Lifelong Education Opportunities
Bill Number:
Hearing Date: April 14, 2005, 10:00 am
Location: SD430
Witness:
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Testimony

Good morning, Mr. Chairman, Senator Kennedy and members of the Health, Education Labor and Pensions Committee. I am pleased to testify today for the Business-Higher Education Forum (The Forum). The Forum is a national non-profit membership organization of chief executives drawn from American corporations and higher education. I might offer a special greeting to Senator Alexander, an alumnus of the Forum, from the time of his tenure as President of the University of Tennessee.

The Forum's mission is to encourage dialogue among leaders of the two sectors on issues central to the role of higher education in the global economy and to provide leadership in shaping sound policy around those issues. We achieve this through collaboration of corporate and academic members, the highest quality research, effective communication, and advocacy with federal, state, institutional and corporate policy makers.

Our recent work has centered, among other issues, on university-industry research collaborations, the role of information technology in transforming teaching and learning, the changing nature of student skills needed in the workforce, and on the challenges of improving access to higher education to an increasingly diverse population. In February 2005, The Forum released its most recent report, A Commitment to America's Future: Responding to the Crisis in Mathematics & Science Education, an action plan for systemic reform.

Many of our members are CEOs of major U.S.-based corporations and research universities. Indeed, our corporate members represent some of the largest research-based pharmaceutical and high-tech corporations in the nation—among them are Pfizer and GlaxoSmithKline, Raytheon and Boeing, IBM and Sun Microsystems to name a few. Our academic members represent a critical mass of the nation's research universities that both educate and employ substantial numbers of mathematicians, scientists, and engineers. As such, our membership is keenly aware of the challenges the nation faces in creating a workforce equipped with the adequate 21st century skills and the need to continue to advance learning long after our students graduate from our high schools, colleges and graduate schools. These challenges are particularly acute in light of rapidly changing demographics, which will bring unprecedented numbers of minority youth to the doors of U.S. postsecondary education institutions and into our economy. Our members are also sensitive to the implications of a well-educated workforce for research, innovation and, intimately, for economic development and global competitiveness.

Concerned by these challenges, in 2002, Forum members launched an initiative on the

state of U.S. mathematics and science education. Led by co-chairs William H. Swanson (Chairman & CEO, Raytheon Company), Warren J. Baker (President, California Polytechnic State University), and L. Dennis Smith (President Emeritus, University of Nebraska) and supported by a working group of members, this effort explored in-depth the state of mathematics and science education in this country, workforce trends, and effective policies for responding to what they defined as a crisis.

While it is common for groups to come before the Senate and proclaim national crises, the data and trends that our initiative collected are truly shocking. Frankly, it has our corporate and university CEOs extremely worried, not just for U.S. corporations' ability to compete globally, but for the health and effectiveness of the nation's schools and colleges as well. The trend lines for demand for graduates who are literate in science, technology, engineering and math will surge while the production of Americans educated in these fields declines.

Our research identified four disturbing trends:

Increasing demands for U.S.¬ workers with higher levels of mathematics and science skills;

Disappointing performance trends of U.S. students on comparative¬ international mathematics and science assessments;

Decreasing¬ numbers of science and engineering degrees awarded to U.S. citizens; and

A critical shortage of qualified mathematics and science¬ teachers.

Let me briefly share with you the data that demonstrate these trends:

Rising Demand

Jobs requiring science, engineering, andθ technical training will increase by 51% between 1998 and 2008, four times faster than overall job growth (U.S. Department of Labor).

By 2008, 6 millionθ job openings for scientists, engineers, and technicians will exist. Of the 20 fastest-growing occupations projected through 2010, 15 of them require substantial mathematics or science preparation. (Bureau of Labor Statistics).

More than 60% of new jobs will demand a solid high schoolθ education and some postsecondary education, while only 12% of new jobs will be available to workers without a high school diploma (Council on Competitiveness).

Disappointing Trends in Student Performance

θ U.S. student performance on international assessments show that: achievement in

mathematics and science deteriorates from being significantly above average at grade 4 to near the bottom in high school; and, problem solving performance by grade 10 students is significantly lower than their peers in 25 countries. Shockingly, 58% of U.S. students did not exceed the lowest level of problem solving achievement.

In addition, recent NAEP (National Assessment ofθ Educational Progress) results indicate that 30 percent or less of the students who take the test in the United States attain the proficiency level. In mathematics and science achievement, when results are broken down by race/ethnicity, we see African-American students lagging far behind other groups. Specifically, in 2003, student achievement in 4th- and 8th-grade mathematics showed percentages of African-American students at or above proficiency to be respectively 10 and 7 percent. In 2000, results in science achievement were no more encouraging, with percentages falling from 7 percent in grade 4 to 3 percent in grade 12 (National Assessment of Educational Progress).

Twenty-two percent of all college American college freshmenθ do not meet the performance levels that are required for entry-level math and need remedial courses. Less than 40 percent of the students who plan to enter science and engineering majors graduate in six years from those fields.

