

STEM Education Benefits All

By Dr. Mel Schiavelli**

President Dwight D. Eisenhower, with a stroke of a pen, effectively launched the nation's public space program by signing the National Aeronautics and Space Act and establishing the National Aeronautics and Space Administration (NASA), which began its operations on October 1, 1958.

NASA's successes and failures, as well as its bureaucracy, are well documented. Its accomplishments during the past 50 years, however, are a testament to technology, innovation, and the value science, technology, engineering and mathematics (STEM) education brings to the nation. NASA was able to rely on a STEM-educated workforce capable of by generating the new knowledge necessary for manned space flight. Fifty years later new knowledge is still the engine that drives innovation. Innovation is the coin of the realm in a 21st century global economy, creating new technological concepts that drive economic growth and job creation and allowing us to prosper in the competition of the global economy.

Innovation today still requires a scientifically literate population and a robust supply of qualified graduates. Unfortunately, a recent report from Tapping America's Potential (TAP), a coalition of 16 of the nation's leading business organizations, shows that the U.S. is losing its ability to innovate and, in effect, its ability to compete.

The report, *Gaining Momentum, Losing Ground*, indicates that little real progress has been made toward the goal of doubling the number of students earning bachelor's degrees in STEM subjects. Since 2005, the number of STEM degrees awarded to undergraduate students has only increased by 24,000, to 225,000--a number that is not on track to meet the TAP goal of reaching 400,000 by 2015.

Innovation begins with the talent, knowledge and creative thinking of a workforce. High-quality STEM education and learning environments that prize innovation and imagination produce graduates who will germinate new inventions, develop new products, and create new solutions to many of our world's most pressing problems.

In the highly competitive global economy, the United States faces the daunting task of supplying our own nation with capable science and technology workers. Collectively, India, China, South Korea, and Japan have more than doubled the number of students receiving bachelor's degrees in the natural sciences since 1975, and quadrupled the number earning engineering degrees. Since the late 1980s, the European Union has produced more science and engineering Ph.D.s than the United States. These countries are hungry to succeed and increasingly capable of doing so.

STEM is now, and will increasingly be, the universal languages of the global marketplace. The nations that invest heavily in STEM education, research, and the development of a skilled STEM workforce will enjoy leadership positions. American students, however, are falling behind in the essential subjects of math and science, putting our position in the global economy at risk.

The key is to avoid having a myopic view on STEM education. STEM education prepares all students for the challenges and opportunities in today's 21st century economy--not just for careers as a scientist. The National Science Foundation estimates that 80% of the jobs created in the next decade will require some form of math and science skills. Engaging and rigorous undergraduate STEM education provides the foundation for the STEM workforce, for advanced study, for well-prepared K-12 teachers, and for an educated 21st century citizenry.

If the U.S. is going to be competitive, we must build a new vision of the role of education in preparing students for the 21st century workforce. Harrisburg University of Science and Technology, with its combined efforts from educators, businesses, and government is an example and a role model.

Our students learn STEM content and processes essential to the world of work and the region's economic development. Business leaders mentor students, teach as corporate faculty, and host internships. Regional organizations provide input into the courses and get the much needed employees who are able to step in and immediately fill the shortage of technically-educated workers with the essential competencies of communications, critical thinking, information fluency, and ethical and civic responsibility. The Commonwealth gets a workforce that can help drive innovation and sharpen America's competitive edge.

NASA's motto is simple: "For the benefit of all". We should adopt a similar view of STEM education.

-hu-

** Dr. Mel Schiavelli is professor of chemistry and president of the Harrisburg University of Science and Technology in Pennsylvania, a private, non-profit, teaching university that offers experiential academic programs in the nationally-critical STEM disciplines to a diversity of student learners. The University's mission also includes a dedication to meet the needs of the Capital Region's youth, workforce, and businesses to create, attract, and expand economic opportunities.