

### Your Question:

You asked about state costs of providing supports for delivery of K-12 computer science instruction, and examples of state supports to defray those costs.

### Our Response:

The following states and Rhode Island are considered national leaders or emerging national leaders in broadening access to high-quality K-12 computer science learning experiences.

Additional details or additional state examples can be researched upon request.

### Arkansas

Per Arkansas Department of Education's State Director of Computer Science Education [Anthony Owen](#), Arkansas has allocated \$10 million to computer science education over a four-year period (FY 15 through 18), with an ongoing commitment of \$2.5 million per year unless it is removed from the state budget.

The table below provides estimates of state allocations to support computer science activities in FY 16 and 17 (and a portion of FY 18).

### Learning Blade

To increase computer science awareness, including computer science careers, states are tapping Learning Blade, an online tool through which middle-grades students solve missions in a game-based format that exposes students to STEM content and careers.

Learning Blade also offers activities, organized by subject and academic standards, that teachers can integrate into lesson plans.

While geared to middle school students, there can be participation benefits for elementary and high school students.

Examples of state support for Learning Blade include:

**Arkansas:** See table below

**Idaho:** FY 17 grants awarded as part of a STEM career awareness system.

**Tennessee:** Supported by the Tennessee STEM Innovation Network (TSIN), a public-private partnership jointly governed by Battelle and the Tennessee Department of Education. [2016 evaluation](#).

Project	Allocations (not expenditures)
Professional development costs (including 2016 summer programs)	\$759,261
Direct to school grants	\$1,613,353.74
FTE CS Specialists FY 17/18	\$988,391.42
Advertising	\$48,622.64
Various operational expenses and microgrants	\$93,995.11
Learning Blade access	\$800,000 (\$400,000 per year for FY 17 and 18)
Standards development	\$77,597.82
Praxis reimbursement allocation	\$25,000
High school teacher stipend allocation	\$400,000
ENIAC programmers project contract	\$50,000
	<b>\$4,856,222.50</b>

As for professional development: 419 participants completed the 2016 summer programs at a cost of \$711,284.67. A breakdown of the grade levels covered by these trainings may be available with additional time.

These summer 2016 trainings represent the last year the state provided grants to directly fund teacher professional development. In 2017, Arkansas transitioned to a model in which computer science specialists embedded in education service cooperatives (the equivalent of intermediate units) provide training to educators in their region and beyond. Since January 2017, approximately 2,500 educators have been trained. The table below indicates the number of educators who have received various types of training.

Type of training	Number of educators trained
Administrators Supporting Computer Science Education in Their Schools	101
Embedding the 5-8 Computer Science Standards Across Content Areas	255
Embedding the K-5 Computer Science Standards Across Content Areas	339
IHigh School Computer Science and Certification Preparation, Day 5 of 5	309
Proper Instruction of the Coding Block for Grades 7 and 8	408
Other Various CS Specialists Led Trainings (Estimate)	1,200

This programming and the \$10 million state investments do not include the [new programming announced](#) in Arkansas Dec. 4-10, 2017.

## Massachusetts

[Statute](#) (enacted in 2015 and revised in 2016) directs the Massachusetts Technology Park Corporation (dba the Massachusetts Technology Collaborative, or MassTech) to, subject to appropriation, establish and promote K-12 computer science education, and serve as the state agent in support of the objectives of the Massachusetts Computing Attainment Network, or MassCAN. Statute establishes that the primary goal of MassCAN is to strengthen the growth and vitality of Massachusetts' technology industry and the technology-dependent business sectors by implementing a broad-based education and workforce strategy, ultimately to increase the number of students prepared to pursue computing technology careers. Towards this end, MassCAN must seek to promote an environment in which all K-12 students have access to computer science coursework.

Statute authorizes MassCAN, subject to the availability of funds, to:

- Promote the development and implementation of educational programs, courses and modules for K-12 students and teachers
- Collaborate with the department of elementary and secondary education in developing new voluntary K-12 computer science standards
- Collaborate with the department of higher education to create computer science professional development hubs at universities in each of the regional STEM networks
- Develop a district-based program to help teachers and administrators implement new computer science courses
- Develop and maintain a website to share computer science resources and disseminate best practices and successes
- Connect computer science students with industry professionals to enhance students' understanding of the relevance of their educational experience to the workplace and STEM career opportunities
- Identify the particular needs of school districts with disproportionately high numbers of underrepresented minorities
- **Leverage at least \$1 in matching funds from private sources of funding for every \$1 expended within the Commonwealth.**

The 2016 general appropriations bill ([Chapter 133](#)) appropriates \$1.7 million to the Massachusetts Technology Collaborative to develop and implement a plan to promote and establish computer science education in K-12 schools. The measure directs the Massachusetts Technology Park Corporation to seek a dollar-to-dollar match of private funds, and calls for a report to be filed with the legislature (and posted to the Massachusetts Technology Park Corporation's website) that includes a 3-year strategic plan.

*Further details on actual MassCAN expenditures supporting various types of computer science efforts available in January.*

## Texas

[WeTeach CS](#) is a two-part program offered in partnership with the University of Texas at Austin.

