

## **Education and Workforce Development in the FY 2015 Budget**

*Christine S. Grant, Yolanda L. Comedy, and Shirley M. Malcom  
American Association for the Advancement of Science*

### **INTRODUCTION**

The President's FY 2015 budget once again recognizes the central role of science, technology, engineering, and mathematics (STEM) to the ongoing economic recovery and to the nation's prosperity. Focusing on investments in education and training to fuel discovery and innovation, the budget reflects those priorities and tough choices to limit spending. The President believes the budget seeks a balanced approach: fiscal constraint and deficit reduction on the one hand and investment for economic recovery on the other.

The President has persisted, as in FY 2014, in proposing a government-wide reorganization of STEM education programs designed to enable more strategic investment in STEM education and more critical evaluation of outcomes. The status of these plans and the coordination of the programs and budgets of the Committee on STEM Education (CoSTEM) are elaborated in a summary document, "Progress Report on Coordinating Federal Science, Technology, Engineering, and Mathematics (STEM) Education." According to the report, the proposed \$2.9 billion in STEM education in FY 2015 represents a 3.7 percent increase over the 2014 enacted level. However, it should be noted that beyond the information found in the CoSTEM report, other investments are critical elements in affecting education outcomes and workforce development, including, for example, supporting system and/or institutional transformation and funding for students in higher education.

The FY 2015 budget demonstrates several bold moves towards the President's priorities, including: 1) increasing accessibility and affordability of college/university education; 2) encouraging college completion; and 3) increasing the number of high quality STEM teachers

and graduates. To accomplish these priorities, the budget proposes strategies and consolidations to better manage science education and training of future scientists and engineers. Significant realignment of program responsibilities, the elimination of redundant programs, and increased consolidation are designed to respond to a STEM education and training system that appears confusing and uncoordinated to many observers.

While the Department of Education and the National Science Foundation play central roles in this work, funding for STEM education and workforce development is also found in other parts of the federal structure including the Departments of Energy, Agriculture, Defense, and Labor; the National Institutes of Health; and the National Aeronautics and Space Administration. This chapter highlights the major investments proposed in the FY 2015 budget for these departments and agencies, with special emphasis on the development and evaluation of scalable innovations, dissemination of evidence-based models that work, and preparation of both the teachers and workers of the future.

#### **DEPARTMENT OF EDUCATION (ED)**

President Obama's FY 2015 budget request for \$69 billion in discretionary appropriations for the Department of Education represents an increase of 2 percent over the previous year's funding. This funding builds on K-12 reform programs, proposing key investments in education that would create opportunity for every child. The proposal seeks to ensure that every student in America is prepared for college and a career. A central focus is improving student learning outcomes in mathematics and science, and on preparing students for science, technology, engineering, and mathematics (STEM) career opportunities. New initiatives this year emphasize preschool activities to prepare four-year-olds for learning. The budget also includes college cost reforms to improve access, retention, and graduation rates for all students. Preparing 100,000 "high quality" STEM teachers continues to be a focus.

Other ED requests include:

- \$14.4 billion to **College- and Career-Ready Students** programs. The program enables states to develop broader and more accurate measures of school performance that encompass student achievement, student growth, and school progress. States that reach

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targets would be eligible for additional Title I awards. This request is the same as that enacted for FY 2014.

