



STEMconnector

State of STEM Data Series

This series provides short, easily digestible sets of answers to the STEM talent data questions that our members face from inside and outside their organizations.

How big is the STEM talent gap?

We are in a STEM talent crisis. Well-paying STEM jobs are growing exponentially, with more created every day. Yet employers struggle to hire skilled and diverse STEM employees. We often call this phenomenon the STEM talent gap.

Naturally, the question comes to mind: *How big is this STEM talent gap?*

We tried some simple math to answer this question:



Unfortunately, this equation is grounded in incorrect assumptions such as:

- There is a common definition of a STEM job vs. a non-STEM job
- We can find a single point in time count of such jobs
- Employers agree on what makes a jobseeker “qualified”

Perhaps the biggest assumption of all is that the STEM talent gap is singular and quantifiable. The National Science Foundation summarized this challenge in their recent, authoritative report on a variety of indicators of the health of the STEM talent ecosystem:ⁱ

Close study of the surplus-shortage question reveals that there is no straightforward “yes” or “no” answer to whether the United States has a surplus or shortage of STEM workers. The answer is always “it depends.”

It depends on which segment of the workforce is being discussed (e.g., sub-baccalaureates, PhDs, biomedical scientists, computer programmers, petroleum engineers) and where (e.g., rural, metropolitan, “high-technology corridors”).

It also depends on whether “enough” or “not enough STEM workers” is being understood in terms of the quantity of workers; the quality of workers in terms of education or job training; racial, ethnic or gender diversity, or some combination of these considerations.

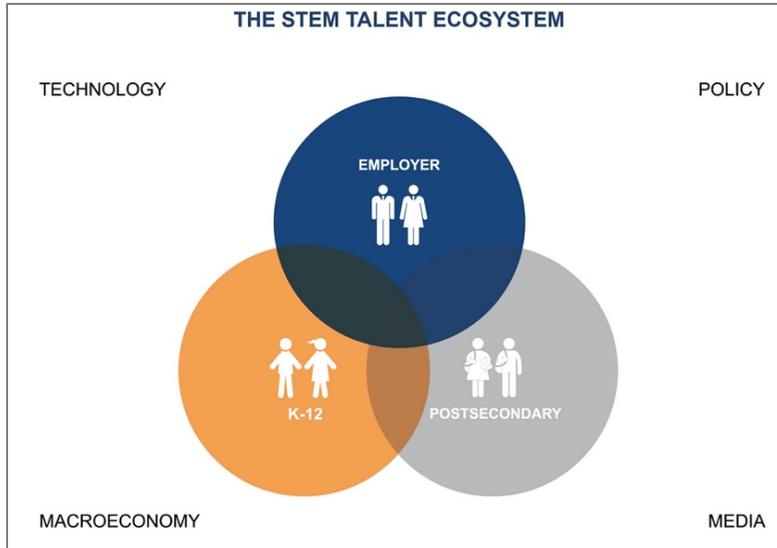
Not only is the answer nearly impossible, but the question itself is flawed. Seeking a single, quantifiable answer to the question:

- Does not reflect the complexity of the challenge, nor all the organizations, sectors, and forces that influence STEM outcomes from cradle to career
- Makes it easy for us to assume that one sector, or one entity, is responsible for the gap
- Leads us to believe there is a single solution to the problem



Asking about the size of the STEM talent gap fails to address the causes and systemic challenges.

Dealing with the STEM talent crisis will require many different solutions enacted in collaboration across the entire STEM talent ecosystem.



Addressing this crisis also requires us to unpack the five interconnected, nuanced gaps in STEM talent.

THE FIVE STEM TALENT GAPS



1. FUNDAMENTAL SKILLS GAP

- Average STEM competency is insufficient for modern work
- The new “STEM skills” (employability skills, 21st century skills) are hard to build in traditional education models
- Employers do not always clearly or appropriately define the skills they need



2. BELIEF GAP

- Students hold incorrect beliefs about their own STEM ability
- Students and others feel they do not “belong” in STEM
- Students believe only certain industries offer STEM jobs
- Employers hold incorrect beliefs about how academic performance and credentials relate to job success



3. POSTSECONDARY EDUCATION GAP

- Not enough people hold credentials beyond high school, but most STEM jobs require postsecondary credentials
- Credentials are misaligned with employer needs
- Jobseekers and employees face challenges engaging in lifelong learning



4. GEOGRAPHIC GAP

- In some regions, the number of jobs is declining, leaving people out of work and with outdated skillsets
- In some regions, there is a booming STEM economy, but companies must import talent as locals are not equipped to compete for those jobs



5. DEMOGRAPHIC GAP

- Lack of access to resources drives achievement gaps in STEM education from early years
- Bias and historic inequity remain embedded in education and employment systems



In sum, instead of asking “how big is the STEM talent gap,” we should be asking:

- What skills do we need to build in all students, so they are ready for today’s STEM careers and prepared to adapt for those of the future?
- How can we better align sectors, respecting separate objectives while working toward common STEM talent goals?
- How can we move from discussion of diversity, equity, and inclusion in the STEM workforce to tangible results?

These questions begin to address the complexity of the STEM talent gap rather than simply trying to define its size.

But if you still need a number to define the STEM talent gap, we have identified a few options:

- In 2018, 80% of engineering and technology decision makers had significant concern about a talent gap in their industryⁱ
- In 2018, for each cybersecurity opening, there was a pool of only 2.3 employed cybersecurity workers for employers to recruit (vs. 5.8 potential recruits per opening in the overall job market)ⁱⁱⁱ
- In 2016, 13 STEM jobs were posted online for each unemployed worker that year – roughly 3 million more jobs than the number of skilled workers who could fill them^{iv}

You can learn more about the STEM talent gap from STEMconnector research and leading field experts in the following readings:

- [State of STEM](#) (STEMconnector, 2018)
- [Revisiting the STEM Workforce, A Companion to Science and Engineering Indicators 2014](#) (National Science Foundation, 2015)
- [STEM crisis or STEM surplus? Yes and yes.](#) (Bureau of Labor Statistics, 2014)
- [STEM](#) (Center on Education and the Workforce, Georgetown University, 2011)

References

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- i National Science Board (2015). Revisiting the STEM Workforce, A Companion to Science and Engineering Indicators 2014. National Science Foundation ([NSB-2015-10](#)) <http://www.nsf.gov/nsb/publications>
- ii Disruptive Shifts in Tech & Engineering Hiring: Our Survey Insights (2019). Modis. <https://www.modis.com/en-us/resources/employers/disruptive-shifts-in-tech-and-engineering-hiring/>
- iii Recruiting Watchers for the Virtual Walls: The State of Cybersecurity Hiring (2019). Burning Glass. https://www.burning-glass.com/wp-content/uploads/recruiting_watchers_cybersecurity_hiring.pdf
- iv Sizing Up the Gap in our Supply of STEM Workers: Data & Analysis (2017). New American Economy. <https://research.newamericaneconomy.org/report/sizing-up-the-gap-in-our-supply-of-stem-workers/>