Part 1: Training UT Austin provides directly (online and F2F) to teachers and professional development providers. This includes the Certification Incentive Program stipends as well. The cost of these activities is about \$1 - \$1.5 million annually.

Part 2: The WTCS Collaborative Network. These are grants UT Austin provides to CS Collaboratives to deliver professional development directly to teachers in their regions. They also leverage the professional development UT Austin provides (such as online courses, AP CS Principles Mini-conference, LOGO Summer Institute, WTCS Summit, etc.). The collaborative grants in 2017 will be close to \$4 million for about 30 projects across the state.

Summary data for 2017:

- Trained 1,010 teachers (combo of WTCS collaborative teachers and teachers served directly by UT Austin)
- Funded 29 WeTeach CS Collaboratives
- WTCS Collaborative teachers (total of 612) received an average of 68 hours of training.

The most recent program evaluation data (published October 2017) are available starting page 22 of the [Texas MSP Professional Development Network 2016-17 Final Evaluation Report](#).

According to [Stacy Avery](#), the Texas Education Agency (TEA) Director under whose WeTeach\_CS falls, Texas has relied in large part upon Title IIB funds to support these efforts. Because Texas is no longer receiving Title IIB funds, there is no government funding for CS moving forward.

However, UT Austin has been a valuable partner in generating corporate support to supplement federal funds channeled through TEA. Avery estimates these corporate gifts total less than \$1 million.

## Washington

Washington STEM is a private organization launched in 2011 with support from Washington State’s business, education and philanthropic communities. Since its inception, Washington STEM has had a focus on computer science.

As of summer 2017, Washington STEM is under contract with OSPI to administer grants to schools, districts, educational service districts (ESDs) (intermediate units), postsecondary institutions, community-based organizations and nonprofits to enhance computer science education.

Washington STEM administered two rounds of funding, one each for FY16 and FY17. Each round provided \$2 million of public funds, and required a 1:1 private match. Funds were to support efforts to train and credential computer science teachers, acquire/upgrade technology for computer science courses, and for “computer science frontiers grants to introduce students to and engage them in computer science.” Frontiers grants also intend to increase interest among female, low-income and minority students in computer science. That contract work is now completed.

In 2016, Washington STEM also supported OSPI in the development and release of the state’s kindergarten through 12th grade computer science standards.

Per [Washington STEM](#), Rounds One and Two of the Computer Science Education Grants served a total of 2,765 teachers and 118,524 students across much of Washington.

## Idaho

[2016 H.B. 379](#) established the Computer Science Initiative for Public Schools, which included adoption of state computer science standards, provision of teacher professional development, and development of a statewide online repository of high-quality K-12 instructional resources in computer science. In Section 7 of 2016 [S.B. 1279](#), the 2016 legislature made a one-time appropriation of \$2 million to support the initiative.

*A handout describing uses of this one-time appropriation available upon request.*

FY 2018 funding data unavailable on short turnaround.

## Utah

Tami Goetz, executive director of the Utah STEM Action Center, provided the following analysis:

The 2017 Utah state legislature provided \$1.255 million in ongoing funds during the 2017 Legislative Session to support creation of the [Computing Partnerships Program](#), which provides competitive grants to public schools and school districts to create K-16 partnerships to support content development, professional learning, infrastructure support, and other activities to support access to high-quality

computer science instruction. (\$50,000 of the \$1.255M is designated for administrative support of the grant program). Efforts of the K-16 Computing Initiative include a focus on K-8 industry-vetted course content, work-based learning opportunities, college readiness, stackable credentials and the granting of funds to support the development of these components in school districts statewide.

The schools or school districts in the table below have been awarded in the first solicitation of the grant program. The first quarter reporting is due in January and will provide data points such as number of students and progress made on the outcome measures. We have retained the other half for a second round of funding after the first of the year. We are working with those submissions that did not receive scores from reviewers that met funding requirements. We have been working closely with those applicants to help them address reviewers concerns so that they can re-submit for the second solicitation. This is important because many of the re-submissions are rural districts that were not quite ready, but with additional input and thought can and should be eligible for funding.

The table below indicates the recipients of this first round of Computing Partnerships Program funding.