- The **Race to the Top- Equity and Opportunity initiative** will focus on supporting efforts to “put state-level innovation at center stage;” to help States and school districts address continuing inequities in achievement and the distribution of educational resources: funding, effective teachers and leaders, access to rigorous coursework, and safe schools. Beginning in FY 2015, \$300 million would be spent on this program. There is an increasing focus on preschool development grants with \$1.3 billion for Preschool for All program and \$500 million in funding for Preschool Development Grants. **First in the World Fund** for \$100 million is a 33.3 percent increase from FY 2014, to provide funding for institutions of higher education to develop and test strategies and practices to improve college completion rates. Similarly, \$75 million is provided through the **College Success Grants for Minority-Serving Institutions**, a new program new for FY 2015. The FY 2015 request of \$29.2 billion for **Pell Grants** represents a similar amount as requested in FY 2014. The budget seeks to keep discretionary funding for the Pell Grant program at the same level as last year, which would allow the maximum award to jump by \$100 to \$5,830 because of an automatic, mandatory increase in funding.
- A request for \$165 million will support **Investing in Innovation (i3)**. Included in this request is support for the **Advanced Research Projects Agency-Education**, modeled after similar approaches in the Departments of Defense and Energy, supported by up to \$49.5 million. \$838.3 million would go to **Federal TRIO Programs** to support a number of programs including, Upward Bound, Talent Search, Veterans Upward Bound, Upward Bound Math-Science, McNair Post baccalaureate Achievement, and Educational Opportunity Services. In addition, \$301.6 million is provided for GEAR UP, a program to increase readiness for postsecondary education.
- Other programs include \$319.7 million to **STEM innovation**, a combination of STEM Innovation Networks, Master Teacher Corps, Teacher Pathways and Mathematics and Science Partnerships (MSP) program. The initiative will provide block grants for the MSP and competitive grants to all other portions of the program. Funds would support professional development, implementation of high-quality curriculum and assessments, and creation of integrated data

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management systems in support of assessment and curriculum development.

- \$29.3 million for **Graduate Assistance in Areas of National Need** scholarships and fellowships. This request is the same level as the enacted for FY 2014.
- \$637.2 million for the **Institute of Education Sciences (IES)** and its four centers: the National Center for Education Research, the National Center for Education Statistics, the National Center for Education Evaluation and Regional Assistance, and the National Center for Special Education Research. The request represents an *increase* of \$60.2 million above that enacted for FY 2014.
- Included in the IES request is support for better data across education and human service programs, including \$70 million, a \$35.5 million *increase* over the 2014 enacted level, for **Statewide Longitudinal Data Systems**; early childhood data systems so that states can use data for research and evaluation; postsecondary data; and research and evaluation of federal student aid.
- The **Aid for Institutional Development** programs (Title III) request is \$577.8 million. Aid for Institutional Development is focused on supporting institutions that serve large percentages of minority and disadvantaged students. Title III funding is awarded both competitively and by a formula. Some institutions have used these funds to enhance their STEM program development. Note that **Minority Science and Engineering Improvement (MSEIP)** is included under Title III.
- Aid for Hispanic Serving institutions includes Mandatory **Developing HSI STEM** and Articulation Programs at \$100 million.

**NATIONAL SCIENCE FOUNDATION (NSF)**

The President's FY 2015 budget supports NSF's strategic plan, *Transform the Frontiers, Innovate for Society, and Perform as a Model Organization*. NSF supports fundamental research and education across all fields of science and engineering in order to "expand the frontiers of knowledge, lay the foundation for economic growth and job creation, and educate a globally competitive workforce." NSF budget priorities in STEM education include the multi-agency program reorganization described above, in which NSF would be a major player. In the FY 2015 budget NSF focuses its reorganization efforts on undergraduate education and expanding its role in graduate education. When compared to the FY 2014 estimate, the K-12 STEM Education Programs would be reduced by \$38.66 million, a decrease of 16.4 percent. The

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Undergraduate programs increased by \$29.4 million (6.4 percent) with Graduate and Professional STEM programs increasing by \$12.26 million (2.8 percent). The Outreach and/or Informal STEM Education Programs remained at the same level as 2014. The total budget request for all NSF STEM education programs (K-12, undergraduate, graduate, and outreach and informal education) is \$1.2 billion, a 0.2 percent *increase* above that for FY 2014.

Education and workforce development support is available in all seven NSF directorates. The Directorate for Education and Human Resources (EHR) is the lead unit, however, providing funding for R&D in STEM education and workforce development. The President's FY 2015 request of \$889.75 million for EHR represents an *increase* of 5.1 percent above that estimated for FY 2014. **EHR Core Research** is distributed across the divisions. **Research on Education and Learning (REAL)** has been subsumed into the EHR Core, and there is a requested increase in the combined/re-stated budget from \$70.58 million in FY 2014 to \$75.57 million in FY 2015.

