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New visions for engineering

By Thomas Katsouleas
Published: Thu, Mar. 12, 2009 04:04PM Modified Fri, Mar. 13, 2009 06:32AM

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DURHAM -- Bailouts, layoffs and foreclosures have been dominating our headlines so much that it seems as if all of our country's biggest problems are about economics. But if you take a closer look at issues ranging from saving the auto industry to controlling health-care costs, you'll see something else that's critically important to getting us back on the right track.

It's the technological nuts and bolts of how we're going to spend the dollars and cents.

No matter how many billions of dollars the stimulus package directs to renewable energy, for example, somebody still needs to figure out how to produce more efficient batteries, cars and solar panels. Technical experts also have an essential role to play in making our industries more competitive, bridges more durable, medicines more effective and troops better able to fight wars.

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Political leaders can't achieve these goals just by throwing money at them; they need the help of engineers and others capable of translating goals into reality. The National Academy of Engineering recently compiled a list of such "grand challenges," which include making solar energy economical, preventing nuclear terror, providing clean water and reverse-engineering the human brain.

Unfortunately, half of all Americans feel that at least one other country is better able to succeed in meeting these challenges, according to a national survey Duke University released earlier this month. The survey by Hart Research Associates found Americans just as likely to say our country's ability to compete technologically over the past century has worsened as to say it has improved. They consider China the nation most likely to replace the United States as the world's leader, followed by Japan and Europe.

Even though only a third of Americans said they know much about engineering, they are astute in recognizing that innovation is essential to their future and that our country's leadership is not assured just because we invented everything from the airplane to the personal computer. More than half felt the lack of competitiveness is reversible if we make investments in education.

What do we need to do? In the short term, as our country addresses the current crisis, it must ensure technical experts are working alongside economists, lawyers and others in developing new policies. More generally, our country must train the kinds of engineers who can look beyond gizmos and equations to collaborate as true partners with policy makers, business professionals, social scientists and humanists in turning ambitious public policies into reality.

Many engineering students welcome this challenge. A recent National Research Council survey found them to be less motivated than earlier generations by puzzle solving, and more eager to change the world. Those of us charged with educating these students have a responsibility to ensure they learn not only circuits and statics, but also about geography, culture, markets and human behavior. Instead of just training "technies," our goal should be to produce socially conscious entrepreneurs with a broad perspective.

When a group of Duke engineering students went to Uganda to try to bring internet connectivity to an isolated African village, for example, they discovered instead were people unable to pay monthly charges for internet service. In response, they started up a local version of an internet café.

It wasn't the fanciest establishment, but it worked. And it required the students to stretch beyond their technical know-how. We need more of this kind of education.

Other engineering schools across the country are also re-examining their teaching practices to produce students with intellectual breadth to match their technical skills. It's an effort far less visible than the turmoil in Washington and on Wall Street, but its outcome is critically important and will affect Americans regardless of whether they have ever set foot on an engineering campus.

Even as layoffs and foreclosures dominate the headlines, in other words, we must not look to spending alone to solve the current crisis. We need to invest in a new type of education to ensure our country has the people it needs to handle the nuts and bolts along with the dollars and cents long after the current headlines fade.

Thomas Katsouleas is dean of the Pratt School of Engineering at Duke University.

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