Decreasing Degree Productivity

In 2001, U.S.θ citizens and permanent residents comprised approximately 60% of full-time graduate students in science and engineering, down from 70% in 1994. In engineering, this percentage dropped from nearly 60% to a little more than 40%; in computer science, from a little over 50% to 35% (National Science Foundation).

By 2008, 2 million science and engineering workers areθ expected to retire, resulting in a short-fall of more than 2 million workers (NASA).

The European Union out-produces engineers two-to-one compared toθ the United States. The college population is increasing ten times faster in China than in the United States, where less than a third of students enter science and engineering programs, and nearly 75 percent of the students in China are pursuing degree programs in science and engineering in universities that are increasingly high quality institutions (National Science Foundation).

θ In 1999, America granted only approximately 61,000 bachelor-level engineering degrees, compared to more than 134,000 in the European Union, 103,000 in Japan, and more than 195,000 in China. Only seven percent of the 868,000 bachelor-level engineering degrees granted worldwide were earned in the United States (National Science Foundation).

Shortage Extends to Teachers

Betweenθ 260,000 and 290,000 new math and science secondary school teachers will be

needed in the 2008-2009 school year (U.S. Department of Education).

Inθ 1999-2000, approximately 50,000 more teachers left the profession than entered it (The Christian Science Monitor)

During 2002-2003, nationwide,θ districts hired more than 10,000 foreign-born teachers with H1B visas in public and private schools. Decreases in numbers of available visas coupled with an international shortage of teachers are threatening offshore supply.

These facts suggest a systemic problem with mathematics and science education in the United States that will limit our ability to create and maintain a 21st century workforce. They will affect: our ability to place qualified science and math teachers in our schools; qualified professors in our college classrooms and labs; conduct basic research in our university labs; limit our corporations' ability to compete globally; and, ultimately the ability to grow our economy in a globally competitive environment.

The Forum recommends taking immediate action to address this crisis by working simultaneously on all the P-12 components of systems of education. In A Commitment to America's Future, we recommend several immediate actions for state policymakers and corporate leaders:

Action 1: Establish a new element of state education infrastructure, a P-16 education council with balanced representation from corporations, education, and policy leaders. The council should be charged by the state to define, benchmark, and initiate a statewide P-16 plan for ensuring that all P-12 students successfully complete a high-quality mathematics and science education.

Action 2: Simultaneously address and align five key components of a P-12 education system. Effective mathematics and science education requires the close alignment of a P-12 system's student standards, curricula, student assessment, teacher quality, and accountability. Proposed change in any one of the five components demands attention to resultant effects in the other four. In particular, it demands attention to necessary changes in the policies and practices of higher education, corporations, and government.

Action 3: Engage corporations and higher education in more effective P-12 reform roles. Corporations must accept responsibility for leading a state's P-16 council work; it also must align all corporate education outreach initiatives with the state's vision of standards-based improvement of P-12 mathematics and science education. Higher education must implement policies and programs that place the education of teachers — in particular, teachers of mathematics and science — at the center of its mission.

Action 4: Implement coordinated national and state-specific public information programs. These two professionally designed programs must be based on a common set of core messages. The corporate-led national campaign should be designed to convince the

public that a high-quality mathematics and science education is necessary to ensuring the adult educational, economic, and civic life of the students now in the schools. Each state-level campaign, developed in cooperation with the state's P-16 council, should localize and support the core messages of the national campaign.

While these recommendations address only a small portion of a much broader systemic crisis in science, technology, engineering, and mathematics education (the so-called STEM disciplines), the Forum is launching the second phase of its work in this area by examining the problems that exist in lifelong learning programs, community colleges, colleges and universities, and graduate schools. Members of the Forum also will explore problems encountered in student visa and immigration policies and their impact on the flow of students, scholars, and researchers to U.S. institutions of higher education, laboratories and corporations.

Our June meeting will bring together scholars and policy makers to begin a process for developing policy recommendations as part of a comprehensive strategy to address these problems. The Forum will examine policies to:

Attract more studentsθ into the STEM disciplines.
Provide incentives for these students to chooseθ careers in teaching these subjects.
Encourage more collaboration amongθ universities, corporations and government to tackle the sources of the crisis.
Ensure that the programs that support students in STEM disciplinesθ and institutions conducting basic research are strengthened, especially programs in the National Science Foundation.
Ensure that American postsecondaryθ education institutions and corporations can recruit the most talented foreign students, scholars and researchers.

Unless we develop a systemic response to the crisis in STEM education in the United States (beginning at middle school level), we risk ceding leadership in science, technology, research and innovation to other nations, which will have profoundly negative consequences for the nation's economic well-being. Unlike many crises, there is consensus about the seriousness and implications of the problems, and the tools at our disposal to address these.

The challenge we face is to generate consensus on how to act at the federal, state, institutional and corporate levels. I can assure you, Mr. Chairman, that the members of the Forum feel the urgency of this crisis. They enthusiastically support the efforts by the National Governors Association for action in the states, and they stand ready to help the Committee in addressing these critical issues at the federal level.

I will be happy to address any questions you might have.