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EDITORIAL

Research, Education, and America's Future

No issue is as vital to the future of U.S. research universities as a renewal of commitment to the mutual benefits of research and education. One of the great strengths of our research universities is their ability to link the creation of new knowledge with the transfer of that knowledge to students. Unfortunately, numerous signs (some real, some perceived) point toward a growing emphasis on research and a de-emphasis on education.

A sensationalistic view of these trends often emerges in the popular press. Recent stories* have described a detached professoriate leaving teaching to graduate students (often with deficient spoken English skills), reward systems based on "publish or perish," faculty "buying out" of teaching responsibilities, and tenure and promotion decisions based entirely on one's ability to attract federal research dollars. These types of reports have fueled a growing public backlash against higher education. A number of states have gone so far as to institute minimum requirements for classroom time and office hours for faculty at public research universities. Although there is certainly some truth in these perceptions, surveys of science and engineering faculty suggest that the situation is both less sensationalistic and more complex. Such surveys report that science and engineering faculty at research universities spend one-third of their time teaching versus just over 40 percent doing research. However, the trend is clearly toward research. The share of research university science and engineering faculty reporting research as their primary responsibility increased from 19 percent in 1973 to 33 percent in 1993, while the share naming teaching as their primary responsibility declined from 69 to 53 percent over the same period.†

Regardless of how one views these trends, a larger set of forces makes it clear that the integration of research and education deserves a higher priority on federal and university agendas. Today's students will spend their careers in a 21st-century workplace that presents complex and open-ended challenges. Those who will thrive in this setting are those who have been educated in a discovery-rich environment. Linking the two activities is also a sound investment of U.S. tax dollars. In a 1995 speech, Massachusetts Institute of Technology President Charles Vest observed, "The most valuable and farsighted concept to emerge from the original [Vannevar] Bush vision was that by supporting research in the universities, the government would also be investing in the education of the next generation—a beautiful and efficient concept. In short, every dollar spent would be doing double duty. This integration of teaching and research is at the heart of America's unique system of research universities."‡

Now is the time to examine all the issues that contribute to imbalances between research and education at research universities. Many institutions have already begun: Efforts (frequently highlighted by *Science*) by individual professors, departments, and entire universities are currently under way. The National Science Foundation hopes to create an environment within universities and the science and engineering community where such efforts can not only grow but are expected and encouraged. The agency's new Recognition Awards for the Integration of Research and Education are one such mechanism.

Learning and discovery are truly inseparable processes, and both lie at the heart of research universities' missions. We also know that the 21st-century U.S. work force will require skills such as solving complex problems, dealing with uncertainty, and probing the unknown that are best acquired through discovery-based learning experiences. Committing ourselves to the integration of research and education will help secure our nation's future by reinvigorating a traditional strength of our great universities.

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*K. Heller and L. Eng, "Higher Education: How High the Price? A Five-Part Series," *Philadelphia Inquirer*, 31 March to 4 April 1996, p. 1; R. Grossman and C. Leroux, "Research Grants Actually Add to Tuition Costs, Study Claims," *Chicago Tribune*, 26 January 1996, p. 1.
†National Science Board, *Science and Engineering Indicators—1996* (NSB 96-21) (U.S. Government Printing Office, Washington, DC, 1996).
‡C. M. Vest, "Research Universities: Overextended, Underfocused; Overstressed, Underfunded," speech delivered at the Cornell Symposium on the American University, 22 May 1995, p. 4.