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The President's FY2015 Budget and STEM Education

Background

Policymakers have an active and enduring interest in STEM education. The topic is raised in federal science, education, workforce, national security, and immigration policy debates. Various analysts have attempted to inventory the federal STEM education effort. These inventories have identified between 105 and 252 STEM education programs and activities at 13 to 15 agencies. Annual federal appropriations for STEM education are typically in the range of about $2.8 billion to $3.4 billion.

FY2015 Proposed Reorganization. The Obama Administration's FY2015 budget request proposes a government-wide reorganization of federal STEM education programs. According to the Office of Management and Budget, the reorganization would consolidate or terminate 31 programs at 9 agencies, affecting $145 million in FY2014 budget authority. (Details may change as new budgetary data become available.) Funding would stay at each agency, but would focus on the priorities outlined in the National Science and Technology Council's Federal STEM Education 5-Year Strategic Plan.

The term "STEM education" refers to teaching and learning in the fields of science, technology, engineering, and mathematics. It typically includes educational activities across all grade levels—from pre-school to post-doctorate—in both formal (e.g., classrooms) and informal (e.g., afterschool programs) settings.

Why reorganize? Some observers perceive the federal STEM education effort as fragmented or even redundant. Analysts who hold this view often see reorganization—particularly when combined with program consolidation—as an opportunity to concentrate the focus of the effort on what they perceive as priority concerns. Others look to reorganization as a means to reduce perceived duplication in the portfolio, thereby potentially increasing efficiency. Some analysts believe reorganization would contribute to better program evaluation and coordination because, they assert, a portfolio made up of a smaller number of large programs is more amenable to (1) certain types of program evaluation methods, and (2) cross-agency coordination.

Why not? A reorganization of federal STEM education programs could result in the elimination or decreased effectiveness of good or popular programs, depending on implementation. Further, one of the historical rationales for embedding small-scale STEM education activities in scientific programs—which may look like undesirable fragmentation to some observers—was the belief that this integration would increase connections between the U.S. scientific and education systems. Consolidating or reducing funding for these activities might disrupt existing networks, with unknown effects on education, research, and communities. (These effects could vary widely.) The degree to which federal STEM education programs actually are duplicative is contested and unknown. As for evaluation, analysts debate the value of reshaping federal programs in conformance with certain types of evaluation methods, when critics say a variety of methods can be appropriate.

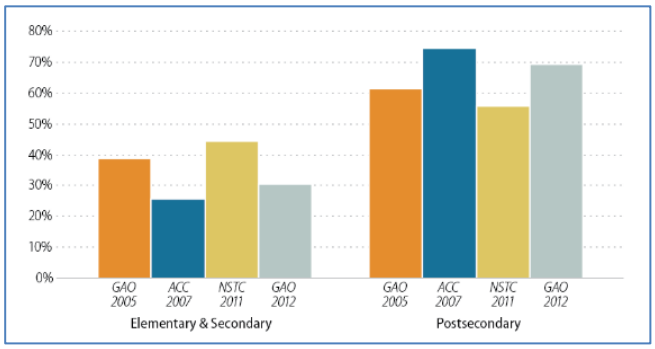
Would it save money? It is not clear. GAO has found that savings from reorganization and consolidation depends on how they are accomplished. In general, if programs are consolidated without reducing effort or caseloads, then savings may be limited to about 10% in administrative costs. Savings could be increased by reducing program scope.

The Federal STEM Education Effort

The current status of the federal STEM education effort is unknown. Most inventories of the effort rely on information from FY2010 or earlier. Policy and fiscal conditions have changed since then. Agencies also make regular changes to STEM education programs each budget cycle.

However, based on available evidence, over half of federal STEM education programs serve postsecondary education—typically in the form of grants and scholarships to students, as well as institutional support to colleges and universities. (See **Figure 1**.) Although STEM education activities may be found across the federal enterprise, about 80% of federal funding goes to the National Science Foundation, Department of Education, and Department of Health and Human Services. By primary objective, federal programs focus on advanced degrees, STEM careers, research experience, learning and engagement, teacher training, and institutional capacity.

Figure 1. Percentage of STEM Education Programs, by Education Level



Source and Notes: CRS calculation based on various federal assessments of the federal STEM education effort, including two Government Accountability Office reports (GAO 2005 and GAO 2012), an Academic Competitiveness Council report (ACC 2007), and a National Science and Technology Council report (NSTC 2011). See author for full citations.

Key Issues

Redux? The idea of a reorganization of the federal STEM education effort is not new. The Obama Administration sought to reorganize the federal effort in FY2014. That reorganization, which was also part of the Administration's annual budget request, would have affected about half the effort. Congressional reaction to the FY2014 proposal was mixed. Although many policymakers expressed conceptual support for reorganization as a means to improve the portfolio, the Joint Explanatory Statement that accompanied the Consolidated Appropriations Act, 2014 (P.L. 113-76) rejected the proposal, stating that it "contained no clearly defined implementation plan, had no buy-in from the education community, and failed to sufficiently recognize or support a number of proven, successful programs." Whether the FY2015 reorganization proposal addresses concerns about the FY2014 proposal remains to be seen.

