

Editorial

Global Leadership in Science and Technology

Recent reports by two groups question whether the U.S. position of global leadership in science and technology can continue. They also identify U.S. science education as a major factor in maintaining the strength of the U.S. economy in an increasingly competitive world.

A report by the Task Force on the Future of American Innovation titled “The Knowledge Economy: Is the United States Losing Its Competitive Edge?” identifies benchmarks—facts or projections that indicate erosion of the U.S. leadership position (1). Several of the benchmarks apply to education.

- Undergraduate degrees in science and engineering (S&E) are awarded to a smaller fraction of undergraduates in the U.S. than in other countries.
- The U.S. share of worldwide undergraduate S&E degrees has dropped.
- Annually the U.S. has a smaller share of the worldwide S&E doctoral degrees than both Asia and Europe.
- The proportion of U.S. citizens in U.S. S&E graduate programs has dropped below 50%, and 57% of S&E postdoctoral fellows are foreign-born.
- Since 1980 the number of S&E positions in the U.S. workforce has grown at nearly five times the rate of the workforce as a whole, but the number of S&E degrees is growing less rapidly than the workforce.
- Rapidly increasing retirements from the S&E field imply that, unless more domestic students pursue S&E degrees, the U.S. is likely to experience a major shortage of high-tech talent.
- As a percentage of gross domestic product, U.S. federal funding of basic research in engineering and physical sciences has declined over the past 30 years.

Another report, prepared by the Business–Higher Education Forum, states in its introduction, “Increased global competition, lackluster performance in mathematics and science education, and a lack of national focus on renewing its science and technology infrastructure have created a new economic and technological vulnerability as serious as any military or terrorist threat.” (2). The report calls on business and higher education leaders to “commit to new and collaborative roles to improve the teaching and learning of mathematics and science in P–12”. The report urges business and higher education leaders to work with teachers to “champion promising initiatives already begun” and to “develop and implement new strategies, policies, and programs that will raise the mathematics and science achievement of *all* of America’s students”.

The Business–Higher Education Forum recommends that four related actions be taken simultaneously:

- In every state, establish a P–16 education council that includes P–12 classroom teachers as well as business, education, and public policy leaders.
- Coordinate changes in content standards, curricula, assessments, teacher preparation, and accountability

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practices with each other and with higher education, business, and government.

- Convince business and higher education to take more responsibility for leading efforts to improve P–16 education.
- Implement coordinated public information programs at the national and state levels.

These four actions are intended to provide a holistic approach to improving mathematics and science education for all students throughout the U.S. The Business–Higher Education Forum emphasizes that the U.S. must begin this initiative immediately or lose its leadership in S&E.

Many of those who are nearing retirement or have recently retired from S&E research, teaching, or government positions were attracted to science at least partly as a result of the public’s perception during the 1940s and 1950s that S&E were crucial components of our nation’s vitality and future progress. During and after World War II policy-makers realized that S&E research, development, and education were important. The launching of Sputnik brought similar realization to the general public and generated great enthusiasm for science as a means to contribute to the public good. Despite the fact that S&E is making much greater contributions today to medicine, materials, and much else, a similar enthusiasm on the part of the public and especially students seems lacking.

By joining with and supporting the efforts of the Task Force on the Future of American Innovation and the Business–Higher Education Forum we can help generate more enthusiasm and insure that *all* students know how important S&E are to our society. Only if we make strong efforts to involve people of every race, ethnicity, gender, and income level in S&E, provide them with the best possible education, and enhance their ability to find productive, meaningful careers can the U.S. hope to maintain global leadership in science and technology.



Literature Cited

1. Task Force on the Future of American Innovation. The Knowledge Economy: Is the United States Losing Its Competitive Edge? <http://www.futureofinnovation.org/> and http://www.chemistry.org/portal/resources/ACS/ACSCContent/government/benchmark_of_our_innovation.pdf (both accessed Apr 2005).
2. Business–Higher Education Forum. A Commitment to America’s Future: Responding to the Crisis in Mathematics and Science Education. <http://www.bhef.com/MathEduReportpress.pdf> (accessed Apr 2005).