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(Original Signature of Member)

111TH CONGRESS
2D SESSION

# H. R. _____

To provide grants to State educational agencies and institutions of higher education to strengthen elementary and secondary computer science education, and for other purposes.

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## IN THE HOUSE OF REPRESENTATIVES

Mr. POLIS of Colorado introduced the following bill; which was referred to the Committee on _____

_____

# A BILL

To provide grants to State educational agencies and institutions of higher education to strengthen elementary and secondary computer science education, and for other purposes.

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 ''Computer Science

5  Education Act of 2010''.

6  **SEC. 2. FINDINGS.**

7    The Congress finds the following:

1     (1) Computing technology, driven by break-
2 throughs in computer science, is an integral part of
3 the culture of the United States and is reshaping
4 how people interact.

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

9     (3) Computer science underpins the information
10 technology sector of the United States economy,
11 which is a significant contributor to the economic
12 output of the United States.

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

18     (5) Computer science is critical for national se-
19 curity and for meeting the challenges that a modern
20 society faces. Of the 14 Grand Challenges for Engi-
21 neering determined by the National Academy of En-
22 gineering, 8 have a predominant or significant com-
23 puter science component.

24     (6) Providing students with computer science
25 education in elementary and secondary school is crit-

1    ical for student success in the 21st century and for

2    strengthening the workforce.

3        (7) Elementary and secondary computer science

4    education gives students a deeper knowledge of the

5    fundamentals of computing, yielding critical thinking

6    skills that will serve them throughout their lives in

7    numerous fields.

8        (8) Computer science courses in elementary and

9    secondary schools are fading from the national land-

10   scape at a time when they are most needed. The

11   Computer Science Teachers Association (CSTA) has

12   found that introductory secondary school computer

13   science courses have decreased in number by 17 per-

14   cent since 2005 and the number of Advanced Place-

15   ment (AP) computer science courses has decreased

16   by 33 percent.

17       (9) Significant disparities in access to computer

18   science education exist for minorities. Research in

19   the Los Angeles Unified School District, the second

20   largest and one of the most diverse school districts

21   in the United States, found college-preparatory com-

22   puter science courses were commonly missing in

23   schools with high numbers of Latino and African-

24   American students.

4

1      (10) According to the National Center for

2   Women and Information Technology, women and

3   certain racial minorities are underrepresented in

4   computer science education. In 2008, 17 percent of

5   AP computer science test takers were women, even

6   though women represented 55 percent of all AP test

7   takers. In 2008, only 4 percent of AP computer

8   science test takers were African-Americans, even

9   though African-Americans represented 7 percent of

10   all AP test takers. Only 784 African-American stu-

11   dents nationwide took the AP computer science

12   exam in 2008.

13      (11) While some States, including Texas and

14   Georgia, allow computer science courses to count to-

15   ward a student's secondary school core graduation

16   requirements, most States that have specific course

17   requirements for graduation count computer science

18   courses only as electives, chilling student interest in

19   computer science courses.

20      (12) The CSTA has found that many States do

21   not have a certification process for computer science

22   teachers, and where certification processes do exist,

23   such processes often have no connection to computer

24   science content.

1    (13) The CSTA has developed model computer
2    science teacher certification pathways for both new
3    and experienced teachers.

4    (14) Computer science education has been en-
5    cumbered by confusion regarding the related but dis-
6    tinct concepts of computer science education, tech-
7    nology education, and the use of technology in edu-
8    cation.

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

14    (16) The Association for Computing Machinery
15    and the CSTA have established a clear four-part,
16    grade-appropriate framework of standards for com-
17    puter science education to guide State reform ef-
18    forts.

19    (17) With the growing importance of computing
20    in society, the need for students to understand the
21    fundamentals of computing, and the significant chal-
22    lenges computer science education faces in elemen-
23    tary and secondary education, broad support for
24    computer science education is needed to catalyze re-
25    form.

1 **SEC. 3. STATE COMPREHENSIVE PLANNING GRANTS.**

2 (a) PROGRAM AUTHORIZED.—The Secretary of Edu-

3 cation shall award grants to State educational agencies to

4 develop comprehensive plans to strengthen elementary and

5 secondary computer science education in accordance with

6 this section.

7 (b) OBJECTIVES.—A comprehensive plan developed

8 under this section shall outline strategies for achieving the

9 following objectives:

10      (1) Provide an engaging and rigorous computer

11      science education intended to ensure students are

12      prepared for the 21st century.

13      (2) Assess the State's needs for computer

14      science education, particularly for underserved popu-

15      lations.

