

VITAL SIGNS

Reports on the condition of STEM learning in the U.S.



SOLVING THE DIVERSITY DILEMMA:

Changing the Face of the STEM Workforce

Our nation's prospects hinge on how well it responds to demographic change. In 2014, only 29 percent of Americans younger than 25 were white or Asian males, down from 33 percent in 2001—and that percentage will continue to shrink. The future of U.S. leadership in technology and innovation will increasingly depend on young women and people of color.

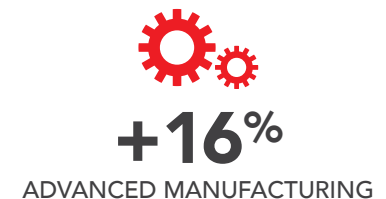
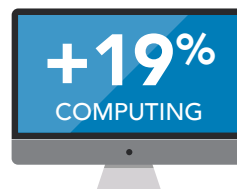
If current trends persist, we are in for a world of trouble. Researchers have long known that women and people of color are scarce in STEM jobs, but Change the Equation's new analysis of demographic and workforce data reveal that the situation has not improved since 2001. CTEq examined trends in three major occupations that require substantial STEM skills: engineering, computing, and advanced manufacturing.¹ None offers a rosy picture of the future.

There is encouraging news, however. There are strategies and initiatives that succeed in bringing girls and young people of color into STEM fields. The biggest problem, however, is scale: these strategies and initiatives are not reaching the vast majority of the nation's children and youth. In response, the business community is leading

an all-hands-on-deck effort to ensure that every young person enjoys access to the best learning opportunities in STEM.

The demand for STEM talent is growing

In the next two decades, STEM jobs will grow faster than non-STEM jobs. Between 2014 and 2024, the number of STEM jobs will grow 17 percent, as compared to 12 percent for non-STEM jobs.² Growth in computing, advanced manufacturing, and engineering will meet or exceed the growth rate of non-STEM jobs:

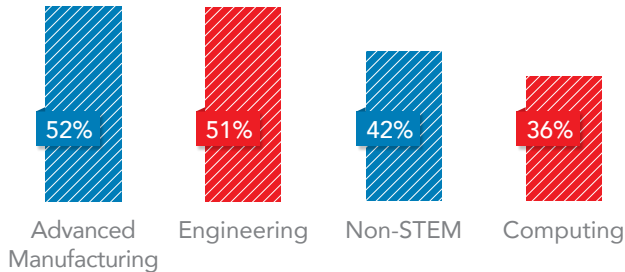


We still have far to go, but our nation possesses the energy, resources, and commitment to develop the vast talents of our young people.

More STEM workers are nearing retirement

While engineering jobs may not grow as fast as computing jobs, looming retirements in the field will increase demand for new talent. Engineering and advanced manufacturing workers are much more likely than non-STEM workers to be within 20 years of retiring.

Percentage of workforce that was 45 or older, 2014

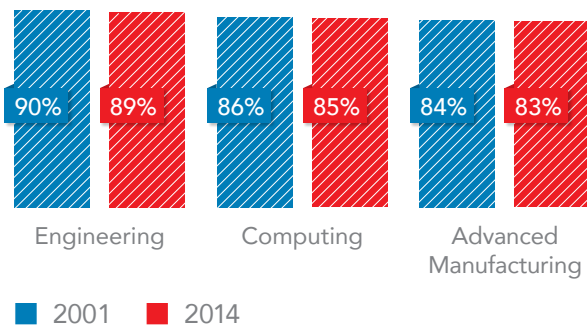


It is no surprise that computer workers are somewhat younger than non-STEM workers, given the relative youth of their industry. Yet the number of older computer workers as a cohort is growing quickly. The number of those aged 45 or older shot up 35 percent between 2001 and 2014, compared to 22 percent for non-STEM workers.

The face of the nation is changing, but the face of the STEM workforce is not

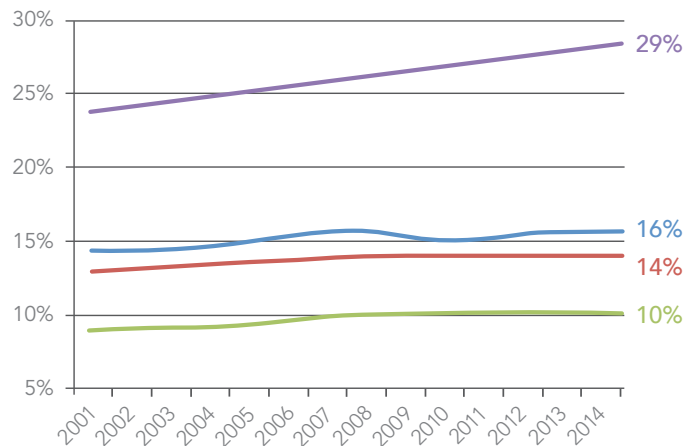
Between 2001 and 2014, whites and Asians declined from 74 to 69 percent of the working-age population.³ Yet their dominance in critical STEM occupations continues unabated.

Whites and Asians as a percentage of the STEM workforce



African Americans and Latinos have lost ground

African Americans and Latinos have surged as a percentage of the U.S. population, but their share of critical STEM jobs has barely budged. In fact, African Americans and Latinos are less likely to pursue careers in engineering, computer science, or advanced manufacturing than they were in 2001.



African American/Latino Percentage of:

- the U.S. working-age population
- the advanced manufacturing workforce
- the computing workforce
- the engineering workforce

Women have seen no improvement since 2001

Women remain as scarce as ever in engineering, computing, and advanced manufacturing.

