



The Times

Wealth-building:

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The house of cards, more respectfully referred to as the financial markets industry, upon which our economy has been built in the last decade, puts the U.S. economy, our security and our standard of living in great jeopardy. The continued drumbeat of headlines decrying our nation's economic woes underscores the urgent need for an economic strategy that transcends market manipulations, tax breaks and belt-tightening. Short-term fixes do not address the long-term goal of sustainable wealth creation.

Not only have we deluded our selves with a false sense of prosperity, we have been distracted from the way in which our great country and our state, in the tradition of Thomas Edison, have always created economic value: through invention, creativity and translating scientific breakthroughs to transformational technologies.

The 2007 National Academies report, "Rising Above the Gathering Storm," stated that as much as 85 percent of measured growth in U.S. income per capita was due to technological change. In order to invent the new technologies that will fuel our economy and improve our world -- with cleaner, alternative energy sources, more fuel-efficient cars, improved delivery of health care, safer food production, cleaner water for the millions of people worldwide who lack it, and many other areas -- our schools and higher-education institutions need to produce more innovators and inventors. Yet, there is a widening gap between science and engineering (S&E) job growth and the number of S&E graduates the U.S. produces: S&E jobs grew by 4.2 percent between 1980 and 2000, but the number of S&E degrees granted increased only 1.5 percent during that same period.

Earlier this year, the American Society of Engineering Education reported that, despite a growing national demand for their skills, the number of engineers graduating from American colleges decreased in 2007 for the first time since the 1990s.

According to the "Governor's Report on Economic Growth Strategy for the State of New Jersey 2007," the state ranks 29th in the nation in the number S&E graduate students studying in state colleges and universities. The report stresses the need for an additional investment in and reform of k-12 and higher-education systems to ensure future economic growth. The National Governors Association 2007 report, "Innovation America, Building a Science, Technology, Engineering and Math Agenda," calls upon states to develop k-12 standards and assessments in technology and engineering as well as in math and science.

Over the next few months, the state of New Jersey has a unique opportunity, if not an obligation, to do just that: to steer more students into the critical fields of invention and innovation by ensuring that all students in elementary, middle and high school receive some meaningful exposure to engineering and innovation as an integral part of their k-12 education, not merely as an elective or extracurricular activity. As the state Board of Education debates the revised New Jersey Core Curriculum Content Standards this fall and into the spring, I would call on our state's parents, education and business community leaders to voice their support for the inclusion of engineering and innovation in science, which all students are required to take, and which parallels the direction of the National Assessment of Educational Progress, which, for the first time, will include technological design as 10 percent of its science exam in 2009. This structure will provide an introduction to these concepts that can be further pursued through technology education courses.

In "The World is Flat," Thomas Friedman vividly illustrated that technology has and will continue to shape the U.S. and international economies and workforce. Preparing students to be adaptable and flexible in a

rapidly changing, 21st-century global economy will require more exposure to technological design, problem-solving and innovation -- skills inherent in an engineering orientation. Regardless of the career they choose, in order to be successful throughout a 30-40 year career, workers will need more, not less, experience with these skills and disciplines.

With the obligation to prepare students for long-term career success and our country's urgent economic challenges, it is clear that our state needs to expose each and every student to engineering and innovation in his or her required k-12 courses. Doing so will provide students with critical 21st-century workforce skills while at the same time benefiting our economy.

An investment in research and development is required, beginning with creating the next generation of inventors, innovators and technology entrepreneurs who are now in our state's k-12 classrooms. Exposing all students to innovation and engineering as an element of required science courses and further detailing them in the context of technology education courses are critical steps toward unleashing the creativity and innovation that has powered New Jersey since the days of Edison.

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