

THE QUEST FOR EXCELLENCE IN TEACHING

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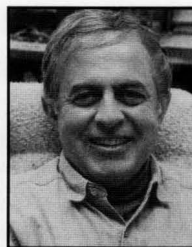
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I believe that teaching is the most transcendent of all the responsibilities of a university professor, and that the search for excellence in teaching must stand as a continuing quest for each of us. There is a view, held by some, that teaching and research are antagonistic endeavors; that one can only be done well at the expense of the other. I do not share this view. I believe that, carried out in proper balance, teaching and research should be mutually reinforcing.

Nonetheless, although it is expected that being a contributor to creating knowledge is a defining attribute of teaching at the university level, there *are* good teachers who do not do research. They are not usually recognized. Yet, the obligation to teaching is so primary and broad that, in instances when research or other obligations are in conflict with it, it must take precedence.

I believe the prerequisites for excellence in teaching to be: mastery of subject; broad knowledge of the field; meticulous preparation; faith in the potential of, and the promise in, each student; the ability to invest one's subject with purpose; the sensitivity to temper rigor with forbearance and firmness with compassion; the courage to hold to one's convictions; and the humility to admit error. It is difficult to measure excellence in teaching with precision. Indeed, it is difficult to define good teaching, although one will recognize it when one sees it. Good teachers are shaped by personal experience; the perception of what constitutes excellence in teaching is uniquely personal. This constitutes my personal statement on excellence in teaching. It is a tribute to those who have taught me.

My high school was an English boarding school in Cyprus. We took English, French, classical Greek, Latin, biology, differential equations, physics, chemistry, the history of the British Empire, and cold showers at 5:00 every morning. It was rigorous



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and it was hard. But it was bearable, except for the English food.

I remember high school as a time when I discovered that I loved poetry, literature, history, music, the sunrise, and mathematics. High school was a profoundly enriching experience; learning was a continual process of discovery. It was also a time of self-discovery. I had great teachers. They all had degrees in their subject areas and a deep interest in the subjects they taught. They did not seem to be bothered by whether or not we were having fun. They were very serious about their tasks.

We did not study American history in high school. Later, as a freshman at Maryland, my teachers were intrigued by my curiosity and interest in American history. Little did they suspect that when one has been taught to get excited about Disraeli, Palmerston, Metternich, and the politics of the balance of power in Europe, it is not difficult to get excited about Jefferson, Madison, and the politics of the power of human rights in the New World.

American history, modern poetry, and Homer stand out as the most memorable subjects from those Maryland days. It was not that chemical engineering couldn't also be exciting—but that was to come later. As a graduate student at Wisconsin I sat in the classes and in the midst of inspiring teachers: Olaf Hougen, R. Byron Bird, W. R. Marshall, Edwin Lightfoot, and Warren Stewart. Chemical engineers recognize them as men of towering scholarly reputations. I, however, stand as witness to the fact that of all their impressive achievements, the most memorable measure of their standing was the special car-

ing with which they held the humblest of students. I was in the presence of great teachers, and I felt it. I knew that I would be fortunate if I succeeded in emulating any of them as my personal example.

Through the years I have continued to learn and draw inspiration from many others: colleagues such as Chi Tien at Syracuse and Sohail Murad here, and students like Raj Rajagopalan of Houston, Alkis Payatakes of Patras, and Hemant Pendse of Maine. Perhaps I have taken something from each of my different teachers, and if so, I hope I have passed on the legacy to my own students. Great teachers are our link to greatness from the past, as our students are our link to the future. That is why the quest for excellence in teaching is a solemn obligation. Great teachers are also good students.

Good teaching is done inside as well as outside the classroom. One must have mastery of subject to enrich content, and broad knowledge of the field to place it in context and to invest it with purpose. But command of subject cannot replace preparation. Good organization, careful writing, and a pace of presentation appropriate to material and audience suggest respect for subject, seriousness of purpose, and sensitivity to student needs. The classroom presentation is not a performance, with the teacher as actor and the students as audience; they are the entire show.

Chemical engineering is a human activity. I try to infuse my classroom presentations with examples of brilliant achievements of real chemical engineers, teachers, and practitioners. I tell them that a great nation needs good chemical engineers just as it needs good poets. Otherwise, neither could its chemical engineers do a good job refining its oil, nor its poets reach for refinement in expressing its values or framing its ideals. Perhaps, ideally, a great nation needs good chemical engineers who are poets.

Good teachers are humorous when appropriate, and try to make their lectures exciting, without making entertainment or the kindling of deep emotions their highest aims. Above all, good teachers stand before students and teach them something that they know well and believe in deeply.

There was a time when I told my students that the purpose of education was not to teach them how to make money, but how to spend it well after they made it. That time is gone. Today we must teach them how to make money as well as how to spend it wisely. But I do not lament the passing of those gentler times. The challenge before us now is how to turn our students into concerned, thinking individu-

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als with durably marketable skills, without making the catering to a current job market our highest aim.

Great teachers do not yield to current fads; that is what university administrators do.

Being a good teacher means spending a lot of time with the weakest students, without losing touch with the best. It means being able to recognize and celebrate what is best in each student, without being blind to what is deficient. It means taking the time to discuss an exam with them, without conceding that the grade they have received is only a first offer. It means writing recommendation letters, even on short notice. It means helping some get scholarships, others to find jobs or to get into graduate school, and still others to get help or to seek counseling. It means meeting with parents, describing to them what we do, and if they have trust in us, as most of them still do, to demonstrate that their trust is well-placed; and if they have misgivings, as increasing numbers do, to reassure them that we are aware of their concerns and that we care.

Above all, good teaching requires that we call students to duty and that we insist they assume primary responsibility for their own learning. The hallmark of education is honesty, and honesty requires that students be told that learning is hard; often painful. That not all of us are great teachers, or even care to be. That it is possible to have fun here, but if that is *all* they want, there are better places for them—perhaps a tropical resort. That if they set their threshold for excitement high they will miss all that is full of wonder around them. That if they learn to have reverence for small wonders, they will discover exaltation in bigger ones. And that there is no entitlement to a degree in chemical engineering; only a fair chance at earning it—through hard work and honesty.

I believe that excellence in teaching is not a state of being, but rather a continual search. It is said that with prose one transmits thought, with poetry one reaches for revelation. I hope that some day before I take up poetry full time, I will have touched it in my teaching.

But then, great teaching is not in the attainment; it is in the quest. □