COLORADO
Department of Higher Education

What is STEM?

An ever present challenge in addressing STEM in our economy is really honing in on how we define STEM education and occupations. Across the country, reports on STEM supply and demand may vary in the conclusion as to whether we are graduating enough STEM-related degrees to meet STEM demand or not, but they may also differ in the way in which they define a STEM program or occupation. In other words, there is no one universally accepted STEM definition and this impacts the scope of STEM discussion.

Often, when we think about STEM what immediately comes to mind are occupations in the Standard Occupational Classification (SOC) categories for Computer and Mathematical Occupations, Architecture and Engineering Occupations, and Life, Physical and (sometimes, but not always) Social Science Occupations. At least two-thirds of workers in these occupations hold a bachelor's degree or higher. In some definitions, healthcare occupations are also included as STEM on the basis of the high level of science-based knowledge that is required of many workers in the field. In reality, there are a number of other occupations across a range of industry and education levels that rely heavily on having specialized knowledge in science, technology/computers, engineering and/or mathematics.

Over the past few years, public postsecondary institutions in Colorado have been aligning their STEM course definitions with the National Science Foundation (NSF) and Immigration and Customs Enforcement (ICE) STEM definitions. This NSF/ICE definition tends to align with a more traditional STEM definition, inclusive of computer-related, mathematical, architecture and engineering fields, while also including a select handful of agricultural, skilled trades, natural resources management, veterinary and healthcare technician fields. Meanwhile, the Brookings Institution has been exploring ways to assess that which is considered a STEM job by focusing on the actual depth of knowledge and skills levels required by each occupation. In doing so, Brookings has developed a definition that expands beyond the typical professional-level jobs we perceive as STEM, and is inclusive of various finance-related, healthcare and skilled trades occupations that have been measured to require significant and advanced levels of STEM knowledge and capabilities (Rothwell, 2013). To regularly reevaluate and measure the level of STEM skill/knowledge required by occupations is quite significant, as occupations can evolve in skill-level and education requirements as our world changes.

Thus, this analysis includes a nod to not only a more limited and historically accepted definition of STEM occupations, but also examines where we stand in terms of STEM occupations as defined by Brookings' extensive research. Data sources include: the Colorado Department of Higher Education to examine trends related to public institution completions and demographic profiles, EMSI for job opening projections (using the 2014.2 class of worker), the Integrated Postsecondary Education Data System (IPEDS), and the Census Bureau's American Community Survey (ACS) for demographic data, in addition to the consultation of select key informants knowledgeable about industry and occupational demand in Colorado.

Related Resources

Rothwell, J. (2103). The Hidden STEM Economy, Brookings Institution, Metropolitan Policy Program Report.

Science, Technology, Engineering, and Mathematics Education: Assessing the Relationship between Education and the Workforce. GAO-14-374. Washington, D.C.: May, 2014.