16      (3) Ensure access to computer science courses,

17      particularly at low-performing schools and for low-

18      income students and students underrepresented in

19      computing.

20      (4) Ensure that students are exposed to grade-

21      appropriate computer science concepts in kinder-

22      garten through grade 12 and that computer science

23      courses at the secondary level are viewed as part of

24      the core curriculum students need to be college- and

25      career-ready.

1    (5) Ensure that teachers have the appropriate

2 background, skills, and access to resources to teach

3 computer science.

4    (c) CONTENTS OF COMPREHENSIVE PLANS.—A

5 State educational agency that receives a grant under sub-

6 section (a) shall develop a comprehensive plan that in-

7 cludes the following:

8        (1) An assessment of elementary and secondary

9    computer science education in such State.

10        (2) Proposals to improve elementary and sec-

11    ondary computer science education in such State

12    through the development and implementation of—

13            (A) challenging and grade-appropriate aca-

14        demic content standards for computer science

15        at elementary and secondary education levels;

16            (B) grade-appropriate assessments of com-

17        puter science learning;

18            (C) programs to increase access to com-

19        puter science courses for students at low-per-

20        forming schools and students underrepresented

21        in computing;

22            (D) improved computer science teacher

23        certification requirements and processes;

24            (E) professional development programs for

25        computer science teachers; and

8

1          (F) programs for ensuring that computer

2       science courses at the secondary level are con-

3       sidered an integral part of the curriculum stu-

4       dents need to be well prepared for higher edu-

5       cation and employment.

6      (d) CONSULTATION.—In developing a comprehensive

7  plan under this section, a State educational agency shall

8  collaborate with representatives of institutions of higher

9  education, with other interested parties, and, where they

10  exist in such State, with State P–16 or P–20 councils.

11      (e) DURATION OF GRANTS.—The Secretary shall

12  award each grant under subsection (a) for a period of two

13  years.

14      (f) FUNDING STRUCTURE.—

15          (1) IN GENERAL.—The Secretary shall award

16       grants under subsection (a) proportionally among

17       the State educational agencies that apply for grant

18       funding under this section based on the number of

19       low-income children served by the State educational

20       agency compared to the total number of low-income

21       children served by all of the State educational agen-

22       cies that apply for grant funding under this section.

23          (2) COUNTING LOW-INCOME CHILDREN.—

24              (A) CATEGORIES OF CHILDREN.—The

25          number of low-income children to be counted

1    for purposes of this section is the aggregate

2    of—

3          (i) the number of children aged 5 to

4          17, inclusive, in the State from families

5          below the poverty level, as determined by

6          the Secretary on the basis of the most re-

7          cent satisfactory data;

8          (ii) the number of children (deter-

9          mined for either the preceding year or for

10         the second preceding year, as the Secretary

11         finds appropriate) aged 5 to 17, inclusive,

12         in the State in institutions for neglected

13         and delinquent children (other than such

14         institutions operated by the United

15         States); and

16         (iii) the number of children aged 5 to

17         17, inclusive, in the State from families

18         above the poverty level as determined

19         under paragraph (4) of section 1124(c) of

20         the Elementary and Secondary Education

21         Act of 1965 (20 U.S.C. 6333(c)(4)).

22      (B) METHODOLOGY.—In making computa-

23    tions under subparagraph (A), the Secretary

24    shall use the methodology described in para-

25    graphs (3) through (5) of section 1124(c) of the

1         Elementary and Secondary Education Act of

2         1965 (20 U.S.C. 6333(c)).

3         (3) MINIMUM GRANT.—Notwithstanding para-

4      graph (1), each State educational agency approved

5      by the Secretary to receive a grant under this sec-

6      tion shall receive a minimum grant of $250,000.

7      (g) AUTHORIZATION OF APPROPRIATIONS.—There is

8 authorized to be appropriated $20,000,000 to carry out

9 this section.

10 **SEC. 4. IMPLEMENTATION GRANTS.**

11      (a) PROGRAM AUTHORIZED.—The Secretary shall

12 award grants to State educational agencies in accordance

13 with this section to implement computer science education

14 improvements proposed in comprehensive plans that meet

15 the requirements of subsections (b) and (c) of section 3.

