NATIONAL SCIENCE FOUNDATION (NSF)
COMPUTER SCIENCE EDUCATION RESEARCH CONGRESSIONAL REPORT
IN COMPLIANCE WITH PUBLIC LAW 114-329:
AMERICAN INNOVATION AND COMPETITIVENESS ACT, SEC. 310 (E)

Summary

The American Innovation and Competitiveness Act, 2017, Public Law 114-329, requires the National Science Foundation (NSF) to undertake specific activities regarding computer science education research (Sec. 310):

"(b)   GRANT PROGRAM.-
    (1) IN GENERAL. — The Director of the Foundation shall award grants to eligible entities to research computer science education and computational thinking.

    (2) RESEARCH. — The research described in paragraph (1) may include the development or adaptation, piloting or full implementation, and testing of —

    A. models of preservice preparation for teachers who will teach computer science and computational thinking;
    B. scalable and sustainable models of professional development and ongoing support for the teachers described in subparagraph (A);
    C. tools and models for teaching and learning aimed at supporting student success and inclusion in computing within and across diverse populations, particularly poor, rural, and tribal populations and other populations that have been historically underrepresented in computer science and STEM fields; and
    D. high-quality learning opportunities for teaching computer science and, especially in poor, rural, or tribal schools at the elementary school and middle school levels, for integrating computational thinking into STEM teaching and learning.

(c)   COLLABORATIONS. — In carrying out the grants established in subsection (b), eligible entities may collaborate and partner with local or remote schools to support the integration of computing and computational thinking within pre-kindergarten through grade 12 STEM curricula and instruction.

(d)   METRICS. — The Director of the Foundation shall develop metrics to measure the success of the grant program funded under this section in achieving program goals.

(e)   REPORT. — The Director of the Foundation shall report, in the annual budget submission to Congress, on the success of the program as measured by the metrics in subsection (d).

(f)   DEFINITION OF ELIGIBLE ENTITY. — In this section, the term "eligible entity" means an institution of higher education or a non-profit research organization."

Background

NSF launched the Computer Science for All: Researcher Practitioner Partnerships (CS for All: RPP) program in 2017 with solicitation NSF 17-525[1]. In 2018, NSF issued an updated solicitation, NSF 18-537[2].

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[1] www.nsf.gov/pubs/2017/nsf17525/nsf17525.htm
[2] www.nsf.gov/pubs/2018/nsf18537/nsf18537.htm

The CS for All: RPP program synopsis in the program solicitation states that:

> "This program aims to provide all U.S. students the opportunity to participate in computer science (CS) and computational thinking (CT) education in their schools at the preK-12 levels. With this solicitation, the National Science Foundation (NSF) focuses on researcher-practitioner partnerships (RPPs) that foster the research and development needed to bring CS and CT to all schools. Specifically, this solicitation aims to provide high school teachers with the preparation, professional development (PD) and ongoing support that they need to teach rigorous computer science courses; preK-8 teachers with the instructional materials and preparation they need to integrate CS and CT into their teaching; and schools and districts the resources needed to define and evaluate multi-grade pathways in CS and CT."

The revised solicitation added the focus on researcher-practitioner partnerships that are supporting schools and districts in defining and evaluating multi-grade pathways in CS and CT. Articulation of coursework and experiences in CS and CT from elementary to middle school, middle to high school, and high school into the first years of college is important to support systemic implementation of CS and CT in schools.

Metrics

Short-, mid-, and longer-term metrics for success were developed and reported upon, as follows:

- Short-term metrics will focus on ensuring that the program is making awards in the four areas outlined in the law and that the awards address the goal of broadening participation in computer science. One indicator of broadening participation is the diversity of the populations targeted in the awards.
- Mid-term metrics will include the extent to which funded projects are achieving goals as measured by the progress reported in NSF's required annual and final project reports.
- Longer-term (beyond five years) metrics will include an evaluation of the outcomes of the program, which are based on the program aims as described in the program solicitation and the well-aligned requirements of Public Law 114-329. Program staff are working with the Evaluation and Monitoring group within NSF's Directorate for Education and Human Resources and the Evaluation and Assessment Capability group within NSF's Office of Integrative Activities to develop (1) a set of specific longer-term metrics and (2) a program evaluation plan for measuring the collective success of the CS for All: RPP projects using these longer-term metrics.

Report on the Success of the Program as Measured by the Short-Term Metrics
Between the submission of the last annual report and December 2018, 35 new awards were made by the program: Below is a summary of the CSforAll: RPP projects funded in FY 2018 pursuant to NSF 18-537:

- 14 awards address subsection (b)(2) A and (b)(2) B;
- 11 awards address subsection (b)(2) C; and
- 10 awards address multi-grade pathways to CT and CS

Finally, all new awards identified at least one underrepresented or underserved group, as outlined in the table below, to address subsection (b)(2) D. (Note: some awards serve more than one underrepresented group and thus the numbers of awards in the table total more than 35).

**Underrepresented or Underserved Group
Served by Backbone Organizations**

Category	Groups Served
Rural	23
Low Socio-Economic Status	12
Disabilities	3
Pacific Islanders	3
Women/Girls	11
English Language Learners	4
African-Americans	22
Native Americans	7
Latino/a	19