**IT Skills Gap Is Really an Education Gap**

[**http://www.cio.com/article/739163/Is\_the\_Technology\_Skills\_Gap\_Fact\_or\_Fiction\_**](http://www.cio.com/article/739163/Is_the_Technology_Skills_Gap_Fact_or_Fiction_)

In Part 2 of CIO.com's three-part series on the technology skills gap in America, Gary Beach suggests that the issue is really an education gap. When it comes to math and science education, is the United States a nation at risk?

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The skills gap, as we discussed in the [first installment of this series](http://www.cio.com/article/739163/is_the_technology_skills_gap_fact_or_fiction_), is a controversial topic. But some, like Adam Davidson, founder of National Public Radio's "Planet Money" program, claim the term is misnamed. For him, a skills gap is really an "education gap."

Based on six years of research I invested in writing my book [*The U.S.Technology Skills Gap*](http://www.amazon.com/books/dp/1118477995), I agree with Davidson. And with Glen Whitney, the founder of the Museum of Mathematics, the country's only math museum located in New York City, who says math (and science) are subjects Americans "love to hate and believe were done by dead Greek guys 1,000 years ago."

The first cracks in America's education gap could first be observed in 1909, according to *A Short History of Mathematics in the United States*, a book written by David Klein.

In his work, Klein tracks a precipitous 41 percent drop in the percentage of American high school students enrolled in math courses from 1909 through 1934. Even at a time when there was incredible technological innovation in America like the Henry Ford's Model T automobile(1908), the radio circuit (1918) and Polaroid photography (1931).

That American kids were not math whizzes should not have come as a surprise. Education was not valued in America at the time. In fact, though the inventions just mentioned were brought to market by Americans, the world's center of technological innovation in the 1930's was not America. It was Germany -- a country where math and science skills were revered. A country that was putting those math and science skills to work building massive war machines in the country's run up to World War II under Adolf Hitler and the Nazis.

I often ask CIOs and IT executives this question: Who was/is the most famous scientist in the history of America? More often than not, the reply I get back is "Albert Einstein."

Technically, the answer is correct. Einstein was an American citizen for the last 15 years of his life. But he never was taught in an American classroom. Rather, Einstein was educated in Switzerland and Germany and immigrated to the United States in 1933 as Hitler was about to come to power in Germany.

After America entered the war in December 1941, the United States War Department bluntly awakened America to its math and science problem. Though the American military at that time had more mules than tanks, the new equipment the War Department did have was more sophisticated than war equipment used at the end of World War I. Equipment that demanded intelligent people to operate complex machines

The hitch was this: though millions of patriotic men and women lined up to serve, many of them lacked skills in math, science and cognitive thinking. The War Department, therefore, was forced to quickly assess those deficiencies by creating an aptitude/IQ test called the "Army General Classification Test."

Introducing this test to the American public, the War Department claimed it was necessary "to minimize the effects of public schooling."

The goal of the Army General Classification Test was to identify intelligent people to fly the new planes, drive the new tanks, command the new ships and operate the new canon. One year after the test's deployment, the Army General Classification Test issued this assessment of the intelligence of the recruits: Nearly 40 percent had the mental capacity of eight-year-olds.

Regardless of their intellectual abilities, these brave men and women fought, and won, World War II. But as they returned home from war, they confronted with weak U.S. public school system that the U.S. War Department sought to "minimize" as the war started. A system where 60 percent of students dropped out of high school before graduation.

And a system that was not prepared for the onslaught of the Baby Boomer Generation, a generation of Americans born from 1946 - 1964. A history-defining generation of Americans who entered the U.S. public school system in 1952 at a staggering pace of two million additional students per year. A generation of Americans that crippled an already ailing school system and infrastructure.

Prior to World War II, the process of teacher certification was arduous. After the war, however, as millions of Baby Boomers created overcrowded classrooms, another huge problem arose. There was not enough teachers to teach these Baby Boomers. In fact, there was a shortage of 132,000 K-12 teachers in America.

