

Statement of Teaching Philosophy

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My ideas about teaching have grown out of my experience in three rather different educational systems. Experiences gained from the Continental European system (Germany, Norway), British system (England, Australia) and American system (USA, Israel) have led me to recognize that there is no unique best approach to teaching, but that teaching takes place in a culturally conditioned context. This varied experience has demanded of me that I regularly evaluate and adjust my approach to teaching, and has built up more flexibility in my approaches to teaching than I otherwise would have had.

For example, German students are expected to be more self-motivated than American students, who, as a rule, have to pay for their education and consequently expect to receive more support and guidance. This leads to a rather strict regimen being imposed on American students, which is necessary for ensuring sufficient success for students of all abilities. I certainly believe that frequent graded assignments are an efficient way to ensure that students will learn to handle the material offered in a course, and find it unfortunate that this approach can only be transferred in limits to German students, who are used to working on their own and resent “being sent back to high school”.

Of course, there are also culturally independent rules to good teaching. While I have observed a certain pressure to use a multimedia approach to teaching (which seems to be largely correlated with funding of these activities), I have personally found a traditional blackboard approach most suitable. Certainly this is connected to the fact that I have mainly taught theoretical physics and applied mathematics courses in recent years. In my experience the pace obtained by presenting lectures with chalk is just right for most students. Moreover, with a bit of experience it is then relatively easy to adjust the pace to optimize the students’ learning process. On the other hand, I do make use of computers when appropriate (say, visual representations of vector fields with the help of Maple in a course on non-linear physics). This I do both by presenting Maple worksheets in class and by assigning exercises which are to be solved with the help of computers.

My approach to teaching has radically changed over the last fifteen years. Having been trained as a mathematical physicist I initially used a style in which formal presentations of theories are subsequently fleshed out by examples. These days, however, I favor a rather opposite style, in which I begin by presenting chosen examples from which I then (ideally with help from the class) deduce general statements. This affords students the joy of discovery, and helps them have a deeper understanding of the material. Subsequent examples are then presented to show applicability and limitations of these general statements.

This approach is connected to my wish of teaching students not merely the facts, but to develop and enhance thinking skills. For example, a critical consideration of assumptions and limitations teaches methodological thinking important beyond the actual content of any chosen course.

One issue I have come to think of as paramount to good teaching is the teacher’s ability to successfully lecture to a very diverse group of students. For example, in my class on Mathematical Methods of Physics at Syracuse University, I had advanced undergraduate students as well as first year graduate students, some of which already had a M.Sc. degree from ICPT in Trieste. To teach such a group of

students required sensitivity to different pre-existing knowledge and ability of individual students as well as constant awareness of the students' learning process. In an undergraduate class, the diversity is even larger; at Queen Mary, I am regularly teaching students from a very diverse ethnic background.

I believe that it is important to be accessible for my students, as learning takes place at different moments and not just in the classroom. In addition to having an open door policy (students can come any time in addition to set office hours) I encourage the use of email. More often than not students work on problems on evenings or weekends and instead of waiting for the next possible time to see me at the office, a quick answer of mine to a question sent via email is all they need to overcome some stumbling block.

I have continuously developed skills in student supervision. For instance, while at the University of Manchester, I participated in a "facilitation workshop" with the goal of better enabling students to do independent work. This has proven to be useful when advising students and postdocs, as each of them need different levels of supervision and support. Attending this course enabled me to adjust my involvement in the research activities of others more appropriately. Currently I am enhancing my teaching qualifications within the framework of a postgraduate certificate of academic practice, a program which is offered at Queen Mary.

In the context of a general redesign of the structure of our first year teaching, I have become heavily involved in a new approach for the teaching of our calculus stream. Supported by an e-learning fellowship for the project "Improving student performance with web-based learning", I have just started a pilot project introducing a novel web-based component into the teaching of calculus. This project is addressing the issue that while pass-rates in Calculus have been reasonable in the past, retention of learned material has been disappointingly low. In our new approach, students are able to engage in self-paced learning. Exercises include guided solutions and sample problems; possibly most importantly, students receive instant feed-back on their level of proficiency. While student opinion on this is rather divided, student performance seems to be indeed improving.

Despite the inter-cultural differences, I found it encouraging (and revealing) that my student evaluations did not differ that much from the US system to the German or British one. My students generally remarked positively about my enthusiasm and ability to relate the subject to them; one negative point was that my expectations are too high. However, even more satisfying to me than evaluations is the fact that students find me approachable. Students in the US and UK have asked me to write letters of recommendation, and students in Germany have approached me as supervisor for diploma theses.

I gain deep satisfaction from successfully helping students to extend their knowledge. Naturally, teaching is not a one-way road; I keep learning from my students about my own approach to teaching. I anticipate continuing personal and professional growth from this process.