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# H. R. 2057

To direct the Secretary of Education to award grants to State educational agencies to develop comprehensive plans to strengthen elementary and secondary computer science education, and for other purposes.

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IN THE HOUSE OF REPRESENTATIVES

APRIL 28, 2015

Mr. CÁRDENAS (for himself, Mrs. LAWRENCE, Mr. RANGEL, and Mr. POLIS) introduced the following bill; which was referred to the Committee on Education and the Workforce, and in addition to the Committee on Science, Space, and Technology, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

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# A BILL

To direct the Secretary of Education to award grants to State educational agencies to develop comprehensive plans to strengthen elementary and secondary computer science education, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

**SECTION 1. SHORT TITLE.**

This Act may be cited as the "Computer Science in STEM Act of 2015".

**SEC. 2. FINDINGS.**

The Congress finds the following:

(1) Computer science is transforming industry, creating new fields of commerce, driving innovation in all fields of science, and bolstering productivity in established economic sectors.

(2) Computer science underpins the information technology sector of the United States economy, which is a significant contributor to the economic output of the United States.

(3) The Bureau of Labor Statistics projects that from 2008 through 2018 more than 1,500,000 high-wage computing jobs will be created in the United States economy, making high-wage computing one of the fastest growing occupational fields.

(4) The breadth of industries requiring computing professionals is diverse, two-thirds of computing jobs are in sectors other than information technology, including manufacturing, defense, health care, finance, and government.

(5) Providing students with computer science education in elementary and secondary school is critical for student success in the 21st century and for strengthening the workforce.

(6) Elementary and secondary computer science education gives students a deeper knowledge of the

fundamentals of computing, yielding critical thinking skills that will serve them throughout their lives in numerous fields.

(7) Computer science courses in elementary and secondary schools are fading from the national landscape at a time when they are most needed. The Computer Science Teachers Association (CSTA) has found that introductory secondary school computer science courses have decreased in number by 17 percent since 2005 and the number of Advanced Placement (AP) computer science courses has decreased by 33 percent.

(8) Significant disparities in access to computer science education exist for minorities. Research in the Los Angeles Unified School District, the second largest and one of the most diverse school districts in the United States, found college-preparatory computer science courses were commonly missing in schools with high numbers of Latino and African-American students.

(9) Only 14 States allow computer science courses to count toward a student's secondary school graduation requirements, chilling student interest in computer science courses.

(10) The CSTA has found that many States do not have a certification or licensure process for computer science teachers, and where certification processes do exist, such processes often have no connection to computer science content.

(11) Computer science education has been encumbered by confusion regarding the related but distinct concepts of computer science education, technology education, and the use of technology in education.

(12) Computer science education courses have often been placed within the vocational education pathways in schools, creating a focus on applied information technology skills rather than a focus on developing core computer science knowledge.

(13) With the growing importance of computing in society, the need for students to understand the fundamentals of computing, and the significant challenges computer science education faces in elementary and secondary education, broad support for computer science education is needed to catalyze reform.

**SEC. 3. AMENDMENT TO THE AMERICA COMPETES REAUTHORIZATION ACT OF 2010.**

Section 2(2) of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 6621 note) is amended by inserting ", and computer science" after "and mathematics".

**SEC. 4. STATE COMPREHENSIVE PLANNING GRANTS.**

(a) PROGRAM AUTHORIZED.—The Secretary of Education shall award grants to State educational agencies to develop comprehensive plans to strengthen elementary and secondary computer science education in accordance with this section.

(b) OBJECTIVES.—A comprehensive plan developed under this section shall outline strategies for achieving the following objectives:

(1) Provide an engaging and rigorous computer science education intended to ensure students are prepared for the 21st century.

(2) Assess the State's needs for computer science education, particularly for underrepresented populations.

(3) Ensure access to computer science courses, particularly at low-performing schools and for low-income students and students underrepresented in computing.

(4) Ensure that students are exposed to grade-appropriate computer science concepts in kindergarten through grade 12 and that computer science courses at the secondary level are viewed as part of the core curriculum students need to be ready for postsecondary education and careers.

(5) Ensure that teachers have the appropriate background, skills, and access to resources to teach computer science.