To address the situation, many states lowered, or abolished entirely, teacher certification programs. Teachers, who would have never qualified to be a teacher prior to the war, now stood in front of millions of young American students.

Life magazine, in March 1958, ran a four-part series on the state of American education entitled "Crisis In Education" where it compared lives of teenagers in America to those living in Moscow. A comparison that didn't fare well for America.

Just as the Life magazine was being published, the U.S. Government, coming just months after the Soviets launched Sputnik into space, sent two delegations from the U.S. Office of Education to the Soviet Union, our country's cold war adversary, to study how their school system functioned. The delegations conclusion read, "we came back deeply concerned about our poorer schools now suffering neglect with this question: will we Americans work and sacrifice to improve public education in the United States?"

Throughout the 1950s and early 1960s, Baby Boomer students, many of taught by incompetent, unqualified teachers, didn't learn their math lessons well. Here's proof. American high school students generally take their SAT tests when they are 17. Do the math. The first group of Baby Boomers to turn 17 did so in 1963. And how did they do? Not very well. For 14 consecutive years, from 1963 through 1976, SAT math and verbal scores for Baby Boomers declined year-after-year-after year.

The long tail of overcrowded classrooms and incompetent teaching of this era remains with America to this day as about 40% of the current teacher population in the United States are Baby Boomers. Teachers whose generation was subjected to horrendous education conditions in America. Teachers whose generation did not learn well math, and science, skills from teachers who shouldn't have been teachers.

(Aside: if you took the SAT test prior to 1995, I can guarantee you that reading The U.S.Technology Skills Gap will add over 100 points to your score. I am not kidding.)

Other cracks were forming in the United States' education gap. One year after the SAT train wreck began in 1963, the First International Mathematics, organized by the International Association for the Evaluation of Educational Achievement, was fielded in 1964 among eighth grade students around the world.

America's students didn't do well. They came in 13th.

Out of 14 countries included in the study.

Seven years later, in 1971, the same organization conducted a science assessment test again among eighth grade students. Different subject. Same result. America's students came in next to last among the 13 countries that participated in the test.

Those results should have shocked America. Instead, it was pushed aside by even more prominent news as the political assassinations of President Kennedy, Martin Luther King, racial tension in America's cities, the growing involvement of our country in the Vietnam War and Watergate dominated headlines across the United States.

Read this paragraph. After you do, I have two questions for you.

"Our Nation is at risk. Our once unchallenged preeminence in commerce, industry, science and technological innovation is being overtaken by competitors throughout the world. While we can take justifiable pride in what our schools and colleges have historically accomplished and contributed to the well-being of the United States, the education foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people. What was unimaginable a generation ago has begun to occur. Other nations are matching and surpassing our educational attainments. If an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might have well viewed it as an act of war. As it stands, we have allowed this to happen to ourselves. America has, in effect, been committing an act of unthinking, unilateral educational disarmament."

When was it written? And, by whom was it written?

This paragraph is extracted from *A Nation at Risk*, a report released by the U.S.Department of Education in April 1983 (http://datacenter.spps.org/uploads/sotw\_a\_nation\_at\_risk\_1983.pdf). The report was an immediate hit with the media with headlines like "Education Panel Sees Rising Tide of Mediocrity", "U.S. Education Unsatisfactory" and "Failure in Education" appearing in editorials across the country.

But the findings and recommendations of *Nation at Risk*, a report written to warn Americans about how our country was falling behind Japan in key industries like automobiles, electronics, photography and office automation, were not embraced.

Besides the attention grabbing headlines, the report did little to stem the tide of mediocre student performance in academic assessment tests administered by the U.S. Department of Education or private organizations like the College Entrance Examination Board who conducts the well-known SAT test.

