Feedback to the U.S. Department of Education on the Implementation of STEM-related provisions in the Every Student Succeeds Act

May 2016

The document compiles feedback from members of the STEM Education Coalition's Leadership Council on STEM-related provisions in the Every Student Success Act and their implementation by the U.S. Department of Education. For some of legislative provisions referenced here we have addressed feedback at specifically highlighted terms and their definition and application. In other cases the feedback is more general or intended to share specific examples of programs and practices that are relevant to certain provisions or that provide illustrative examples of such programs in action.

Title II Part A: Supporting Effective Instruction

`(xvii) Developing and providing professional development and other comprehensive systems of support for teachers, principals, or other school leaders to promote high-quality instruction and instructional leadership in science, technology, engineering, and mathematics subjects, including computer science.

Feedback:

> ***The Dept of Education should strongly recommend to states and districts that Title II dollars be spent on professional development activities for STEM educators. There is a huge need for professional learning resources that will allow educators to have access to quality professional learning that will strengthen content, enhance practice and increase student achievement.***

Title II B STEM Master Teacher Corps:

''SEC. 2245. STEM MASTER TEACHER CORPS.

''(a) IN GENERAL.—From the funds reserved under section 2241(4) for a fiscal year, the Secretary may award grants to— 1) State educational agencies to enable such agencies to support the development of a State-wide STEM master teacher corps; or ''(2) State educational agencies, or nonprofit organizations in partnership with State educational agencies, to support the implementation, replication, or expansion of effective science, technology, engineering, and mathematics professional development in programs in schools across the State through collaboration with school administrators, principals, and STEM educators.

Feedback:

> ***Professional development elements that hold promise for supporting changes in teachers' content knowledge, their content knowledge for teaching, and their instructional practices include engaging teachers in analysis of student thinking and learning; incorporating specific supports to help teachers use new knowledge to change their teaching practice; providing an expert program facilitator; attending to school context, such as principals' support and curriculum alignment; and considering issues of sustainability in the program design.***

''(b) STEM MASTER TEACHER CORPS.—In this section, the term 'STEM master teacher corps' means a State-led effort to elevate the status of the science, technology, engineering, and mathematics teaching profession by recognizing, rewarding, attracting, and retaining outstanding science, technology, engineering, and mathematics teachers, particularly in high-need and rural schools, by—

''(1) selecting candidates to be master teachers in the corps on the basis of—

''(A) content knowledge based on a screening examination; and

Feedback:

> ***Teachers' knowledge for science teaching—content knowledge and pedagogical content knowledge—should be measured in a variety of ways, including tests, interviews, and surveys.***

''(B) pedagogical knowledge of and success in teaching;

''(2) offering such teachers opportunities to—

‘‘(A) work with one another in scholarly communities; and

Feedback:

> ***A “scholarly community,” or “ professional learning” community can be defined as one comprising individuals with a shared vision, a team approach to problem solving, and a disposition toward continual learning through reflection. These learning communities should focus on student learning, and practices of collaboration and inquiry. Teachers’ knowledge is situated in their daily practice and active engagement in such a community will improve teacher knowledge and their students’ learning.***

‘‘(B) participate in and lead high-quality professional development; and

Feedback:

> ***The best available evidence based on professional development programs suggests that the following features of such programs are most effective:***
> - ***active participation of teachers who engage in the analysis of examples of effective instruction and the analysis of student work,***
> - ***a content focus,***
> - ***alignment with district policies and practices, and***
> - ***sufficient duration to allow repeated practice and/or reflection on classroom experiences.***

<u>State-wide Efforts to Expand High-Quality STEM Courses:</u>

``SEC. 4104. STATE USE OF FUNDS.

``(i) increasing student access to and improving student engagement and achievement in--

``(I) high-quality courses in science, technology, engineering, and mathematics, including computer science;

Feedback:

- ***As an example, the State of Florida has developed course descriptions for STEM and most recently Computer Science at the secondary level. Creating or identifying an existing criteria to support the essentials of a high quality program would ensure equity and maximize our efforts.***
- ***The definition of a "high-quality course" should be sufficiently broad so as to include either a traditional in-classroom course or a less-traditional, project-based activity that achieves desired learning objectives. Can this definition include afterschool and informal learning opportunities as well?***

Title IV Local (LEA/District) Activities to Support STEM Education

Title IV``SEC. 4107. ACTIVITIES TO SUPPORT WELL-ROUNDED EDUCATIONAL OPPORTUNITIES.

``(C) programming and activities to improve instruction and student engagement in science, technology, engineering, and mathematics, including computer science, (referred to in this section as `STEM subjects') such as—

``(i) increasing access for students through grade 12 who are members of groups underrepresented in such subject fields, such as female students, minority students, English learners, children with disabilities, and economically disadvantaged students, to high-quality courses;

Feedback:

Guidance could address some relative levels of success and growth in achieving these goals. As an example, would 1 – 2 females in an engineering class qualify as a significant measure of success? Seems to depend on the circumstances.

