STATEMENT OF TEACHING PHILOSOPHY

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BACKGROUND AND EXPERIENCE

I have been teaching mathematics, in one capacity or another, at the university level since 1996. I was offered my first opportunity to teach by one of my professors at University of Hamburg while I was an undergraduate. At the time, my responsibilities as a teaching assistant included holding tutorials and recitation hours for courses in pure and applied mathematics, during which I directly interacted with classes of about 25 students. I continued teaching as a graduate student at University of Kansas (KU), and more recently as a visiting assistant professor at University of California, Riverside (UCR). At both KU and UCR, I have held sole instructorships for various mathematics courses ranging in size from 6 to 130 students.

One crucial change that I experienced as I made the transition from University of Hamburg to KU was a fundamental difference in the student population. In Hamburg I worked with groups of students that were, for lack of a better word, homogeneous; they were about the same age, they came from the same cultural and ethnic background, they often approached problems with a similar mindset, and they shared a comparable educational background as they entered the course. Quite the opposite was the case at KU, as my students differed from one another in many respects, most notably in their academic background and their reasons for pursuing higher education. This introduced new challenges and I came to realize that in order to be effective as an instructor, it is necessary to recognize these differences and to adapt one’s methods accordingly. Despite the challenges – or perhaps because of them – I have found working in such a diverse environment to be an engaging experience. There is never a dull moment.

TEACHING METHODS AND PHILOSOPHY

Most of the courses which I enjoyed (or endured) as a student were comprised of the well-organized and efficient presentation of definitions, theorems, and proofs, in a rather linear fashion. In my own experience as an instructor, however, this approach is usually insufficient at the undergraduate level; a good deal of motivation and redundancy seems necessary to make the material stick. Whenever possible, rather than merely presenting the correct version of a conventional definition or theorem, I take time to illustrate why the statement at hand should seem natural to us, at least in the given context, and why other versions of the same would be inapplicable or even false. (To this end, I find it helpful to also briefly discuss how the definition or theorem in question was first conceived or discovered by its originator.) For a concrete example, consider the product rule for differentiation of functions of a single variable: I noticed early on that even
after a thorough discussion of this rule, including the proof and calculation of many non-trivial examples, a considerable portion of the students would eventually relapse and revert to the more convenient formula \( \frac{d}{dx} f(x)g(x) = f'(x)g(x) \), and they would do so notwithstanding my explicit warnings against this fallacy. As a remedy, I began to challenge my students with the following extra credit problem during the same lecture in which I introduce the product rule: Can you come up with a pair of functions \( f \) and \( g \) such that the derivative of the product \( fg \) happens to equal \( f'g' \)? (The magical words extra credit seem necessary to entice even the laziest or least interested student to give this a try.) Those who did not pay much mind to the product rule at first are now bound to look it up on their own and to contemplate it in contrast to the woeful expression \( f'g' \), while those who were in no danger of making such mistakes in the first place still enjoy the challenge posed to them and seize such opportunities to prove themselves.

Throughout each academic term, I gradually increase the amount of independent work and thought that I demand from my students. I convey to them that while I am there to assist them at any time, they are the ones who will ultimately have to do the thinking. The more they learn, the more I entice them to contribute to the learning process. For example, I am more lenient about the use of correct notation and terminology at the onset of the course and more strict towards the end. As another example, shortly after the semester has begun, I start to phase in the policy that students who visit me with questions during my office hours should be able to present their question in a (more or less) coherent manner, in writing, on the board. Some of them may become impatient at first, as they expect me to readily provide them with the solution to each problem, and it may seem to them as if I present them with more questions than answers. Sooner or later, however, they rise to the challenge and begin to actively participate in various aspects of the course, each in their own way; while some contribute actively to the lectures, others prefer one-on-one discussions during my office hours, and yet others prefer communication via email. This is also when I notice many of them starting to develop individual strengths and a sense of confidence about the subject. In short, it seems the more I challenge them (with careful timing), the better they perform.

Ideally, I aim to coach my students to become not only proficient in the subject that is being taught, but also somewhat self-sufficient. I believe that the value of their education is not necessarily measured by the grade that they earn on a test, but more so by the extent to which they can apply their newly acquired knowledge and skills to reach their individual goals. Ultimately, the intent should be to improve their ability to think independently and effectively.

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