16      (b) BENCHMARKS.—Each State educational agency

17 applying for a grant under this section shall—

18         (1) develop quantifiable benchmarks for the ac-

19         tivities supported under such grant, which may in-

20         clude benchmarks for increasing—

21            (A) student knowledge and competency of

22            grade-appropriate computer science concepts;

23            (B) the number of students that take com-

24            puter science courses;

1         (C) the diversity of students who take com-

2         puter science courses;

3         (D) the number of students who plan to

4         pursue postsecondary computer science degrees;

5         (E) the diversity of students who plan to

6         pursue postsecondary computer science degrees;

7         and

8         (F) the number of teachers who are cer-

9         tified to teach computer science; and

10     (2) submit such quantifiable benchmarks to the

11 Secretary for approval.

12 (c) ACTIVITIES.—Grant funds received under this

13 section shall be used by each State educational agency for

14 the development and implementation of—

15     (1) challenging and grade-appropriate academic

16 content standards for computer science;

17     (2) grade-appropriate assessments of computer

18 science learning;

19     (3) programs to increase access to computer

20 science courses for students at low-performing

21 schools and students underrepresented in computing;

22     (4) improved computer science teacher certifi-

23 cation requirements and processes;

24     (5) professional development programs for com-

25 puter science teachers;

1    (6) programs for ensuring that computer

2  science courses at the secondary level are considered

3  an integral part of the curriculum students need to

4  be well prepared for higher education and employ-

5  ment;

6    (7) effective computer science curricula;

7    (8) computer science distance learning pro-

8  grams; and

9    (9) such other activities that strengthen com-

10  puter science education and that such State edu-

11  cational agency considers appropriate.

12  (d) ADMINISTRATIVE EXPENSES.—A State edu-

13  cational agency may use not more than five percent of a

14  grant received under this section for administrative ex-

15  penses.

16  (e) PARTNERSHIPS.—In performing the activities re-

17  quired under subsection (c), each State educational agency

18  shall partner with institutions of higher education and

19  local educational agencies, and may partner with nonprofit

20  organizations, businesses, and other State educational

21  agencies.

22  (f) NON-FEDERAL SHARE.—

23    (1) IN GENERAL.—Each State educational

24  agency receiving a grant under this section shall

25  provide a non-Federal share, in cash or in kind, of

1 the funding for the activities described in subsection

2 (c) of not less than 20 percent of the total cost of

3 such activities in any fiscal year.

4 (2) FINANCIAL HARDSHIP WAIVER.—The Sec-

5 retary may reduce or waive the requirement to pro-

6 vide a non-Federal share under paragraph (1) for a

7 State educational agency if such State educational

8 agency demonstrates a need for such waiver or re-

9 duction due to extreme financial hardship.

10 (g) DURATION OF GRANTS.—The Secretary shall

11 award each grant under subsection (a) for a period of five

12 years.

13 (h) SUBSEQUENT GRANTS.—At the end of the five-

14 year period for a grant, the grant recipient may apply for

15 an additional grant under this section by submitting an

16 updated comprehensive plan that meets the requirements

17 of subsections (b) and (c) of section 3. In considering an

18 application for a subsequent grant under this section, the

19 Secretary shall take into consideration the reports filed

20 under subsection (l).

21 (i) FUNDING STRUCTURE.—

22 (1) TOTAL APPROPRIATIONS LESS THAN

23 $200,000,000.— If the total amount of funds made

24 available for grants under this section is less than

25 $200,000,000 for any fiscal year, the Secretary shall

1  award grants for such fiscal year on a competitive
2  basis among State educational agencies that meet
3  the requirements for funding under this section and
4  shall give priority to State educational agency pro-
5  posals that include an emphasis on serving low-per-
6  forming schools and on increasing participation in
7  computer science by students underrepresented in
8  computing.

9     (2) TOTAL APPROPRIATIONS OF $200,000,000
10    OR MORE.—If the total amount of funds made avail-
11    able for grants under this section is $200,000,000 or
12    more for any fiscal year, the Secretary shall award
13    grants for such fiscal year on the same basis as
14    grants are awarded under paragraphs (1) and (2) of
15    section 3(e).

16  (j) FUNDING PRIORITY.—In allocating grant funds
17  received under this section, a State educational agency
18  shall give priority to proposals that include an emphasis
19  on serving low-performing schools and on increasing par-
20  ticipation in computer science by students underrep-
21  resented in computing.

22  (k) SUPPLEMENT, NOT SUPPLANT.—Funds made
23  available to carry out this section shall be used to supple-
24  ment, and not supplant, other Federal and State funds

1 available to carry out the activities described in this sec-
2 tion.