In the FY 2015 proposal the Division of Graduate Education (DGE) will lead the STEM Professional Workforce Preparation component of EHR's core R&D activity.

NSF programs include the following:

- The **Graduate Research Fellowship** program (\$333.34 million) builds on and expands NSF's previous **Graduate Research Fellowship** program to allow fellows to gain specialized experiences and training in key STEM areas. An increase of approximately 2,000 fellows is expected, bringing the total number of fellows to 10,000. There is also an increase in stipend support from \$32,000 to \$34,000. Half of this funding is coming from DGE (\$166.72 million) and the remainder from the budget of the Office of International and Integrative Activities.
- The expanded **NSF Research Traineeships** program (\$58.20 million) focuses training on strategically identified research areas, leveraging NSF's traineeship and research investments. Building on previous investments, particularly the Integrative Graduate Education and Research Traineeship program, it will encourage innovation and design of graduate programs to support opportunities within specific disciplines. The out-year commitments for IGERT

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(\$20.36 million), which is slated for elimination, are still included in the NRT budget request.

The **Improving Undergraduate STEM Education (IUSE)** (\$118.48 million) reflects a more extensive coordination of NSF's undergraduate STEM education investments within a framework of EHR program consolidation; the remainder is from the research units, while the amount from DUE is \$99.08 million. IUSE maximizes the impact of NSF's ongoing investments in undergraduate education by improving STEM learning and learning environments; broadening participation in STEM and increasing institutional capacity; and building the STEM workforce for the future. Starting in FY 2014, Nanotechnology Undergraduate Education in Engineering (NUE), Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP), Transforming Undergraduate Education in STEM (TUES), Transforming Undergraduate Biology Education (TUBE), Widening Implementation and Demonstration of Evidence-based Reforms (WIDER), and a few other programs were consolidated into IUSE. The FY 2015 budget represents a 33.7 percent increase from FY 2014. The **Research Experiences for Undergraduates Sites and Supplements** program is about the same as last year (\$75.1 million) and will provide early opportunities for student research, which can be especially influential in maintaining a student's interest in science, engineering and mathematics as consistent with the recommendations from the PCAST report, *Engage to Excel*.

The **Division of Research on Learning in Formal and Informal Settings (DRL)** provides strategic direction and program guidance for the STEM Learning component of EHR's Core R&D activity. The President's FY 2015 request of \$241.58 million represents an *increase* of 4.9 percent above the FY 2014 budget and includes:

- **STEM-C**, a formalized collaboration between the Division of Research and Learning (DRL) and the **Computer and Information Science and Engineering Directorate**, combines the former **Math and Science Partnership** and the **Computing Education for the 21<sup>st</sup> Century** program. Total funding for this program is \$57.08 million.
- \$55.0 million for **Advancing Informal STEM Learning**, formerly the Informal Science Education program, at the same levels as FY 2014.

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- \$102.53 million for the **Discovery Research K-12** program, an *increase* of 10.8 percent from that for FY 2014.

The **Division of Human Resource Development (HRD)** invests in agency-wide efforts to broaden participation of underrepresented minorities and minority-serving institutions, women, and persons with disabilities by building institutional capacity and conducting research on mechanisms and models for achieving these goals. The President's FY 2015 HRD request of \$143.11 million represents a slight *increase (0.7 percent)* above that estimated for FY 2014 and includes:

- \$54.81 million for **Learning and Learning Environments** and \$22.98 million for **Centers for Research Excellence in Science and Technology**, the same amount as in FY 2014

The **Division of Undergraduate Education (DUE)** portfolio anchors NSF investments in innovative and effective science and mathematics learning environments. The President's FY 2015 request of \$241.72 million for DUE represents an *increase* of 12.4 percent above that enacted for FY 2014 and includes in addition to IUSE:

- **Learning and Learning Environments** at \$116.830 million, a 29.6 percent *increase*.
- **Advanced Technological Education** at \$64.0 million.
- \$60.89 million for the **Robert Noyce Scholarship Program**, which includes the program's engagement in the design, development, and testing of a new program track: **STEM Teacher Leader Corps the STEM Master Teachers**.