(c) CONTENTS OF COMPREHENSIVE PLANS.—A State educational agency that receives a grant under subsection (a) shall develop a comprehensive plan that meets the objectives described in subsection (b) and includes the following:

(1) An assessment of elementary and secondary computer science education in such State.

(2) Proposals to improve elementary and secondary computer science education in such State through the development and implementation of—

(A) challenging and grade-appropriate academic content standards for computer science at elementary and secondary education levels;

(B) grade-appropriate assessments of computer science learning;

(C) programs to increase access to computer science courses for students at low-performing schools and students underrepresented in computing;

(D) improved computer science teacher certification or licensure requirements and processes;

(E) professional development programs for computer science teachers; and

(F) programs for ensuring that computer science courses at the secondary level are considered an integral part of the curriculum students need to be well prepared for higher education and employment.

(d) CONSULTATION.—In developing a comprehensive plan under this section, a State educational agency shall collaborate with representatives of institutions of higher education, with other interested parties, and, where they exist in such State, with State P–16 or P–20 councils.

(e) DURATION OF GRANTS.—The Secretary shall award each grant under subsection (a) for a period of 2 years.

(f) FUNDING STRUCTURE.—

(1) IN GENERAL.—The Secretary shall award grants under subsection (a) proportionally among

the State educational agencies that apply for grant funding under this section based on the number of low-income children served by the State educational agency compared to the total number of low-income children served by all of the State educational agencies that apply for grant funding under this section.

(2) COUNTING LOW-INCOME CHILDREN.—

(A) CATEGORIES OF CHILDREN.—The number of low-income children to be counted for purposes of this section is the aggregate of—

(i) the number of children aged 5 to 17, inclusive, in the State from families below the poverty level, as determined by the Secretary on the basis of the most recent satisfactory data;

(ii) the number of children (determined for either the preceding year or for the second preceding year, as the Secretary finds appropriate) aged 5 to 17, inclusive, in the State in institutions for neglected and delinquent children (other than such institutions operated by the United States); and

(iii) the number of children aged 5 to 17, inclusive, in the State from families above the poverty level as determined under paragraph (4)(A) of section 1124(c) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 6333(c)(4)).

(B) METHODOLOGY.—In making computations under subparagraph (A), the Secretary shall use the methodology described in paragraphs (3) through (5) of section 1124(c) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 6333(c)).

(3) MINIMUM GRANT.—Notwithstanding paragraph (1), each State educational agency approved by the Secretary to receive a grant under this section shall receive a minimum grant of $250,000.

(g) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated such sums as necessary, subject to the availability of appropriations, to carry out this section.

**SEC. 5. IMPLEMENTATION GRANTS.**

(a) PROGRAM AUTHORIZED.—The Secretary shall award grants to State educational agencies in accordance with this section to implement computer science education

improvements proposed in comprehensive plans that meet the requirements of subsections (b) and (c) of section 4.

(b) BENCHMARKS.—Each State educational agency applying for a grant under this section shall—

(1) develop quantifiable benchmarks for the activities supported under such grant, which may include benchmarks for increasing—

(A) student knowledge and competency of grade-appropriate computer science concepts;

(B) the number of students that take computer science courses;

(C) the diversity of students who take computer science courses;

(D) the number of students who plan to pursue postsecondary computer science degrees;

(E) the diversity of students who plan to pursue postsecondary computer science degrees; and

(F) the number of teachers who are certified to teach computer science; and

(2) submit such quantifiable benchmarks to the Secretary for approval.

(c) ACTIVITIES.—Grant funds received under this section shall be used by each State educational agency for the development and implementation of—

(1) challenging and grade-appropriate academic content standards for computer science;

(2) grade-appropriate assessments of computer science learning;

(3) programs to increase access to computer science courses for students at low-performing schools and students underrepresented in computing;

(4) improved computer science teacher certification requirements and processes;

(5) professional development programs for computer science teachers;

(6) programs for ensuring that computer science courses at the secondary level are considered an integral part of the curriculum students need to be well prepared for higher education and employment;

(7) effective computer science curricula;

(8) computer science distance learning programs; and

(9) such other activities that strengthen computer science education and that such State educational agency considers appropriate.

(d) ADMINISTRATIVE EXPENSES.—A State educational agency may use not more than five percent of a

grant received under this section for administrative expenses.

