

Rethinking graduate education

At the present time, graduate education in the United States is in a state of uncertainty. This is true for physics as for many other fields, although by almost any measure the over-all strength of our graduate physics programs is impressive. There are 170 departments granting the PhD; their total enrollment is now about 10 000, down from a 1967–69 high of over 15 000; they still admit over 2000 students each year and graduate about 1200 with doctoral degrees; their total faculties exceed 4000. About one third of the departments grant 70% of the doctorates, and these departments account for about 60% of the faculty. However, this conspicuous concentration is matched by a wide dispersion of productive graduate programs throughout the country.

Having become an intrinsic, as well as expensive, part of our comprehensive system of higher education, graduate education is now required to justify its continued public support. Since the number of advanced degrees conferred is the most easily quotable measure of the “productivity” of a graduate program, the first question usually asked concerns the apparent overproduction of PhD’s in our graduate schools. But, both from within the profession and from without, other questions about the value and viability of graduate education are being raised: Are graduate programs an expendable luxury in some institutions, tolerated in a period of expansion for the pleasure of a faculty that had to be indulged in a competitive market? Do our graduate programs have adequate support for the breadth and depth needed to provide quality education? Do they attract the best qualified students, and do they equip these students suitably for their expected careers? Do the university departments have the ability to renew themselves with gifted young physicists to ensure the continued vitality of the physics enterprise?

It is unlikely that all PhD programs can survive the critical scrutiny exemplified by these questions, which are now being asked of many state and private institutions. The physics community must address these questions and bring its proverbial problem-solving skills to bear on them. Dramatic changes are not called for, but a strategy of multiple “five-percent remedies” must be devised, as advocated by the 1974 Conference on Tradition and Change in Graduate Education at Pennsylvania State University.

The AIP and its member societies, especially

The American Physical Society and the American Association of Physics Teachers, have the responsibility to help the departments to keep physics graduate education strong. The Committee on Education of the APS has the explicit mission “to influence the style and extent of graduate education in physics.” The Committee administers the Visiting Physicists Program, which serves to acquaint graduate students with the challenges of the industrial sector and gives industrial physicists a better understanding of graduate education. In conjunction with scientific meetings, the Committee has recently launched some intensive short courses on advanced topics. With the APS Forum on Physics and Society, and the AAPT, the Committee sponsored the Conference on Tradition and Change in Graduate Education. In determining how to meet these obligations further the Committee welcomes advice from all physicists.

What else can our scientific organizations do to help maintain the strength of graduate education? Should they adhere to their confirmed stance of avoiding any evaluative role and confining themselves to be purveyors of information on the changes that are taking place in graduate education? Or should they attempt to promulgate the adoption of minimal standards of quality in PhD programs and help with the assessment of existing graduate departments? These questions confront us again with the ancient conflict between planning for the common need and reliance on enlightened self-regulation.

In either case it is essential to establish the principle that graduate education, in the largest sense, is the process of learning new insights and new techniques, engaged in by teachers and students alike, and that physics departments devoted to advanced work contribute a good deal more than a certain number of PhD degrees. It is the doing and cultivating of physics in universities, in a great variety of ways and in interaction with other disciplines, that merits support on a broad front. The interests of society in general and the physics community in particular coincide in demanding the vigorous pursuit of the highest quality in our physics graduate education. This is a valid and humane goal for our actions.

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