OPINION

Ohio's Academic Goals Humbled

Changing a single word can unintentionally affect millions of lives. Recently when The State of Ohio Board of Education amended its science academic standards, it replaced the "MASTERY" objective with the more modest and humble "UNDERSTANDING" of science, technology, engineering and mathematics (STEM). The Ohio Academy of Science opposes this change, asking that students learn to practice rather than just be aware of STEM subjects.

In today's curriculum, students must develop mastery of the English language, and basic U.S. government and American history. Ohio high school graduates should be able to read, write, and speak our native tongue, know who the governor of Ohio is, understand the checks-and-balances of our federal government and remember that Abraham Lincoln signed the Emancipation Proclamation. Unfortunately, the same students are not expected to be masters of STEM ... they'll not design and execute scientific experiments, compute the compound interest on their mortgage or credit card debt, know how a semiconductor works in every one of their household electronic devices work or what Einstein actually discovered.

Ohio's choice of "understanding" vs. "mastery" makes our students effectively spectators of science, technology, engineering and mathematics.

For 200 years, America has prospered from the ingenuity of our scientists and engineers and the inventions and opportunities they created. Where would we be today without antibiotics, the airplane, telephone, integrated circuits, silicon chips and disposable diapers? The 20th Century brought the inventions that filled factories, created American prosperity and jobs, and raised our standard of living. As we approached the 21st century, the United States lost leadership of the lowest cost manufacturing to factories overseas, but we still invented the products those factories produced. Clearly, our national advantage lies in our ability to out-innovate other nations.

I recently asked an executive of a major global company headquartered in Ohio if his company needed Ohio to graduate more engineers and scientists. His frank answer was "no." His company can hire engineers and scientists from universities in China and India where they are more plentiful, as well educated, and paid much less. There is no shortage of this group as Asia is graduating TEN times more engineers than we are. THAT is a major problem for Ohio and for America's competitive advantage. You can bet your next Asian-made automobile or flat screen TV that Asian schools are teaching these students STEM "mastery" and not just "understanding."

As an industrial scientist, I've worked with hundreds of other innovators. Every one of these engineers and scientists had benefited from two essentials of their public education: one, inspiration to pursue their chosen field by a special mentor, and two, mastery of STEM subjects such that they could focus on technical application at higher levels in college. They all had passion for their field of study, and they were ALREADY well grounded in math, physics, chemistry and biology, and often at advanced levels. They were masters not spectators of STEM.

Fifty years ago we projected a need to graduate students destined to pursue university degrees, farming, manufacturing, the trades or civil service. However, for today's students, the future will be different. Just "understanding" STEM will leave them unqualified to compete with their global counterparts in engineering and scientific fields. With just "understanding" of STEM, they will be woefully unprepared for the new American job market. Today, we need to establish proficiency in biology, math, chemistry and physics to the same level of mastery Ohio demands for English, history, and social studies. If we want Ohio public school graduates to be highly competitive in the new world, they need to be well grounded in all STEM subjects, be inspired to pursue their futures in technology development areas where the jobs will be, and be creative in the application of those sciences.

In about two years new national standards for science education will thankfully supplant Ohio's humble standards. A document being used to draft those standards implies that "mastery" of core ideas in science is the "ultimate educational destination."

So does a single word change from "mastery" to "understanding" in academic standards hold great significance for the future of our state? You bet it does. Write your state senators and representatives and tell them that we want our Ohio students to be masters not spectators of STEM: science, technology, engineering and mathematics.

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