New Analysis Questions Push for More Degrees

Academics, business leaders, and politicians have warned repeatedly that the United States risks losing its economic edge unless it produces more scientists and engineers. They also say that the country’s system of science and math education is not up to snuff. But a new study* questions two basic tenets of that argument, concluding that work force data do not support claims of a looming labor shortage and that test scores indicate U.S. students are doing at least as well in science and math as their international counterparts are.

The supposedly sorry state of STEM (science, technology, engineering, and mathematics) education was a driving force behind enactment this summer of the America COMPETES Act, which authorizes $44 billion for a cornucopia of research and education programs across several federal agencies (Science, 10 August, p. 736). The bill drew heavily on a 2005 U.S. National Academies’ report, the title of which, Rising Above the Gathering Storm, refers to the impending economic crisis facing the United States unless it bolsters STEM education (Science, 21 October 2005, p. 423).

But sociologist Harold Salzman of the Urban Institute and demographer B. Lindsay Lowell of Georgetown University, both in Washington, D.C., say that the academies’ report paints a misleading picture and that its assumptions are leading to flawed STEM education policies. They note that the annual U.S. production of bachelor’s, master’s, and doctoral degrees in STEM fields has averaged three times the annual growth of science and engineering jobs between 1985 and 2000. They also point out that fewer than one-third of the 15.7 million workers with at least one STEM degree at any level hold jobs that require such training. Given those numbers, says Salzman, “expanding our production of scientists and engineers just defies market reality.” Last week, Salzman made his case twice on the same day, at a talk at the Urban Institute titled “Houston, Do We Really Have a Problem Here?” and in a hearing before the House Committee on Science and Technology on how globalization affects the U.S. science and engineering work force.

The authors also say that U.S. students are learning more than critics give them credit for. For example, they note, math scores on the National Assessment of Educational Progress (NAEP) for students in eighth grade rose 15 points from 1973 to 2004. And contrary to popular belief that they trail the pack, says Salzman, U.S. students rank in the middle tier of countries on an international assessment of 15-year-olds in math and science.

Norman Augustine, former CEO of Lockheed Martin and chair of the panel that produced the Gathering Storm report, does not buy their arguments. In an e-mail to other members of the panel, Augustine notes that “what the [new analysis] does not observe is that an undergraduate degree in [science or] engineering is a prized credential for those who wish to attend business school, law school, medical school or [go into] a number of other fields[.]. . . . If the Gathering Storm report is incorrect, we will end up having devoted additional dollars to improving our children’s education and to the discovery of new knowledge. On the other hand, if Drs. Lowell and Salzman are wrong, America may well face a serious growth in unemployment and a commensurate decline in its standard of living.”

Those who argue for strengthening U.S. science education say that NAEP is not the right yardstick for measuring what today’s students need to know. “In a global economy with a global labor pool, it is insufficient to compare American students’ past performance to American students’ current performance,” says Bill Bates of the Council on Competitiveness, one of several groups that lobbied heavily for the COMPETES Act. Salzman and Lowell say that they are not arguing for the status quo but rather that any new policies should address the real problems in STEM education. For elementary and secondary schools, they say, there is more for the lowest performing students, many of whom are minorities. And within higher education, they say that scholarships should be based on market demand for workers trained in individual disciplines rather than across-the-board support. Salzman also recommends that universities put greater emphasis on teaching communications and teamwork skills. “The iPod’s success has had more to do with its creative design rather than its technical guts,” he says.

Augustine says Salzman and Lowell have raised some important issues but that he is worried their criticism could undermine efforts to boost the research and training budgets of federal research agencies slated for growth in the COMPETES Act. However, David Goldston, the top staffer on the House Science Committee before he retired from the government last year, doesn’t think their paper will weaken the case for greater investments in science and engineering. “It’s worthwhile to debate what the nature of the investments should be, what part of the social scale they should be targeted toward, and what competitiveness really comes from,” he says. If the new study sparks those discussions, Goldston adds, “that’s all to the good.”

-YUDHIJIT BHATTACHARJEE

* www.urban.org/UploadedPDF/411562_Salzman_Science.pdf

Against the grain. Harold Salzman (center) told Congress last week that the United States produces enough technical workers for the economy.