3    (l) REPORTS.—Each State educational agency receiv-
4 ing a grant under this section shall—

5        (1) measure the progress of such State edu-
6    cational agency in achieving the benchmarks devel-
7    oped under subsection (b)(1);

8        (2) collect data relating to student-related
9    benchmarks developed under subsection (b)(1) in a
10    form that is disaggregated by student race, eth-
11    nicity, gender, disability status, migrant status,
12    English proficiency status, and low-income status,
13    except that such disaggregation shall not be required
14    when the number of students in a category is insuf-
15    ficient to yield statistically reliable results or the re-
16    sults would reveal personally identifiable information
17    about an individual student;

18        (3) collect such other performance information
19    as the Secretary may reasonably require for the na-
20    tional evaluation conducted under section 7;

21        (4) submit a report to the Secretary addressing
22    each item in paragraphs (1) through (3) not later
23    than four years after the date on which the State
24    educational agency receives an initial grant under
25    this section; and

1    (5) not later than two years after the date of

2    the submission of the report required under para-

3    graph (4), and biennially thereafter until the State

4    educational agency no longer receives grant funding

5    under this section, submit to the Secretary an up-

6    date of such report.

7    (m) GUIDANCE.—The Secretary shall provide guid-

8 ance to State educational agencies regarding acceptable

9 data sources and methodologies for—

10    (1) establishing performance benchmarks; and

11    (2) measuring progress by State educational

12    agencies receiving grants under this section.

13 **SEC. 5. COMMISSION ON COMPUTER SCIENCE EDUCATION.**

14    (a) COMMISSION.—Not later than 90 days after the

15 date of the enactment of this Act, the Secretary shall es-

16 tablish a Commission, to be known as the "Blue Ribbon

17 Commission on Computer Science Education" (in this sec-

18 tion referred to as the "Commission"), to provide rec-

19 ommendations for expanding and improving computer

20 science education.

21    (b) MEMBERSHIP.—The Commission shall consist of

22 not more than 20 members and shall include at least one

23 of each of the following:

24    (1) A State education official.

25    (2) An expert in computer science.

1 　　　(3) A representative of an elementary or sec-

2 　ondary computer science education practitioner orga-

3 　nization.

4 　　　(4) An elementary or secondary computer

5 　science teacher.

6 　　　(5) A social scientist with expertise on equity

7 　issues in the field of computer science.

8 　　　(6) A representative of the computing industry

9 　or an industry that depends on computing services.

10 (c) REVIEW.—The Commission shall—

11 　　　(1) review the state of elementary and sec-

12 　ondary computer science education; and

13 　　　(2) review the state of computer science teacher

14 　certification requirements.

15 (d) REPORT.—Not later than 270 days after the date

16 on which the Commission is established, the Commission

17 shall submit to Congress and the Secretary a report con-

18 taining the results of the review under subsection (c).

19 Such report shall include—

20 　　　(1) recommendations on best practices for com-

21 　puter science instruction, teacher preparation, and

22 　professional development;

23 　　　(2) recommendations on best practices for com-

24 　puter science teacher certification, including rec-

25 　ommendations on achieving congruence between

1 State computer science teacher certification stand-
2 ards and the content of teacher preparation pro-
3 grams offered by institutions of higher education;
4 and

5     (3) recommendations for expanding capacity—
6         (A) to help students understand computer
7         science, the job opportunities available to those
8         who pursue computer science education, and
9         the importance of computer science in the econ-
10         omy;

11         (B) to strengthen computer science edu-
12         cation in the elementary and secondary public
13         education system in the United States; and

14         (C) to increase participation in computer
15         science among students underrepresented in
16         computing.

17 (e) TERMINATION.—The Commission shall terminate
18 on the date that is 30 days after the date of the submis-
19 sion of the report required under subsection (d).

20 **SEC. 6. MODEL TEACHER PREPARATION PROGRAMS.**

21 (a) MODEL TEACHER PREPARATION PROGRAMS.—
22 The Secretary may award grants to institutions of higher
23 education to improve computer science teacher training.

1     (b) ELIGIBLE ACTIVITIES.—A grant received under

2 subsection (a) shall be used to carry out at least one of

3 the following activities:

4        (1) Development of courses for undergraduate

5     students that—

6           (A) prepare such students to teach com-

7         puter science at the elementary and secondary

8         level;

9           (B) address content and pedagogy in com-

10         puter science education; and

11           (C) engage teacher education and other

12         relevant departments at such institution of

13         higher education.

14        (2) Development and support of mentoring pro-

15     grams to support computer science teachers who are

16     new to the profession.

17     (c) DURATION OF GRANTS.—Each grant awarded by

18 the Secretary under this section shall be for a period of

19 five years.