(e) PARTNERSHIPS.—In performing the activities required under subsection (c), each State educational agency shall partner with institutions of higher education and local educational agencies, and may partner with nonprofit organizations, businesses, and other State educational agencies.

(f) NON-FEDERAL SHARE.—

(1) IN GENERAL.—Each State educational agency receiving a grant under this section shall provide a non-Federal share, in cash or in-kind, of the funding for the activities described in subsection (c) of not less than 20 percent of the total cost of such activities in any fiscal year.

(2) FINANCIAL HARDSHIP WAIVER.—The Secretary may reduce or waive the requirement to provide a non-Federal share under paragraph (1) for a State educational agency if such State educational agency demonstrates a need for such waiver or reduction due to extreme financial hardship.

(g) DURATION OF GRANTS.—The Secretary shall award each grant under subsection (a) for a period of five years.

(h) SUBSEQUENT GRANTS.—At the end of the 5-year period for a grant, the grant recipient may apply for an additional grant under this section by submitting an updated comprehensive plan that meets the requirements of subsections (b) and (c) of section 4. In considering an application for a subsequent grant under this section, the Secretary shall take into consideration the reports filed under subsection (l).

(i) COMPETITIVE BASIS; PRIORITY.—The Secretary shall—

(1) award grants for a fiscal year on a competitive basis among State educational agencies that meet the requirements for funding under this section; and

(2) give priority to State educational agency proposals that include an emphasis on serving low-performing schools and on increasing participation in computer science by students underrepresented in computing.

(j) FUNDING PRIORITY.—In allocating grant funds received under this section, a State educational agency shall give priority to proposals that include an emphasis on serving low-performing schools and on increasing participation in computer science by students underrepresented in computing.

(k) SUPPLEMENT, NOT SUPPLANT.—Funds made available to carry out this section shall be used to supplement, and not supplant, other Federal and State funds available to carry out the activities described in this section.

(l) REPORTS.—Each State educational agency receiving a grant under this section shall—

(1) measure the progress of such State educational agency in achieving the benchmarks developed under subsection (b)(1);

(2) collect data relating to student-related benchmarks developed under subsection (b)(1) in a form that is disaggregated by student race, ethnicity, gender, disability status, migrant status, English proficiency status, and low-income status, except that such disaggregation shall not be required when the number of students in a category is insufficient to yield statistically reliable results or the results would reveal personally identifiable information about an individual student;

(3) collect such other performance information as the Secretary may reasonably require for the national evaluation conducted under section 6;

(4) submit a report to the Secretary addressing each item in paragraphs (1) through (3) not later

than four years after the date on which the State educational agency receives an initial grant under this section; and

(5) not later than two years after the date of the submission of the report required under paragraph (4), and biennially thereafter until the State educational agency no longer receives grant funding under this section, submit to the Secretary an update of such report.

(m) GUIDANCE.—The Secretary shall provide guidance to State educational agencies regarding acceptable data sources and methodologies for—

(1) establishing performance benchmarks; and

(2) measuring progress by State educational agencies receiving grants under this section.

**SEC. 6. NATIONAL EVALUATION.**

(a) IN GENERAL.—Not earlier than 4 years after the date of the enactment of this Act, the Secretary shall contract with an independent organization for a comprehensive, scientifically valid, and quantitative evaluation of the performance and effectiveness of the activities funded by grants received under this Act in improving the availability and quality of computer science education, the overall participation rate of students in computer science courses,

and the participation rate of students underrepresented in computing in computer science courses.

(b) REPORTING REQUIREMENTS.—

(1) INITIAL REPORT.—Not later than 5 years after the date of the enactment of this Act, the Secretary shall submit to Congress a report on the results of the evaluation described in subsection (a).

(2) REPORT UPDATES.—Not later than 2 years after the date on which the Secretary submits the report required under paragraph (1), and biennially thereafter, the Secretary shall submit to Congress an update of such report.

**SEC. 7. EXPANDING TEACHER PREPARATION PROGRAMS FOR COMPUTER SCIENCE TEACHERS.**

(a) COMPUTER SCIENCE MODEL TEACHER PREPARATION PROGRAM.—Part B of title II of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 6661 et seq.) is amended by adding at the end the following:

**"SEC. 2204. COMPUTER SCIENCE MODEL TEACHER PREPARATION PROGRAM.**

"(a) ESTABLISHMENT.—The Secretary is authorized to award grants to institutions of higher education to improve training for elementary school and secondary school computer science teachers.

