WHY **STEM** EDUCATION **MATTERS**

Science, technology, engineering and math (STEM) are where the jobs are.

STEM job creation over the next 10 years will outpace non-STEM jobs significantly, growing 17 percent, as compared to 9.8 percent for non-stem positions.[1] Jobs in computer systems design and related services – a field dependent on high-level math and problem-solving skills – are projected to grow 45 percent between 2008 and 2018. The occupations with the fastest growth in the coming years – such as biomedical engineers, network systems and data communications analysts, and medical scientists – all call for degrees in STEM fields.[2]

STEM workers can expect higher salaries.

College graduates overall make 84 percent more over a lifetime than those with only high school diplomas. But further analysis of 171 majors shows that STEM majors can earn higher wages. For example, petroleum engineering majors make about $120,000 a year, compared with $29,000 annually for counseling psychology majors. Math and computer science majors earn $98,000 in salary, while early childhood education majors get paid about $36,000.[3] According to the Commerce Department, people in STEM fields can expect to earn 26 percent more money on average and be less likely to experience job loss. The STEM degree holders also tend to enjoy higher earnings overall, regardless of whether they work in STEM or non-STEM occupations.[4]

And yet the United States is failing to produce enough skilled STEM workers.

Sixty percent of the new jobs that will open in the 21st century will require skills possessed by only 20 percent of the current workforce.[5] The U.S. may be short as many as three million high-skills workers by 2018. Two-thirds of those jobs will require at least some post-secondary education. American universities, however, only award about a third of the bachelor's degrees in science and engineering as Asian universities. Worldwide, the United States ranks 17th in the number of science degrees it awards. [6]

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The United States is fast losing its competitive edge.

The competitive edge of the US economy has eroded sharply over the last decade, according to a new study by a non-partisan research group. The report found that the U.S. ranked sixth among 40 countries and regions, based on 16 indicators of innovation and competitiveness. They included venture capital investment, scientific research, spending on research, and educational achievement.[7] The prestigious World Economic Forum ranks the U.S. as No. 48 in quality of math and science education.[8]

American students aren't keeping up with students in other countries in math and science.

International results released in 2010 showed once again that U.S. students rank well below many foreign competitors in the crucial areas of math and science. The rankings from the Organization of Economic Cooperation and Development (OECD) showed American students scored 17th in science achievement and 25th in math ability out of 65 countries. According to the 2009 National Assessment of Education Progress (NAEP), the "Nation's Report Card," only one percent of U.S. fourth grade and 12th grade students and two percent of eighth grade students scored in the highest level of proficiency in science. In fact, the NAEP science results showed students' performance worsened the longer they were in school, with 72 percent of the fourth graders, 63 percent of the eight graders, and just 60 percent of the 12th graders scoring at or above the "basic" level. In an analysis comparing the NAEP math scores of "advanced" 8th graders with their counterparts overseas, the only countries that the U.S. ranked ahead of were Portugal, Greece, Turkey and Mexico.[9]

The decline in STEM knowledge capital is reducing the basic scientific research that leads to growth.

The U.S. is no longer the "Colossus of Science," dominating the research landscape in the production of scientific papers, that it was 30 years ago. In 1981, U.S. scientists fielded nearly 40 percent of research papers in the most influential journals. By 2009, that figure had shrunk to 29 percent. During the same period, European nations increased their share of research papers from 33 percent to 36 percent, while research contributed by nations in the Asia-Pacific region increased from 13 percent to 31 percent. China is now the second-largest producer of scientific papers, after the U.S. with nearly 11 percent of the world's total.[10]

American STEM shortcomings mean crucial research and development that pushes the frontiers of innovation is waning.

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), almost 83 percent of research and development was carried out in developed countries in 2002, but dropped to 76 percent by 2007. China was leading the pack of emerging nations with 1.4 million researchers. By 2009, for the first time, over half of U.S. patents were awarded to non-U.S. companies.[11]

Other nations are racing to establish dominance in math and science.

Russia is building an "innovation city" outside of Moscow. Saudi Arabia has a new university for science and engineering with a $10 billion endowment. China is creating new technology universities by the dozens and has replaced the U.S. as the world's top high technology exporter. Singapore has invested more than a billion dollars to make that country a medical science hub and attract the world's best talent. These nations and many others have rightly concluded that the way to win in the world economy is by doing a better job of educating and innovating.[12]

The STEM gap is costing Americans jobs and money.

U.S. students fall behind 31 countries in math proficiency, according to a 2011 Harvard study that concluded the U.S. could increase GDP growth per capita by enhancing its students' math skills. Over an 80-year period, economic gains from increasing the percentage of math proficient students to Canadian or Korean levels would increase the annual U.S. growth rate by 0.9 percentage points and 1.3 percentage points, respectively. That increase could yield $75 trillion.[13]

It's time for the U.S. get back in the game in education.

25 years ago, the U.S. led the world in high school and college graduation rates. Today, the U.S. has dropped to 20th and 16th.[14] We can do better. The good news is that APTIP schools already are.

Sources:

(1) U.S. Commerce Department, 2011

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(6) Georgetown University's Center on Education and the Workforce, 2010

(7) Information Technology and Innovation Foundation, 2009

(8) World Economic Forum

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(10) Thomson Reuters Global Research Report, November 2010

(11) UNESCO

(12) Norman Augustine, former CEO Lockheed Martin, Forbes magazine, 2010; Thomas Friedman, The New York Times, Oct. 13, 2010

(13) "Globally Challenged: Are U.S. Students Ready to Compete?" Harvard Program on Education Policy and Governance, 2011

(14) Organization for Economic Co-operation and Education (OECD), "Education at a Glance," 2008

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