Recipient	Amount	Program Activities
Three Falls Elementary School	\$43,852	Afterschool CS and robotics club using 4-H curriculum. Professional development for teachers by partnering with Utah State University, to integrate CS into future curriculum.
Provo City School District (SD) (all elementary schools)	\$127,620	Develop and implement K-6 CS pilot program in elementary schools: keyboarding, CS Professional Development, curriculum
Coral Canyon Elementary	\$99,360	Afterschool CS and robotics club through 4-H and summer CS day camps. Professional development through Utah State University.
Iron County SD (two elementary schools, one middle school, one high school)	\$538,856	Increase CS class offerings in high school of Programming I. Adding Creative Coding to middle school. Partner with SWTEC for certification program in Computer Programming for high school students.
Entheos Academy (Elementary/middle charter school)	\$90,800	Increase keyboarding classes in elementary schools, through an increase in software and hardware. Professional development to increase teacher knowledge and integrate CS into classrooms. Offer CSD and Computer Technology classes to middle school students. Afterschool club offerings in CS for middle school.
Bryant Middle School	\$50,570	Implement afterschool coding and robotics clubs with mentors from nearby high school and summer GREAT camps run by U of Utah. Professional development for coding and teaching CSD. Expand extracurricular classes to include CSD.
South Kearns Elementary, Kearns Junior High	\$182,439	Establish new program, Future Leaders in Tech: introduce low income students to CS through robotics and coding. Create pathway between schools to recruit students in elementary school and keep them involved through middle school. Intensive summer coding program and afterschool clubs for elementary students, Creative Coding for middle school.
Davis SD (all elementary schools)	\$207,255	Heavy professional learning for Lab Managers, provided by BootUp PD for CS instruction. Lab Managers will offer CS classes. Half of elementary schools included in initial roll out, with second half in year following.
Success Academy (Middle/high charter school)	\$64,615	“Academy for Computers and Engineering” Recruit students for their CS “fast track” advanced collegiate pathway. Retain students in pathways with CS tutors, college mentors and industry speakers. Prepare students for degree in CS with intensive summer programs focusing on critical thinking, study skills and beginning coding.
Juab/South Sanpete/North Sanpete (consortium of three districts; elementary and middle schools)	\$147,900	Create CS pathway from elementary to high school. Adding classes for basic coding in elementary and afterschool coding clubs and summer camps. Girls coding club in middle school and increase class offerings, including Creative Coding.

Private funding has been utilized to support multiple summer and academic year workshops. There has been considerable in-kind support from industry partners that has been crucial for the success of this program. Industry partners led the legislative request for funding which resulted in [SB190](#). They have helped to review the grants and have been helping us to reach out to rural communities to bring industry engagement to their projects. There are several grant collaborations that have been leveraged into the computing initiative including [code.org](#) sponsorship for professional learning workshops. The STEM Action Center has been in partnership with [code.org](#) and the Utah State Board of Education over the past 2 years, to professional learning opportunities to K-12 Utah teachers. The curriculum provided in a lead learner model include: Computer Science Fundamentals, Exploring Computer Science, Computer Science Discoveries and Computer Science Principles. The STEM Action Center is also partnership with Carnegie Mellon University, through funding from the Infosys Foundation, to implement engaging, cross-disciplinary instructional programs in K-8 classrooms.

An interesting development for this program has been the rural emphasis. The Governor launched a 25K Rural Jobs Initiative about a year ago (the World Trade Center has been taking the lead for the Governor's Office to organize and implement the rural initiative). They have been conducted a series of rural tours to kick off the initiative, with the ultimate goal of having every rural county develop and present an economic development plan to the Governor. The STEM AC has officially partnered with the World Trade Center to bring the K-16 Computing Partnership (i.e., SB190) resources to each of these counties/school districts. Our goal is to have every rural county include an aspect of computing education and talent development in their economic development plan. So far this has been received with great enthusiasm!

In addition, the Utah STEM Bus is making its debut in the 2017-18 school year.

The STEM Bus travels to schools and other organizations statewide to offer hands-on, real-world, project-based STEM learning opportunities. The STEM Bus delivers these opportunities through two options: "[STEM Elementary](#)" provides 30-minute sessions for first through third grades. "STEM Saturated" provides two-hour sessions for fourth through 12th grades. "STEM Saturated" curricular options include:

- Robotics.
- 3D Modeling and Printing.
- Renewable Energy.
- Video Game Design.
- Computer Programming.

The design and creation of the USB was supported by a generous grant from Tesoro. Additional business partners have since contributed to the USB, including MHTN Architects (all design work), Utah Transit Authority (donated the 40-foot bus), Comcast (wrap design and installation) and program supported by VCBO Architects, Boeing, Larry H. Miller, Adobe, IMFlash and Hill Air Force Base.

## Iowa

\$250,000 was allocated by 2017 H.F. 642 to support the computer science teacher professional development fund incentive fund created by [2017 S.F. 274](#). The computer science professional development incentive fund may award grants to an applicant school district or accredited nonpublic school, or collaborative of one or more districts, accredited nonpublic schools, and area education agencies (intermediate units), to provide:

- Proven computer science professional development activities for Iowa teachers.
- Tuition reimbursement for Iowa teachers seeking endorsements or authorizations to teach computer science.

## Virginia

[2017 S.B. 1493](#) directs Northern Virginia Community College (NVCC), in consultation with the Virginia Department of Education, to contract with a partner organization to provide high-quality training and professional development for Virginia teachers statewide. According to Timothy Ellis, Computer Science & Virtual Learning Specialist, Virginia Department of Education, \$550,000 was appropriated to NVCC for this purpose, and most of these funds are being spent on teacher training. NVCC is facilitating program development with CodeVA, which for the last few years trained about 120 teachers annually. It is hoped that this partnership and funding will increase the number of teachers trained in 2018 to around 600, with a much higher percentage of K-5 teachers receiving training. They are working on curriculum development through a committee under development.

They have no plans currently to purchase materials.

More information on this effort available from [Chris Dovi](#) at CodeVA or [Steve Partridge](#) at NVCC.