

FOREIGN GRADUATE STUDENTS IN A US UNIVERSITY

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In a typical physics graduate program these days, foreigners make up more than half of the student population. As a faculty member at the University of Georgia during the past two decades, I have been able to observe their impact on the teaching of physics. In this column I will examine the perspectives of the foreign students experiencing our education and those of the American students encountering large numbers of foreign students for probably the first time. I will also offer my own thoughts as an instructor who was initially thrust onto this scene little aware of its significance.

From 1970 to the present the number of permanent physics faculty here has remained at about 25; most were born and educated in the US. During this same period, our graduate student enrollment has had great year-to-year fluctuations, ranging from 20 to 40. A little more than half of our students have had foreign undergraduate degrees, and approximately half of our MS and PhD degrees were granted to foreign students.

I have been part of this scene for the past 20 years, and I have regularly taught statistical mechanics, a course that is required of all our PhD students. For most of this period, I have also been a member of our graduate admissions committee. My observations—quite qualitative to be sure—are born of this experience.

Population inversion

I will first mention the composition of our student body—the proportions of American and foreign students in a given academic year—during the past two decades. The significance of these values is self-evident: Having no American students would be unacceptable in a state-supported institution such as ours, while having no foreign students would not be preferred ei-

ther, at least not at the present time. It would seem desirable to maintain the proportion of American students at one-third to three-quarters of the total. When this range is exceeded in either direction, our teaching practices can become skewed.

Except in the early 1970s, less than half of our graduate students have been American. In more than a few years, the proportion of Americans has even hovered close to one-third of the physics student body. Some of our newly arriving foreign students have been astonished to find that they, and not the American students, form a majority in the department. It is a situation that is not likely to exist outside the US. It is indeed a population inversion.

Views from abroad

We have averaged about 10–15 foreign graduate students each year, of whom 3–5 are newly admitted. Every year the department receives large numbers of applications from abroad, many more than can be accepted. It is not easy to evaluate the applications accurately because of their large numbers and diverse backgrounds. How does one read a letter of recommendation from one country and compare it fairly with a similar letter from another country? What the students themselves write about why they wish to study physics is often quite moving. Their desire to know the truths of physical nature and their yearning to participate in the discovery process can stir resonant chords. They do not make the decisions any easier.

Why do foreign students choose to come to the University of Georgia? Although my colleagues and I would like to think that they are attracted by our growing reputation, the truth of the matter is that only a small fraction do come for this reason. After arriving here, however, they seem to soon develop an interest in our research programs. Almost all choose to stay here until they receive

their degrees.

Do the foreign students return home after they receive their degrees? Our records of the past two decades indicate that about half of our foreign students have returned to their native countries soon after receiving their degrees, to work at institutions there. Others return home later, raising this proportion to perhaps two-thirds to three-fourths. This high ratio seems to speak to their love of physics and sense of patriotism.

The above observations are quite consistent with views expressed by our current foreign students, most of whom say that they left their homelands intending to return to serve their countries. In most cases their intentions have remained unchanged by their experiences here. The exceptions are mostly among those whose native countries have been deeply affected by political turmoil.

Barriers to learning

Most foreign students must overcome linguistic and cultural barriers to succeed, especially in their first years here. Surprisingly, most arrive unprepared to face these barriers. They tend to think of physics as a universal subject with an established style of learning, much of which is expressed in mathematics. Hence studying in another country, however different, should require no special preparation except perhaps in the language.

For students coming from places where English is not widely used, their preparation for the language difference never seems enough. Most often they underestimate their real need for fluency. The overnight change of languages is for many a harrowing experience, capable of perverting even their personalities. Students who are not normally shy have found themselves reluctant to speak. Attending classes becomes a burden, and it may take a few years for them to regain their confidence.

Perhaps less severe, but nevertheless present, is the barrier due to

cultural differences. For students coming from places that have older cultural traditions, the egalitarian relationship that seems to exist here between faculty and students is confusing, and they do not quite know how to act in these circumstances. For example, we encourage our students to ask questions in the classroom. But for our foreign students, it is no simple matter to accept this encouragement. Their ingrained sense of deference seems to hold them back, and the language barrier can compound their hesitancy. Unless liberated, they cannot partake in one of our best traditions.

Action and reaction

When the proportion of foreign students becomes large, there is inevitably an impact on the American students that goes beyond the cultural diversity to which they are exposed. Nearly all American students who have taken classes with significant numbers of foreign classmates say that they were challenged and pushed to work harder. Most foreign students, they say, have a better mathematics and physics background than they.

Why this disparity? Perhaps the much discussed deficiency in mathematics and science education in our secondary schools during the last decade or two is finally showing up. It is not, I think, that the preparation our foreign students receive is intrinsically superior to ours. But in their countries, they do seem to maintain the level of math and science education that has traditionally been required of those going into science. But we do not, at least not uniformly.

One may also argue that our foreign students are chosen more selectively than our American students, from a much larger pool of applicants. Also, our foreign students tend to be older and more experienced. Nearly all of our incoming American students are less than 25 years old, but half of the foreign students are older than 25, and some have had advanced courses or have even taught college courses.

What is the effect of this disparity on our teaching of graduate courses? Because we tend to pitch our teaching to the traditional level, most of our foreign students can follow us easily, but most of our American students cannot. Sometimes we are too impatient. Sometimes we think to ourselves that we would like more foreign students. Putting aside the political ramifications of such a move, we should still resist the temptation, because if the number of American students falls too low, it can be self-

defeating in more fundamental ways.

American students contribute to the learning of their foreign classmates by explaining idioms and colloquialisms, lending their lecture notes and, at times, deciphering scribbles on the blackboard. Perhaps the most important contribution is showing the foreigners our way of learning. The foreign students laud their American classmates' enthusiasm, activism and cooperative spirit, as well as their direct and easy ways of asking questions in class. Without their American classmates, the foreign students at an American university would not receive a fully American education.

What should a professor do if the proportion of Americans in his or her class is too low? Perhaps a little digression may help illustrate my point. On two occasions, I have been a visiting professor, once in Western Europe and another time in Asia. At these two distant universities, I delivered my lectures in no less rigorous detail than at home. But unlike those at home, these lectures were seldom if ever interrupted by questions from students. It occurred to me then that in some ways the life of a lecturer would be much easier if no questions need be entertained. In my teaching in the US, no matter how well I think I have prepared or how many times I have taught a subject, a student will every now and then ask a new question. On occasion, I have broken out in a sweat when I could not think of the correct answer. While I cannot say I enjoy such experiences, I nonetheless come back to class the next day with the missing answer and I redouble my efforts in the preparation of my next lecture. I feel that my students learn more and become keener through such questions and answers, enlivened with discussion. Through this kind of dialogue, they too come to realize that physics is a living subject.

Returning to my previous question, we must recognize that a classroom full of foreign students—where one can command reverence and practice teaching unchallenged—is a danger zone. When this danger zone is sighted, we must increase our efforts to find more qualified American students and bring them into our physics programs. If this is beyond our control, we must raise our awareness of this situation and make our teaching as dynamic as possible.

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