Division of Human Resource Development (HRD) budget also includes:

- \$13.5 million for the **Tribal Colleges and Universities Program**.
- \$7.84 million for the **Alliances for Graduate Education and the Professoriate Program**. There is a 92.5 percent decrease in the AGEP Graduate Research Supplements, a reduction of 1.85 million.
- \$14.9 million for the **ADVANCE** program, a reduction of 1.56 million from the FY 2014 estimate. There was a 0.3 million reduction in the Career-Life Balance program (-23.1percent).

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- \$31.94 million for the **Historically Black Colleges and Universities Program**.
- \$45.62 million for the **Louis Stokes Alliances for Minority Participation** program.
- The **Excellence Awards in Science and Engineering** request is \$5.82 million; Partnerships for Research & Education in Materials (PREM) program, \$6.43 million; and Enhancing the Math Sciences Workforce in the 21<sup>st</sup> Century, \$5.69 million.

**DEPARTMENT OF ENERGY (DOE)**

DOE education activities are administered through the **Office of Science Workforce Development for Teachers and Scientists (WDTS)** program. WDTS supports activities that engage students and professionals in STEM education to ensure DOE has a sustained pipeline of skilled and diverse workers to support its mission, administer its programs, and conduct its research. The DOE budget request would fund the program at \$19.5 million, a *decrease* of \$7.0 million from FY 2014, representing a decrease in the supported activities at DOE laboratories.

It is unclear what the final proposed budget changes are in the Graduate Student Research Program (formerly Office of Science Graduate Fellowship). The Progress Report on Coordinating Federal STEM Education indicates a major change with the elimination of the budget item for the Graduate Student Research Program (formerly Office of Science Graduate Fellowship) in the amount of \$8.7 million. There is an increase in the funding request for the Graduate Student Research Program for a total of \$2.5 million; this program was new in FY 2014 at an amount of \$2.0 million. The DOE budget, however, indicates a decrease in the Graduate Student Research Program from \$10.7 million to \$2.5 million. These amounts are approaching the FY 2013 level of \$2.99 million for this same program.

An increase is proposed in the Community College Internship (formerly Community College Institute of Science and Technology) from \$0.7 to \$1.0 million.

The Office of Science has increased the budget request for the Visiting Faculty Program (formerly Faculty and Student Teams) from \$1.3 to \$1.7 million supporting approximately 15 additional faculty and 10 of

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their students, drawn from smaller colleges and universities, Historically Black Colleges and Universities, and Hispanic-Serving Institutions.

### **DEPARTMENT OF DEFENSE (DOD)**

DOD education activities are administered through its **National Defense Education Program (NDEP)** within the basic research program. The FY 2015 request would reduce the NDEP budget from \$77.24 to \$45.48 million; a significant component of that reduction is the movement of the Faculty Fellowship program to the DOD research arena. The K-12 component of this program was eliminated in FY 2014 (a \$12 million reduction); and the NDEP **Science, Mathematics and Research for Transformation Scholarships (SMART)** component was reduced slightly from \$46.3 million in FY 2014 to \$45.5 million in FY 2015. The National Security Science and Engineering Faculty Fellowship (NSSEFF) program is realigned from the National Defense Education Program (NDEP) to the Basic Research Initiatives. The NSSEFF requested amount for FY 2015 is \$33.19 million, an increase from the \$30.9 million in the FY 2014 budget.

The continuing **HBCU and Minority Institutions** program would fund research and educational capacity building with a proposed \$24.4 million, a reduction from \$35.9 million in the FY 2014 budget.