STEM Education Strategy. The America COMPETES Reauthorization Act of 2010 (P.L. 111-358) directed the National Science and Technology Council (NSTC) to develop a federal STEM education strategy. The NSTC published that strategy after the release of the FY2014 budget request. Some policymakers perceived the NSTC strategy as (at least in part) a justification for the FY2014 reorganization proposal; while others saw it as a starting point for debate about the portfolio. If legislators agree—and some may not—that reorganization would improve the federal effort, then the question of "to what end?" may follow. The list of challenges in STEM education is long and wide-ranging. Policymakers' views about which of these challenges ought to be tackled, and in what order and manner, may vary. The NSTC strategy offers one possible direction. Other analysts may prefer alternative goals or means. The broader context to debate about the Administration's proposed reorganizations includes potentially unresolved questions about both the NSTC strategy and the general direction of the federal STEM education effort.

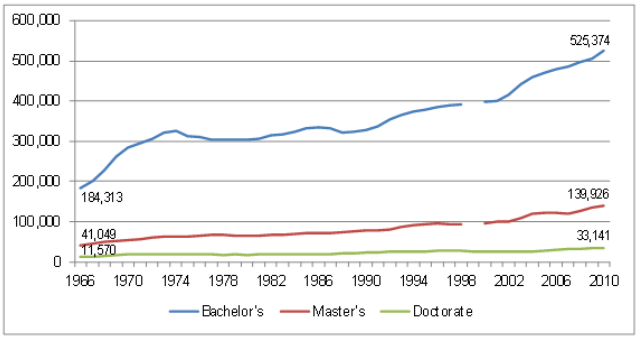
Implementation. One of the challenges that the Administration's proposed FY2014 STEM education reorganization faced was the lack of a detailed implementation plan. Some policymakers hesitated to adopt the reorganization without a clear understanding about what the changes would mean for programs and constituencies. Further, while a detailed implementation plan may address concerns about the mechanics of the changes, it may also generate new concerns about effects. Either way, questions about implementation may be raised during deliberations over the FY2015 proposed reorganization.

Stakeholders. During debate over the FY2014 proposed reorganization, many stakeholders—including those in science and education—appealed to Congress for more input into national STEM education policy. Some STEM advocates asserted that the development of the FY2014 plan "lacked transparency," and that decisions were made with insufficient input from program users. Administration supporters, on the other hand, noted that "vested interests" may seek to impede the rationalization of "overlapping and wasteful" programs. The role of stakeholders in the reorganization process may be raised again in FY2015.

More Information

The United States is widely believed to have a poorly performing STEM education system. However, the data paint a complex picture. If measured by degree production, the number of degrees in STEM fields almost tripled between 1966 and 2010. (See **Figure 2**.) On the other hand, achievement gaps between demographic groups persisted between 1990 and 2011, despite gains by all students.

Figure 2. Number of S&E Degrees Awarded from 1966-2010, by Degree Level



Source: National Science Foundation, National Center for Science and Engineering Statistics, "Table 1," *Science and Engineering Degrees: 1966-2010*, NSF 13-327, June 2013.
Notes: Includes only degrees where field of study is known. Includes degrees awarded in the social sciences and psychology. Data not available for Bachelor's and Master's degrees in 1999.

International Tests. While U.S. students tend to outscore all-country averages, they typically rank below the scores of industrialized nations on international tests. Analysts debate the meaning and implications of these rankings. Some observers see U.S. student performance as a problem for a society driven by innovation; others argue these tests (for a variety of methodological and historical reasons) are insufficient barometers of future national performance.

Broadening Participation. The demographic profile of the U.S. youth population is changing. It is less non-Hispanic white, and the college-going population is less male, than previous generations. Some of these "growing" groups—e.g., Latinos, women—are underrepresented in some STEM fields. Some analysts assert that differences in participation rates reflect personal choices and aptitude; others perceive systematic barriers to participation that exclude certain groups from STEM fields. Socioeconomic status and urbanization level may also impact STEM participation.

STEM Workforce. Historically, interest in ensuring the strength of the U.S. STEM workforce has driven federal investment in STEM education. Although a consensus holds that the United States faces (or will soon face) workforce shortages in STEM fields, some analysts dispute this notion. The national debate is ongoing. About 6% of the U.S. workforce (7.2 million people) is employed in a STEM occupation.

For more information see CRS Report R42642, *Science, Technology, Engineering, and Mathematics (STEM) Education: A Primer*, by Heather B. Gonzalez and Jeffrey J. Kuenzi.

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