

115TH CONGRESS
2D SESSION

S. 3471

To direct the National Science Foundation to support STEM education research focused on early childhood.

IN THE SENATE OF THE UNITED STATES

SEPTEMBER 18, 2018

Mr. SCHATZ introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

A BILL

To direct the National Science Foundation to support STEM education research focused on early childhood.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Building Blocks of
5 STEM Act”.

6 **SEC. 2. FINDINGS.**

7 The Congress finds the following:

8 (1) The National Science Foundation has made
9 the largest financial investment in STEM education

1 of all Federal agencies, and plays a very powerful
2 role in helping to set research and policy agendas.

3 (2) Studies have found that children who en-
4 gage in scientific activities from an early age develop
5 positive attitudes toward science and are more likely
6 to pursue STEM expertise and careers later on.

7 (3) However, the majority of current research
8 focuses on increasing STEM opportunities for stu-
9 dents in middle school and older.

10 (4) Women remain widely underrepresented in
11 the STEM workforce and this gender disparity ex-
12 tends down through all levels of education. Strategic
13 funding of programs is needed in order to under-
14 stand and address the root cause of this gap.

15 **SEC. 3. DEFINITIONS.**

16 In this Act:

17 (1) DIRECTOR.—The term “Director” means
18 the Director of the National Science Foundation.

19 (2) EARLY CHILDHOOD.—The term “early
20 childhood” applies to children from birth through
21 the age of 10.

22 (3) INSTITUTION OF HIGHER EDUCATION.—The
23 term “institution of higher education” has the
24 meaning given the term in section 101(a) of the
25 Higher Education Act of 1965 (20 U.S.C. 1001(a)).

1 sortia of such institutions or organizations), to accel-
2 erate research efforts to increase understanding of
3 the factors that contribute to the participation of
4 young girls in STEM activities.

5 (2) RESEARCH AREAS.—Research areas funded
6 by a grant under this subsection may include—

7 (A) the role of teacher training and profes-
8 sional development, including effective incentive
9 structures to encourage teachers to participate
10 in such training and professional development,
11 in encouraging or discouraging young girls from
12 participating in STEM activities;

13 (B) the role of teachers in shaping young
14 girls' perceptions of STEM and discouraging
15 such girls from participating in STEM activi-
16 ties;

17 (C) the role of other facets of the learning
18 environment on the willingness of young girls to
19 participate in STEM activities, including learn-
20 ing materials and textbooks, classroom decora-
21 tions, seating arrangements, use of media and
22 technology, classroom culture, and gender com-
23 position of students during group work;

1 (D) the role of parents and other care-
2 givers in encouraging or discouraging young
3 girls from participating in STEM activities;

4 (E) the types of STEM activities that elicit
5 greater participation by young girls;

6 (F) the role of mentorship and best prac-
7 tices in finding and utilizing mentors;

8 (G) the role of informal and out-of-school
9 STEM learning opportunities on girls' percep-
10 tion of and participation in STEM activities;
11 and

12 (H) any other activity the Director deter-
13 mines will accomplish the goals of this sub-
14 section.

15 (3) GRANT RECIPIENT REPORT.—An entity
16 awarded a grant under this subsection shall report
17 to the Director, at such time and in such manner as
18 the Director may require, on the activities carried
19 out and materials developed using such grant funds.

20 (b) DEVELOPMENT AND TESTING OF SCALABLE
21 MODELS FOR INCREASED ENGAGEMENT.—

22 (1) IN GENERAL.—The Director shall award
23 grants, on a competitive basis, to institutions of
24 higher education or nonprofit organizations (or con-
25 sortia of such institutions or organizations), to de-

1 velop and evaluate interventions in pre-K and ele-
2 mentary school classrooms that increase participa-
3 tion of young girls in computer science activities.

4 (2) PARTNERSHIPS.—In order to be eligible to
5 receive a grant under this subsection, an institution
6 of higher education, nonprofit organization, or con-
7 sortium, shall enter into a partnership with one or
8 more local educational agency or State in carrying
9 out the activities funded by such grant.