The Navy Historically Black Colleges and Universities/Minority Institutions Research and Education Partnership program budget is \$0.9 million and the Army Educational Outreach Program (AEOP) is 9.3 million.

The DOD STARBASE program has been eliminated from the budget. The program supported DOD's Science, Technology, Engineering and Mathematics education initiative, focusing on elementary students, primarily fifth graders, including students that are historically under-represented in STEM. The SeaPerch program was also eliminated from the budget (\$1.1 million). The National Security Agency Stokes Educational Scholarship Program was reduced from \$1.9 to \$1.6 million in the FY 2015 budget.

### **NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)**

NASA's Office of Education coordinates the efforts of Mission Directorates and NASA Centers to inspire the nation's K-12 learners and educators. The overall education budget for FY 2015 was reduced by

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27.7 percent. The Office of Education will continue to coordinate with the Department of Education, the National Science Foundation, and the Smithsonian Institution on STEM issues in order to maximize NASA's unique resources that support the reorganization initiative. NASA will continue to provide opportunities for students and educators to engage in activities that tie directly to NASA's science, technology, and engineering activities. The FY 2015 request would *decrease* the **National Space Grant College and Fellowship** program by 40 percent (to \$24 million) and the **STEM Education and Accountability** program by 4.6 percent. The **Minority University Research and Education Program** would see no change from FY 2014. The President's FY 2015 request of \$89 million for these programs represents an overall *decrease* of 23.8 percent from the \$117 million enacted for FY 2014. Beyond the funds in the Office of Education, NASA has generally been strong in requiring education and public outreach components associated with its missions. How this will be handled in the future is unclear.

**ENVIRONMENTAL PROTECTION AGENCY (EPA)**

The EPA has defined education to include "communities across the nation." The resulting changes in their programs are as follows: the Cooperative Training Partnership in Environmental Sciences Research was reduced from \$700,000 to \$100,000, and the GRO Fellowships for Undergraduate Environmental Study (\$1.8 million) and the National Environmental Education and Training Partnership (\$2.2 million) were eliminated. The STAR Graduate Fellowship Program was eliminated with a total reduction of \$9.3 million. The student design competition (People, Prosperity & the Planet Award) was reduced from \$2.1 to \$1.7 million.

**DEPARTMENT OF AGRICULTURE**

**The Institution Challenge, Multicultural Scholars and Graduate Fellowships** program was reduced from \$9 million to zero in a consolidation effort across the government. In addition, the **Secondary Education/2-Year Post Secondary** budget was eliminated from an original value of \$900,000. The Agriculture in the classroom program (\$600,000), and **Women and Minorities in STEM Fields Program (WAMS)** (\$400,000) were also eliminated. The **4H Science and Youth Development Programs** were reduced from \$25.2 million to \$23.5 million. There was a slight increase in the **National Institute of Food and Agriculture (NIFA) Fellowship Grants Program** by \$200,000 to a

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total of \$7.5 million. There was the inclusion of a **Hispanic-Serving Agriculture Colleges and Universities Endowment Fund** in the amount of \$10 million. The FY 2015 budget request also includes \$43.9 million for the **1890 HBCU land grant institutions**, and \$3 million for the **Federally-Recognized Tribes Extension Program**, both the same as FY 2014.

### NATIONAL INSTITUTES OF HEALTH (NIH)

NIH education and training activities are distributed throughout the individual institutes.

The President's budget would continue to support **Ruth Kirschstein National Research Service Award** trainees at the same level as FY 2014. The National Institute of General Medical Sciences **Division of Training, Workforce Development, and Diversity (TWD)**, created in FY 2013, leads efforts related to research training, and is the institute's focal point for facilitating the development of a diverse and inclusive biomedical research workforce. The FY 2015 request for the TWD program is \$621.14 million, an increase of \$2.55 million, or 0.4 percent above the FY 2014 enacted level. A high priority will go to activities that promote diversity in the biomedical and behavioral research workforce – in particular, the **Post-baccalaureate Research Education** Program and the **Minority Access to Research Careers** Program.

