DiGennaro: What skills are needed? Who will teach them?

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Task forces and think tanks all too often issue reports about how the future economic health of our nation, a state or a region hinges on the ability of U.S. universities to graduate more students who are equipped to handle jobs in science, technology, engineering or math (STEM).

With all the reports and budget proposals, however, there appears to be a lack of coordination between STEM education initiatives and specific types of STEM-related jobs. There are enormous differences between training students to become lab technicians and training students to become research scientists. For the most part, task forces and commissions assume that "more is better" in the STEM pipeline. But in reality, creating incentives for more students to become lab technicians will not necessarily address unmet demands for engineers with graduate degrees.

The Center for Innovative Technology (CIT) submitted its Commonwealth Research and Technology Strategic Roadmap to the Virginia General Assembly in November 2011. The roadmap does a fine job of outlining promising industrial sectors in different geographic areas of the commonwealth. It describes those industries, and the research priorities and existing strengths at Virginia universities and government labs. What is missing, however, is a discussion of the specific types of jobs that are expected to result from government investments in those sectors.

Why does this matter? Because any given business will need to hire multiple workers, with different academic credentials and work experiences. For example, a STEM-focused business may need to hire 100 lab technicians and 20 research scientists, plus dozens of other employees whose jobs don't require significant STEM skills — administrative assistants, accountants, and others.

Schools need to prepare students to fill all these types of jobs. There is no one-size-fits-all curriculum that is a perfect fit for all students. The optimal high school math and science courses for a future biology lab technician will be substantially different from the optimal high school math and science courses for a future research scientist in a university.

Failing to acknowledge those differences ensures that some students — such as those with the aptitude and interest in pursuing a doctorate in STEM — will have to play catch-up when they get to college, after coasting through too-easy high school math and science courses. In other cases, students who had the potential to become stellar lab technicians will avoid the appropriate courses in college, after struggling with too-challenging high school math and science courses.

Let's approach STEM work force issues with more precision. Our secondary schools should be structured to align their graduates' coursework, skills and interests more precisely with projected work force needs. That means offering multiple types of courses and course sequences, rather than attempting to shoe-horn all students into the same courses. Having many paths to prepare students for different STEM-related occupations could be very effective at produce an even better-qualified STEM work force.

The Bureau of Labor Statistics recently released the 2012-13 Occupational Outlook Handbook. This handbook has nationwide projections to 2020, with information on the typical education and training needs for each occupation. Let's use that data, along with the data already gathered about Virginia's commercial base, to figure out more precisely what our public schools should do to maximize the impact of our General Assembly's economic development investments.

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