Over the next 30 years, from 1983 - 2013 , as a litany of results from other tests were released by the International Association for the Evaluation of Educational Achievement (1995, 1999, 2003, 2007, and 2011), the Programme International Student Assessment test (2000,2003,2006, 2009), and more stringent national testing mandated by law through the U.S. Department of Education's National Assessment of Educational Progress's "No Child Left Behind" initiative, this sobering picture of America's education gap came into clear focus:

The deeper an American student proceeded through the U.S. public education system, the further behind the rest of the world American young people fell even though, as a nation, the $600 billion the United States spends annually on public education is, by far, the most of any nation in the world)

Here's a story that illustrates why America's education gap threatens our country's future prosperity. Earlier this year I attended a technology conference that included a keynote panel on the topic of the "skills gap."

The panel members included a high-ranking official from the U.S. Department of Labor, and several business executives. As the panel began, the government official claimed that despite 12 million unemployed Americans, and nearly 4 million open job postings, jobs that cannot be filled because employers say applicants do not have the right skills for the job, "there is no skills gap in America because if there was, the Department of Labor would be monitoring higher weekly wages (because employers would have to compete with higher salaries for valued workers ) and the existence of a national skills gap would mean lengthening of hours worked per week (because employed workers would have to work overtime to do the work of open job positions)."

As the Labor Department official ended his opening comment, one of the business executives on the panel disagreed strongly with the secretary's comments and said the following:

"Mr. Secretary, I respectfully disagree with your point of view. Wages per hour and number of hours worked per week are so 20th century labor measurement points. Right now, I have an open position for a software engineer. I haven't been able to find one here in the United States. So tomorrow I am making an offer to a German engineer who lives in Berlin. And I am going to pay her a lot of money. Mr.Secretary, those wages will never show up on your domestic reports."

And then another panel member, this one the CEO of a global manufacturing firm, said, "Mr.Secretary, my firm has just concluded an internal audit of our employment needs in the coming three years. The audit claims for us to remain globally competitive our company will need to hire 5,000 IT workers. 5,000 workers"

He continued, "my business, the business of manufacturing, is changing rapidly. In fact, it has become a software-driven business. A business where software drives robots, lasers and computers on my manufacturing floor. I can source work anywhere in the world where a talented job candidate has a computer and an Internet connection. My audit concludes we will not be able to find those workers here in America."

America's education gap is real. After 60-years of widening, many, including myself, feel it is rapidly reaching a national tipping point that threatens our nation's future economic growth, the employability of our workers and our national security as the prospect of cyberwar lurks on the horizon.

I have heard this analog several times: America seems like the proverbial frog in the pot of water, content as the temperature rises slowly. But then unable to escape as it reaches 212 degrees.

In 1962, as President Kennedy was encouraging Americans to look to the end of the decade and land a person on the moon, an obscure Japanese physicist by the name of Mitsutomo Yuasa was looking back 450 years. In an essay in a Japanese scientific journal, he concluded since 1540 the world's center of scientific activity has shifted west from one country to another every 80-110 years.

Yuasa placed the mantel of worldwide scientific leadership on the East Coast of America in 1920. Do the math. If Yuasa's theory, often referred to as Yuasa's Phenomenon, is in play again, it claims between now and 2030 another country, a country to America's west, will take over as world scientific leader.

Some say the next center of world scientific activity by 2030, if Yuasa's Theory is to be believed, will be the People's Republic of China. I am not thoroughly convinced it will be. But what I am sure of is this: If America wants to prolong its position as world's scientific leader it must continue to excel at innovation and invention. Two areas that put a premium on a country's ability to produce a world-class education system.

In 1990, the Commission on the Skills of the American Workforce, released a report with a provocative title that read "America's Choice: High Skills or Low Wages?"

Sadly, in my opinion, America has not yet made that choice.

Our nation's education gap continues to widen.

The temperature of the sea of mediocrity that America seems to content to swim in is fast approaching 212 degrees. Our nation remains at risk.

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