveys to the students the idea that Math is historically determined and, at the same time, alive. As one of my professors once said, “we are not talking about Math, we are doing Math”. Some of the teaching techniques I use are discussed below.

Whenever I have to present an example or the proof of a result, I guide the students by asking them a series of questions. The students then have the feeling that they came up with the method, and this is in part true. In this process I try to emphasize as much as possible how the hypotheses were used, rather than focusing on the technical or computational details. I then recapitulate the result and how we obtained it. Since they were actively involved in the creative process, it makes it easier for them to remember the concepts.

Analogies, pictures, examples, and even stories: the more tools to help the students understand and remember, the better. I teach by analogies: with other mathematical ideas or with ideas from Physics or the real world. For example, when computing the *work* of a vector field, to justify why we consider the tangent direction, I tell them to think of a horse pulling a carriage along a railway: the only force that matters is in the direction of the railway, the rest is wasted effort. I sometimes illustrate a concept using a specific example, before presenting it in its generality. As a geometer, it comes natural to draw on the board as much as possible, to help the students visualize the concepts. Finally, if I have an anecdote regarding the history of a result, I incorporate it in the lecture.

I encourage the interaction among students: “giving ability makes us able,

communicating intelligence makes us intelligent”¹. For a student, explaining a concept to her/his peers is an optimal way to understand it, or to realize that the concept is not as clear as she/he thought. And of course, sometimes a student may find a better way of explaining a concept than the one I had used. I stimulate group discussions, usually moderated by me at the board. To favor interaction, I have also a discussion board online, where students can discuss topics of the course. In some courses I use worksheets, and I give the students practice problems and have them work on it in groups.

My goal is to have the students become an active and integral part of teaching.

¹*Solo se interrogato (Only under interrogation)*, D. Starnone, educator and writer (1995)