

THE ROLE OF THE PROFESSOR

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This essay is intended not only to help professors better understand their own role, but also to help the public at large better appreciate this role. Although the essay is written from the point of view of a professor of mathematics, its essence should apply to professors in any field.

When I am being asked what I do for a living and then answer that I am a professor, the next question invariably is: "What do you teach?" This shows that to most people, a professor is just a glorified teacher. The university administration expects me to do research as well as teaching, and it is assumed that these are the only important duties of an academic. In fact, sometimes I get questionnaires in which I am asked how I spend my time: what percentage on "teaching" and what percentage on "research". I am very uncomfortable when answering such questions. Recently I realized that I have spent most of my professional life neither with "teaching" nor with "research" in the narrow sense: rather, I have been mostly occupied with professing my subject: mathematics. There are important distinctions between a teacher, a researcher, and a pure professor. Let me make them clear.

The teacher's focus is on his students. His task is to convey a fixed body of knowledge to his students and to worry about the best way to do so. He normally follows a textbook and a "syllabus". A very important part of his job is to assign homework and to give tests to find out how much his students are learning. He pays attention to what the students think of him and his performance. He sympathizes with his students' worry about their grades.

The professor's focus is on his subject. He "lives" his subject and cannot easily switch it off, even while lying in bed awake or on vacation. He recreates the subject in his mind each time he lectures on it. He cannot know, in the beginning of a course, exactly how and in what order he will present the material. He may even, in the middle of the course, change his mind about what material to include or exclude. He always tries to find a new approach to and better insight into the subject of his course. He almost never gives a course twice in the same way, and he considers it anathema to

have to follow a textbook and a syllabus. He is pleased if some students follow and appreciate his efforts, but he finds homework, tests, and grades a nuisance. As the famous British mathematician G.H. Hardy put it in his book *A Mathematician's Apology*: " I hate 'teaching', and have had to do very little,... ; I love lecturing, and have lectured a great deal to extremely able classes;..."

The researcher's focus is on the discovery of new results. He is the creator of new knowledge. His nightmare is to get stuck in his search or to learn that what he has found has already been discovered shortly before by somebody else. Priority is very important to him and will sometimes induce him to rush into print prematurely.

The professor's focus, on the other hand, is on understanding, gaining insight into, judging the significance of, and organizing old knowledge. He is disturbed by the pile-up of undigested and ill-understood new results. He is not happy until he has been able to fit these results into a larger context. He is happy if he can find a new conceptual framework with which to unify and simplify the results that have been found by the researcher. Before going into print, he lets his ideas ripen. Priority is not an issue for him.

I and most of my colleagues are teachers and researchers as well as professors in the senses described above. Most are very good professors, but many are only mediocre teachers or just adequate researchers. I know only one who is very good in all three categories.

In the Faculty Handbook of this University, under "Criteria for Faculty Appointments", I can find almost nothing that relates to professing a subject in the sense described above. Such professing rarely gets much recognition. Most of the rewards in academia go to those who excel in research or in teaching. I believe this has had some bad effects.

The emphasis on research has led to the well-known "publish- or-perish" phenomenon. It has led to excessive specialization. A young faculty member receives promotion because the letters of recommendation say that he is "one of the best in his field"; but his field may be so narrow that there are only ten people in the world working in it, and few outside this small circle can understand the "new results" this faculty member has found. In mathematics, it is easy to get a paper published that contains new results, no matter how obscure and insignificant. Papers that present important new perspectives often are rejected because they contain "no new results".

In recent years, young faculty members are more and more encouraged to pay attention to teaching, especially since faculty-course evaluations have become common. This has made teaching more and more a popularity contest, and it has often led to lowering of standards and grade-

inflation. Most students do not know the difference between a teacher and a professor. They expect to be treated in college the same way as they were treated in high school. They do not know that, in college, they should be their own teachers.

The reasons for the push toward research and teaching alone may be, at least in part, financial. Academics are encouraged to scramble for research grants. The granting agencies want proposals that contain strategies for obtaining specific "results". As to the push towards "teaching", the following analysis by Camille Paglia in the *Times Literary Supplement* of May 22, 1992, although unfair to many parents and students, may contain some truth: "As costs continue to rise, [the colleges are] locked into a strictly commercial relationship with parents. Intellectual matters [take] a back seat to the main issue: providing a 'nice time' for students with paying parents."

One may argue that we need only researchers and teachers, and that professors are unnecessary. I do not agree because I believe that the professor is the mediator between the researcher and the teacher.

Without influence from the professor, the teacher's curriculum would soon become more and more outdated and lifeless. Even now, many of the people who write textbooks for elementary courses in mathematics are hacks who have only a very shallow understanding of the subjects they are writing about. The teachers who select these books often do not know better, and the sales success of these books depends more on the number of educationist gimmicks used than on the soundness of the content. Academics are not likely to get merit raises for writing elementary textbooks.

Without listening to the professor, the researcher would soon become a narrow specialist who loses all contact with the rest of science. The "results" found by the researcher, if not critically examined, sorted, and fit into a coherent framework by the professor, would be of little value.

I believe that it is impossible to be a good teacher without being at least a little bit of a professor in the sense of having some passion for the subject. The sad state of the mathematics education in our secondary schools is caused, at least in part, by the fact that too few teachers have any such passion. I also believe that it is impossible to be a good researcher without being somewhat of a professor, because research cannot be good unless it relates to something larger than itself.