10 (3) USES OF FUNDS.—Grants awarded under
11 this subsection shall be used for activities that draw
12 upon the expertise of the partner entities described
13 in paragraph (2) to increase participation of young
14 girls in computer science activities, including—

15 (A) offering training and professional de-
16 velopment programs, including summer or aca-
17 demic year institutes or workshops, designed to
18 strengthen the capabilities of pre-K and elemen-
19 tary school teachers and to familiarize such
20 teachers with the role of gender bias in the
21 classroom;

22 (B) offering innovative preservice and in-
23 service programs that instruct teachers on gen-
24 der-inclusive practices for teaching computing
25 concepts;

1 (C) developing distance learning programs
2 for teachers or students, including developing
3 curricular materials, play-based computing ac-
4 tivities, and other resources for the in-service
5 professional development of teachers that are
6 made available to teachers through the Inter-
7 net;

8 (D) developing a cadre of master teachers
9 who will promote reform and the adoption of
10 gender-inclusive practices in teaching computer
11 science concepts in early childhood education;

12 (E) developing tools to evaluate activities
13 conducted under this subsection;

14 (F) developing or adapting pre-K and ele-
15 mentary school computer science curricular ma-
16 terials that incorporate contemporary research
17 on the science of learning, particularly with re-
18 spect to gender inclusion;

19 (G) developing and offering gender-inclu-
20 sive computer science enrichment programs for
21 students, including after-school and summer
22 programs;

23 (H) providing mentors for girls in person
24 and through the Internet to support such girls
25 in participating in computer science activities;

1 (I) engaging parents of girls about the dif-
2 ficulties faced by girls to maintain an interest
3 and desire to participate in computer science
4 activities, and enlisting the help of parents in
5 overcoming these difficulties;

6 (J) acquainting girls with careers in com-
7 puter science and encouraging girls to consider
8 careers in such field; and

9 (K) any other activities the Director deter-
10 mines will accomplish the goals of this sub-
11 section.

12 (4) GRANT RECIPIENT REPORT.—An entity
13 awarded a grant under this subsection shall report
14 to the Director, at such time and in such manner as
15 the Director may require, on the activities carried
16 out, materials developed using such grant funds, and
17 the outcomes for students served by such grant.

18 (5) EVALUATION REQUIRED.—Not later than 4
19 years after the date of enactment of this Act, the
20 Director shall evaluate the grant program under this
21 subsection. At a minimum, such evaluation shall—

22 (A) use a common set of benchmarks and
23 assessment tools to identify best practices and
24 materials developed and demonstrated by the
25 partnerships described in paragraph (2); and

1 (B) to the extent practicable, compare the
2 effectiveness of practices and materials devel-
3 oped and demonstrated by such partnerships
4 with those of partnerships funded by other local
5 or State government or Federal Government
6 programs.

7 (6) DISSEMINATION OF RESULTS.—

8 (A) EVALUATION RESULTS.—The Director
9 shall make publicly available free of charge on
10 an Internet website and shall submit to Con-
11 gress the results of the evaluation required
12 under paragraph (5).

13 (B) MATERIALS.—The Director shall en-
14 sure that materials developed under a program
15 funded by a grant under this subsection, that
16 are demonstrated to be effective in achieving
17 the goals of this subsection (as determined by
18 the Director), are made publicly available free
19 of charge on an Internet website, including
20 through an arrangement with an outside entity.

21 (7) ANNUAL MEETING.—The Director may con-
22 vene an annual meeting of the partnerships partici-
23 pating in a program funded by a grant under this
24 subsection, for the purpose of fostering greater na-
25 tional collaboration.

1 (8) TECHNICAL ASSISTANCE.—At the request of
2 a partnership seeking a grant under this subsection,
3 the Director shall provide the partnership with tech-
4 nical assistance in meeting any requirement of this
5 subsection.

6 **SEC. 6. COMPUTER SCIENCE IN THE ROBERT NOYCE**
7 **TEACHER SCHOLARSHIP PROGRAM.**

8 Section 10 of the National Science Foundation Au-
9 thorization Act of 2002 (42 U.S.C. 1862n–1) is amend-
10 ed—

11 (1) by striking “and mathematics” each place it
12 appears and inserting “mathematics, informatics,
13 and computer science”;

14 (2) in subsection (a)(3)(B), by striking “or
15 mathematics” and inserting “mathematics, informat-
16 ics, and computer science”; and

17 (3) in subsections (b)(1)(D)(i), (c)(1)(A), and
18 (d)(1), by striking “or mathematics” each place it
19 appears and inserting “mathematics, informatics, or
20 computer science”.

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