``(ii) supporting the participation of low-income students in nonprofit competitions related to STEM subjects (such as robotics, science research, invention, mathematics, computer science, and technology competitions);

Feedback:

The following specifically applies to "robotics competitions:"

- ***The afterschool program should be a competitive sport, while requiring the application of real-world math and science concepts.***
- ***Like any other school sports, the program should have strict rules, limited resources and time limits.***
- ***Teams should be required to build robots based on sound engineering principles.***
- ***The program should emphasize learning and using sophisticated hardware and software.***
- ***Competitions should particularly stress several of the points noted above by developing strategic problem-solving, organizational, and team building skills.***
- ***The program should provide teams for students in all grades – K-12***

``(iii) providing hands-on learning and exposure to science, technology, engineering, and mathematics and supporting the use of field-based or service learning to enhance the students' understanding of the STEM subjects;

Feedback:

- ***Can purchase of classroom materials (such as lab equipment, probes, etc, not considered educational technology) be considered an allowable use of funds under this provision?***
- ***What tools/data points/resources are available to districts that must do a needs assessment under Title IV.***
  Hands on learning: Teachers are moving away from preplanned outcomes for "cookbook" laboratories or hands-on activities and instead are conducting multiple investigations driven by students' questions, with a range of possible outcomes that collectively lead to a deep understanding of established core scientific and engineering ideas. Students better learn to ask questions, develop and use models, analyze data, and construct explanations from data.
- ***Well-rounded educational activities should incorporate real-world challenges, as a precursor or complement to education, in order to create authentic and intrinsic learning opportunities. Children are naturally curious and innovative, and well-rounded educational opportunities leverage those inherent qualities and interests.***

``(iv) supporting the creation and enhancement of STEM-focused specialty schools;

``(v) facilitating collaboration among school, after-school program, and informal program personnel to improve the integration of programming and instruction in the identified subjects; and

Feedback:

- ***State afterschool and STEM networks should be resources for states as they implement these provisions. Further, research shows that afterschool and other out of school time settings are particularly effective for fostering interest in STEM fields among underrepresented populations. Guidance from ED can point to that research.***
- ***Does this include paying entrance fees; cost of parts; travel costs; stipends or fees for afterschool providers who mentor or coach competitive teams?***

- ***As an example, the California Afterschool Network has developed the Expanded Learning STEM Quality Elements guide.***

    - ***Some comments specific to the design of effective informal and afterschool STEM education programs:While problem solving is an important element of any afterschool STEM program, the program should also emphasize additional values; e.g., working in a team to solve problems, valuing failure as a learning experience, and while competing with other teams learning also to cooperate with them.***

    - ***A key factor is access to experienced mentors who bring their real-life STEM experience to students in afterschool STEM programs.***

    - ***Integrating math and science teachers is an important factor.***

``(vi) integrating other academic subjects, including the arts, into STEM subject programs to increase participation in STEM subjects, improve attainment of skills related to STEM subjects, and promote well-rounded education;

Educational Technology to Support STEM Learning

``SEC. 4109. ACTIVITIES TO SUPPORT THE EFFECTIVE USE OF TECHNOLOGY.

``(5) providing professional development in the use of technology (which may be provided through partnerships with outside organizations) to enable teachers and instructional leaders to increase student achievement in the areas of science, technology, engineering, and mathematics, including computer science; and

Feedback:

Science Teachers' Learning: Enhancing Opportunities, Creating Supportive Contexts from the National Academy of Sciences has a number of examples of incorporating professional development through the use of technology

As an example, Indiana has three professional organizations that all have an annual conference specifically in their areas for professional development. The organizations are ICTM – Indiana Council of Teachers of Mathematics, HASTI – Hoosier Association of

Science Teachers Incorporated and ETEI – Engineering and Technology Teachers Incorporated.

Comment [JP1]: Every state has these organizations and each organization has annual conferences like this. in this context this makes little sense

STEM-Focused Specialty School Definition

``SEC. 4102. DEFINITIONS.

``(8) Stem-focused specialty school.--The term `STEM-focused specialty school' means a school, or dedicated program within a school, that engages students in rigorous, relevant, and integrated learning experiences focused on science, technology, engineering, and mathematics, including computer science, which include authentic schoolwide research.

Feedback:

- ***The associated learning experiences focused on STEM education can include afterschool and informal learning activities. As such, the supports afforded teachers and administrators in these schools should extend to the afterschool and informal program providers and professionals.***
- ***Most schools attempt to incorporate many elements of STEM by implementing state standards and district curriculum. Further defining the term to include district/state approval will aid in the clarity to identify our intended target.***
- ***Also, does this only apply to schools that incorporate all facets of STEM within their program or would a focus on one suffice? i.e. a school with a computer science/technology focus ; a school with a medical arts focus.***

Some examples:

- ***Indiana does have a STEM Certified School Rubric that does spell out many aspects around many of the practices listed in this section. The Indiana Afterschool Network has also developed STEM Afterschool standards.***
- ***Ohio has STEM Certified Schools that meet this definition and have gone through a through self-study, application process and site visits for verification***
- ***Arizona has STEM Certified Schools that have formed a community of practice and meet this definition***
- ***Indiana has STEM Certified Schools that meet this definition and have gone through a through self-study, application process and site visits for verification.***
- ***North Carolina has STEM Schools of Distinction that meet this definition and have gone through a through self-study, application process and site visits for verification***

- ***Texas has STEM Certified Schools** that meet this definition and have gone through a through self-study, application process and site visits for verification*
- ***Washington has STEM Lighthouse Schools** that meet this definition and have gone through an application process and site visits for verification*