The President's proposal is continuing support for two Common Fund initiatives: the **Enhancing the Diversity of the NIH-Funded Workforce** program is seeking \$39.4 million, up from \$32.5 million in FY 2014, and the **Strengthening the Biomedical Research Workforce** program is seeking \$6.75 million, the same level as FY 2014. The centerpiece of the initiative is the Common Fund's **Enhancing the Diversity in the NIH-Funded Workforce** Program. This program consists of three highly integrated initiatives through which awardees will collectively develop, implement, and test novel ways of engaging, training, and mentoring young scientists and will disseminate successful approaches across the nation for large-scale impact.

The **Building Infrastructure Leading to Diversity (BUILD)** initiative would be funded at a level of \$35.2 million in FY 2015 (up from 27.8 million in FY 2014). BUILD is a set of experimental training awards designed to learn how to attract students from diverse backgrounds into the training pipeline and to encourage their persistence to become future

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NIH-supported researchers. BUILD is designed to provide relatively under-resourced institutions with the opportunity to develop novel approaches to training and mentoring their students, many of whom are from disadvantaged backgrounds and/or backgrounds that are nationally underrepresented in biomedical research. The initiative will provide awards to approximately 10 institutions across the country; transformative impact will occur via nationwide dissemination of effective approaches developed through BUILD.

The **National Research Mentoring Network (NRMN)** is creating a single nation-wide network of mentors and mentees that will connect students, postdoctoral fellows, and faculty to experienced mentors; develop novel mentoring strategies; establish standards for good mentorship; provide training opportunities for mentors; and provide networking and professional opportunities for mentees. FY 2015 funding is requested at \$2.38 million, down from \$2.7 million in FY 2014.

The **Coordinating and Evaluation Center (CEC)** within the Diversity program will work across all components of the consortium to determine what works and for whom. CEC will coordinate activities of the consortium as a whole, work with BUILD and NRMN awardees to establish hallmarks of success at all career stages, coordinate evaluation of BUILD and NRMN activities, and disseminate successful approaches to the biomedical research and training community. CEC is funded at about the same amount as FY 2014 at a level of \$1.9 million.

STEM Programs would be reduced by \$3.2 million. This includes elimination of the Diversity Research Education Grants in Neuroscience (\$1.0 million) and the Short Term Educational Experiences for Research (STEER) for Undergraduates and High School Students (\$500,000).

**DEPARTMENT OF LABOR (DOL)**

The President's request would fund the **Workforce Innovation Fund** at \$60 million, up from \$47.3 million in FY 2014.

The President's FY 2015 budget launches the **Community College Job-Driven Training fund**, requesting \$6 billion over 4 years with a budget of \$1.5 billion in FY 2015, for a program jointly administered by DOL and the Department of Education to support state and community college partnerships with businesses to build the skills of American workers. The fund will replace the **Trade Adjustment Assistance Community**

**College and Career Training Grants**, for which FY 2014 was the final year of funding at a level of \$464 million. The TAACCCT grant program, implemented in coordination with the Department of Education, was one of several federal grant programs to fund projects that use evidence to design program strategies.

### **FY 2015 SUMMARY AND INTERPRETATIONS**

As proposed in FY 2014, the budget for STEM education in FY 2015 is constructed to support a proposed reorganization of STEM education in the federal government. The FY 2014 reorganization plan specifically designated the Department of Education as the lead for K-12 STEM education, the National Science Foundation as the lead for undergraduate and graduate STEM education, and the Smithsonian Institution as the lead for informal STEM education. The FY 2015 budget backs away from these designations while moving toward coordinating roles. In the analysis in this chapter the authors have chosen also to report on selected other funding sources that will be vital in achieving the goals set out by CoSTEM, especially those programs that support institutional/system transformation and that provide financial aid to students.