20     (d) LIMITATIONS.—The Secretary may not award

21 grants under this section before the earlier of the date of

22 the submission of the report of the Blue Ribbon Commis-

23 sion on Computer Science Education required under sec-

24 tion 5(d), or the date that is one year after the date of

25 the enactment of this Act. The Secretary shall consider

1 such report, if available, in awarding grants under this
2 section.

**SEC. 7. NATIONAL EVALUATION.**

4  (a) IN GENERAL.—Not earlier than four years after
5 the date of the enactment of this Act, the Secretary shall
6 contract with an independent organization for a com-
7 prehensive, scientifically valid, and quantitative evaluation
8 of the performance and effectiveness of the activities fund-
9 ed by grants received under this Act in improving the
10 availability and quality of computer science education, the
11 overall participation rate of students in computer science
12 courses, and the participation rate of students underrep-
13 resented in computing in computer science courses.

14  (b) REPORTING REQUIREMENTS.—

15   (1) INITIAL REPORT.—Not later than five years
16   after the date of the enactment of this Act, the Sec-
17   retary shall submit to Congress a report on the re-
18   sults of the evaluation described in subsection (a).

19   (2) REPORT UPDATES.—Not later than two
20   years after the date on which the Secretary submits
21   the report required under paragraph (1), and bienni-
22   ally thereafter, the Secretary shall submit to Con-
23   gress an update of such report.

**SEC. 8. DEFINITIONS.**

25  In this Act:

1    (1) COMPUTER SCIENCE.—The term "computer

2    science" means the study of computers and algo-

3    rithmic processes and includes the study of com-

4    puting principles, computer hardware and software

5    design, computer applications, and the impact of

6    computers on society.

7    (2) COMPUTER SCIENCE EDUCATION.—The

8    term "computer science education" includes com-

9    puting education in any of the following:

10    (A) Software design.

11    (B) Hardware design.

12    (C) Creation of digital artifacts.

13    (D) Abstraction.

14    (E) Logic.

15    (F) Algorithm development and implemen-

16    tation.

17    (G) Programming paradigms and lan-

18    guages.

19    (H) Theoretical foundations.

20    (I) Networks.

21    (J) Graphics.

22    (K) Databases and information retrieval.

23    (L) Information security and privacy.

24    (M) Artificial intelligence.

1    (N) The relationship between computing

2   and mathematics.

3    (O) The limits of computation.

4    (P) Applications in information technology

5   and information systems.

6    (Q) The social impacts of computing.

7   (3) INSTITUTION OF HIGHER EDUCATION.—The

8 term "institution of higher education" has the

9 meaning given that term in section 101(a) of the

10 Higher Education Act of 1965 (20 U.S.C. 1001(a)).

11   (4) LOCAL EDUCATIONAL AGENCY.—The term

12 "local educational agency"—

13    (A) subject to subparagraph (B), has the

14   meaning given that term in section 9101(26) of

15   the Elementary and Secondary Education Act

16   of 1965 (20 U.S.C. 7801(26)); and

17    (B) includes any charter school (as defined

18   in section 5210(1) of the Elementary and Sec-

19   ondary Education Act of 1965 (20 U.S.C.

20   7221i(1))) that constitutes a local educational

21   agency under State law.

22   (5) SECRETARY.—The term "Secretary" means

23 the Secretary of Education.

24   (6) STATE EDUCATIONAL AGENCY.—The term

25 "State educational agency" has the meaning given

1 that term in section 9101(41) of the Elementary

2 and Secondary Education Act of 1965 (20 U.S.C.

3 7801(41)).

4 (7) STATE P–16 OR P–20 COUNCIL.—The term

5 "State P–16 or P–20 council" means a body of pub-

6 lic officials and public and private sector leaders

7 that—

8     (A) is established by a State executive

9     order, statute, or voluntary agreement and may

10     be regularly chaired or co-chaired by the Gov-

11     ernor of the State;

12     (B) sets formal aligned expectations for a

13     seamless system of education from the earliest

14     years of a child's development through the kin-

15     dergarten through grade 12 system and into

16     and through postsecondary education;

17     (C) acts as a venue for collaboration across

18     early learning, including preschool through the

19     first 4 years of higher education or through

20     doctoral and professional schools; and

21     (D) receives State, foundation, business, or

22     other funding to carry out the body's agenda.

23 (8) STUDENTS UNDERREPRESENTED IN COM-

24 PUTING.—The term "students underrepresented in

25 computing"—

1        (A) means populations historically under-

2    represented in computer science disciplines; and

3        (B) includes females, racial minorities, and

4    low-income students.