"(b) ELIGIBILITY.—The Secretary shall award a grant under this section to an institution of higher education that—

"(1) has, at minimum—

"(A) a program in teacher education; and

"(B) a program in computer science or informatics; and

"(2) submits an application at such time, in such form, and containing such information and assurances as the Secretary may require.

"(c) USE OF FUNDS.—An institution of higher education that receives a grant under the section shall use the grant funds to carry out not less than one of the following activities:

"(1) Develop courses for undergraduate students that—

"(A) prepare such students to teach computer science in elementary schools and secondary schools;

"(B) address content and pedagogy in informatics or computer science education; and

"(C) engage the teacher education department and other relevant departments at the institution of higher education.

"(2) Develop and fund teacher mentoring programs to support elementary school and secondary school computer science teachers who are new to the profession.

"(d) DURATION OF GRANTS.—Each grant awarded by the Secretary under this section shall be for a period of 5 years.

"(e) REPORT.—Not later than 180 days after the conclusion of the grant period described under subsection (d), an institution of higher education that receives a grant under this section shall submit to the Secretary and Congress a report that—

"(1) identifies the number of teachers served under the grant;

"(2) identifies the number of teachers described in paragraph (1) who obtain a teaching position in a computer science classroom; and

"(3) evaluates the activities carried out under this section.".

(b) TECHNICAL AMENDMENT.—The table of contents for such Act is amended by inserting before the item relating to part C of title II the following:

"Sec. 2204. Computer science model teacher preparation program.".

**SEC. 8. COMPUTER SCIENCE IN THE ROBERT NOYCE TEACHER SCHOLARSHIP PROGRAM.**

Section 10 of the National Science Foundation Authorization Act of 2002 (42 U.S.C. 1862n–1) is amended—

(1) by striking ''and mathematics'' and inserting ''mathematics, informatics, and computer science'' in each place it appears;

(2) in subsection (a)(3)(B), by striking ''or mathematics'' and inserting ''mathematics, informatics, and computer science'';

(3) in subsections (b)(1)(D)(i), (c)(1)(A), (d)(1), and (i)(7) by striking ''or mathematics'' in each place it appears and inserting ''mathematics, informatics, or computer science''; and

(4) in subsection (i)(5), by striking ''or mathematics'' and inserting ''mathematics, or computer science''.

**SEC. 9. DEFINITIONS.**

In this Act:

(1) COMPUTER SCIENCE.—The term ''computer science'' means the study of computers and algorithmic processes and includes the study of computing principles, computer hardware and software design, computer applications, and the impact of computers on society.

(2) COMPUTER SCIENCE EDUCATION.—The term ''computer science education'' includes computing education in any of the following:

(A) Software design.

(B) Hardware design.

(C) Creation of digital artifacts.

(D) Abstraction.

(E) Logic.

(F) Algorithm development and implementation.

(G) Programming paradigms and languages.

(H) Theoretical foundations.

(I) Networks.

(J) Graphics.

(K) Databases and information retrieval.

(L) Information security and privacy.

(M) Artificial intelligence.

(N) The relationship between computing and mathematics.

(O) The limits of computation.

(P) Applications in information technology and information systems.

(Q) The social impacts of computing.

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

(4) LOCAL EDUCATIONAL AGENCY.—The term ''local educational agency''—

(A) subject to subparagraph (B), has the meaning given that term in section 9101(26) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 7801(26)); and

(B) includes any charter school (as defined in section 5210(1) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 7221i(1))) that constitutes a local educational agency under State law.

(5) SECRETARY.—The term ''Secretary'' means the Secretary of Education.

(6) STATE EDUCATIONAL AGENCY.—The term ''State educational agency'' has the meaning given that term in section 9101(41) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 7801(41)).

(7) STUDENTS UNDERREPRESENTED IN COMPUTING.—The term ''students underrepresented in computing''—

(A) means populations historically underrepresented in computer science disciplines; and

(B) includes females, racial minorities, and low-income students.

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