When offered in FY 2014, the reorganization proposal led to considerable uncertainty within the STEM education community, especially as the Congress, in a show of bipartisanship, rejected one proposed change after another while departments and agencies scrambled to respond. Many of the concerns expressed in regard to the FY 2014 proposal remain. It is not clear, for example, that the stakeholder community has been engaged in thoughtful conversation about effective strategies. It has also been difficult to follow the money and the programmatic intent of the consolidation or to envision how coordination will be accomplished across agencies and departments. While the language of “research and evidence based” strategies has been employed, it is not clear that the proposed consolidations have been guided or informed by research or evidence based strategies; it is also not clear that the histories of the programs have informed the consolidation decisions. If one were to consider a program such as IGERT at the NSF, for example, it gets strong reviews for its efforts to enable the skills development needed to support interdisciplinary research. While the out-year IGERT support is scheduled to be continued, the core of the program is slated to be replaced by the National Research Traineeships, which will be situated in the discipline-based directorates. For many, this has been viewed as a step backward, especially as science and

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engineering is becoming much more interdisciplinary. The management of such programs has posed a challenge for many institutions as well as for the funding entities. It is important to consider how implementation of the new program will be managed in such a way as to retain the strongest elements of this former program while accomplishing the coordination sought under its replacement.

While consolidation has resulted in fewer programs, it seems not to have yielded fewer program goals; and it remains unclear that care has been taken to attend to the interests that originally led to program proliferation, such as prior inattention to underserved populations, groups of institutions, or levels of schooling. The same monies are being asked to support myriad goals, and it is unclear how success of these goals, individually and collectively, will be tracked. Both gender and disabilities issues are slated to be supported within Education Core Research, for example, but it is also not clear whether this will be done as “within program targeting” or through some other means. Noting a success rate of about 12 percent for education research grants overall at the NSF, without some purposeful focusing it is likely that the topics related to diversifying the STEM workforce will be marginalized or neglected outright. It is noted that support for Hispanic-serving institutions and for understanding the barriers faced by Latino students in STEM is to be largely encouraged and mainstreamed under existing program titles; but once again, it is not clear how this will happen without “within program targeting,” greater guidance from and technical assistance by staff, and expansion of the reviewer base as well as the education of reviewers.

Given the fact that the overwhelming bulk of the money for K-12 STEM education is in the Department of Education it is *de facto* the lead for this area. As the proposed funding levels increase so too do the concerns about the resources and capacity within ED to carry out these plans. A major coordination challenge lies in the differences in funding cultures between ED’s STEM implementation programs and the ED R&D unit as well as the funding culture of the science-based agencies and departments. Moving research into implementation/practice will remain a challenge, no matter how strong the research or the theory.

Coordination of investments and program consolidation are goals worth pursuing. But the devil lies in the details of implementation. Improving the theory that supports STEM education is also a worthy goal, but supporting the translational elements and adoption by the practitioner

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communities remains a challenge. Having mechanisms in place to move critical issues from practice into the foreground of the STEM education research community is also vitally important so that priority investments are made in addressing important questions. Many questions remain:

Do the consolidation and coordination go far enough? For example, what might be the opportunities to include STEM experiences and learning in early care and education, even beyond the preschool initiatives in ED? Or even into Headstart?

Much of the support for building the professional workforce comes in funding of undergraduate and graduate students through research grants. Are there opportunities for advancing diversity, workforce, and career development goals?

Post-secondary technical training concerns reside in the Departments of Labor and Education; are there opportunities to draw on the experiences of NSF, such as in its highly regarded Advanced Technological Education (ATE) program, to inform these efforts?

Are there better ways to support the mainstreaming of STEM education improvement efforts beyond the STEM specific programs?

Can the best of NASA's mainstreaming of education and public outreach traditionally associated with its missions inform a larger incorporation of public engagement and broader impacts beyond that agency?

Since in many ways the proposed STEM education reorganization is a work in progress, CoSTEM might be encouraged to think bigger, beyond the current portfolio, even as the agencies and departments figure out internally how to implement the goals effectively and in such a way as to provide clarity to and allay the concerns of the STEM education community.