Women as a percentage of the:	2001	2014
Engineering Workforce	13%	12%
Computing Workforce	27%	26%
Advanced Manufacturing Workforce	10%	10%

The good news: we can solve this

The numbers are sobering, but past need not be prologue. Decades of effort have steadily boosted young Americans' math and science performance, particularly among students of color,⁴ but we must capitalize on these gains. We can draw women and people of color into the STEM workforce by reaching dramatically higher numbers of young people with life-changing STEM experiences in the K-12 years, both in and out of schools. The nation's female and minority youth are a rich vein of talent we have not fully tapped.

Talent is hiding in plain sight

There are already tens of thousands of high-performing African American and Latino students in each K-12 grade level, and hundreds of thousands of high-performing girls. In fact, more Latino than Asian 10th-graders fall into the top 25 percent of performers in math and English, for example.⁵ Our challenge is to nurture this talent before these students lose momentum and turn their sights elsewhere.

The College Board estimates that more than 55,000 underrepresented students from the class of 2016 have the potential to succeed in at least one Advanced Placement course. Yet if current trends persist, some 21,000 (39 percent) of those students will not take an AP course.⁶ Of high achievers who do not take AP courses, half report lacking the confidence to take them, and half say the courses are not available.⁷ Federal data confirm that African American and Latino students are much less likely than their white or Asian peers to have access to advanced science and math courses like chemistry, physics, or calculus.⁸ We must not squander those students' potential.

There is also unmet demand for STEM experiences outside of school. A 2014 survey of households found that 60 percent of black children and 57 percent of Latino children not currently enrolled in afterschool programs would be enrolled if such programs were available to them. That amounts to some 10 million children of color who are ripe for critical enrichment opportunities—and a critical chance to expand access to the best learning opportunities in STEM.⁹

We can reach millions more young people

It makes no sense to brood on disappointing data. Instead, we must seize the opportunity to ensure that every young student has access to rich STEM experiences.

In states across the country, business leaders have long championed rigorous standards for what students should learn in math and science and better access to vital STEM courses, such as computer science, in K-12. These measures are bearing fruit in states across the country and promise to raise the bar for all students.

Businesses are also helping expand a growing number of powerful STEM learning programs and strategies that have the potential to reach many more girls and young people of color across the country. Change the Equation's STEMworks features dozens of programs that have held up to rigorous third-party review of their effectiveness.¹⁰ For example, Camp Invention is giving thousands of underserved elementary students exciting hands-on STEM experiences outside of school. Girls who take part in Girlstart's afterschool and summer programs are taking more challenging math and science courses in high school and earning higher test scores. The National Math and Science Initiative's College Readiness Program is helping many more girls and students of color in hundreds of high schools take and pass AP tests in math and science. The Level Playing Field Institute's SMASH program is carefully grooming promising young people of color to succeed in STEM majors at prestigious universities.

Business is leading the way

CTEq is leading a national movement to bring programs like these to millions more young people across the country. CTEq's corporate members stepped up to the plate to expand STEMworks programs to roughly 330,000 more young people in 2014. In 2015, CTEq will double down on success, leading a charge to bring transformative STEM experiences to 1.5 million more young people. In addition, leaders in states like Iowa and Massachusetts are collaborating with business leaders combining public and private funds to expand effective STEM learning opportunities to young people across their respective states.¹¹

We still have far to go, but our nation possesses the energy, resources, and commitment to develop the vast talents of our young people. Now is the time for businesses, governments, educators, and other STEM advocates to join forces and address the massive unmet need for inspiring and educational STEM experiences.

Given the changing face of America, few efforts could be more important.

- 1 To review CTEq's definitions of STEM jobs, engineering jobs, computing jobs, and advanced manufacturing jobs, please see <http://changetheequation.org/solving-diversity-dilemma>.
- 2 Unless otherwise noted, all demographic and workforce data in this brief are derived from CTEq analysis of data supplied in December 2014 by Economic Modeling Specialists International (EMSI): <http://www.economicmodeling.com>.
- 3 For purposes of this analysis, the "working-age population" is the population aged 20 to 69.
- 4 U.S. Department of Education, National Assessment of Educational Progress mathematics and science assessment, 2003-2013. See <http://vitalsigns.changetheequation.org/#us-United-States-Pipeline>.
- 5 Marni Bromberg & Christine Theokas, *Falling out of the lead: Following high achievers through high school and beyond* (Washington, D.C.: The Education Trust, 2014).
- 6 Change the Equation analysis of data from the 2014 College Board Program Results, retrieved January 26, 2015 from <https://www.collegeboard.org/program-results>. The College Board found that 39 percent of public school students from the class of 2014 who had the potential to succeed in an AP class did not take one. If the same percentage holds for the class of 2016, more than 21,000 students with AP potential will not take an AP class.
- 7 The College Board, The 9th Annual AP Report to the Nation, February 13, 2012
- 8 US Department of Education Office for Civil rights, *Civil rights Data Collection Data Snapshot: College and Career Readiness*, March 2014.
- 9 Afterschool Alliance, *America After 3 p.m.: Afterschool Programs in Demand* (Washington, D.C.: Afterschool Alliance, 2014).
- 10 See <http://www.changetheequation.org/stemworks>.
- 11 See the Iowa Governor's STEM Advisory Council (<http://www.iowastem.gov>) and the Governor's STEM Advisory Council of Massachusetts (<http://www.mass.edu/stem/home/council.asp>).

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Change the Equation works at the intersection of business and education to ensure that all students are STEM literate by collaborating with schools, communities, and states to adopt and implement excellent STEM policies and programs. CTEq's coalition of members are working toward universal STEM literacy by advocating for state policies and practices that are known

to produce STEM-literate high school graduates; ensuring high standards for all students; and supporting evidence-based high quality STEM learning programs.

www.changetheequation.org