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Engineering: Lessons from Medical Schools

The challenges that exist in engineering education and engineering research are widely recognized. National sources of funding and of fellowships are critical. However, universities and their schools of engineering also need to look within to meet these challenges. The crux of the crisis may well be the awkward status of many engineering schools as hybrids more like academic departments than like professional schools.

From the vantage points of the Office of Science and Technology Policy and the Office of Management and Budget during the Carter years, I noted significant lessons for engineering from recent restructuring of medical schools.

No one would consider a modern medical school education complete without experience in hospital and clinic settings to complement academic work. The same should apply to advanced engineering education and experience in industrial research settings. Such arrangements widen the curriculum to include practical problem-solving, which in turn often reveals gaps in basic knowledge. Providing such options would counteract the criticism that many graduate engineering programs are too narrow or too theoretical, would stimulate industrial support, and would attract advanced students.

Most medical schools have full-time academic faculty members who work in research laboratories established or expanded at affiliated hospitals. Some of these laboratories are distant geographically or professionally from the schools, and faculty have often viewed these situations as less desirable. Nevertheless, the creative development of new ties and useful facilities has made it feasible for university medical centers to build up new programs and attract faculty who are capable of competing for outside support.

Some engineering faculty members already perform research in industrial laboratories, research institutes, or contract research groups outside the academic structure. These extra-academic arrangements provide salary supplements, special research challenges, and access to better equipment, while ensuring adequate protection of proprietary interests. More opportunities may exist for such arrangements, and they should be assessed as an alternative to losing or failing to recruit faculty members.

Universities will have to recognize and tolerate the professional status and incomes of such engineering faculty. In turn, faculty with off-campus activities must honor their primary commitments and fulfill their responsibilities within the university community. As most medical school faculty can testify, this scheme is a formula for long hours and hectic schedules.

In most medical schools, selected full-time practitioners form a "clinical faculty" who supplement the teaching of the full-time academic faculty and give students a wider experience in medical training and practice. The clinical faculty typically exchange their time and access to their patients for the prestige and stimulation of the university medical center affiliation.

The potential for a counterpart of the clinical faculty in engineering is quite real. The stronger the academic faculty, the more likely they will be to interact comfortably with professionals outside the academic community. In a time when the popularity of engineering fields and the teaching loads are changing rapidly, schools should value the flexibility to expand teaching without making long-term academic commitments.

Schools of engineering vary in their interests, circumstances, traditions, and geographic proximity to industrial or government laboratories. Each school must clarify its goals and its preferred mix of theoretical and applied work. Medical schools were in similarly diverse situations when they devised clinical relationships and expanded research. Institutional planning, not just national leadership, is needed to restructure many engineering schools so that academic and professional objectives can be addressed and both kinds of activities can flourish.—GILBERT S. OMENN, *Science Policy Fellow, Brookings Institution, Washington, D.C. 20036 and Professor of Medicine and of Public Health, University of Washington, Seattle 98195*