2018 Legislative Report

Computer Science Teacher Education Grant Program

Submitted to:
House and Senate Education Committees of the Colorado General Assembly

By:
The Colorado Department of Education

December 2018

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Introduction

Administered by the Colorado Department of Education (CDE), the Computer Science Teacher Education Grant (CSEd) Program is a state-funded program designed to increase the number of teachers available to provide computer science education in Colorado. The program provides support to help local education agencies (LEAs) train teachers on computer science education with the intention of growing the capacity of schools to offer computer science courses and increasing the number of students who interact with computer science content. The CSEd is available to Colorado public schools, district charter schools, institute charter schools, board of cooperative services schools, and facility schools.

The CSEd grant program was authorized by the Colorado General Assembly during the 2017 legislative session through Senate Bill 17-296. The legislation requires that the Department submit an annual report to the education committees of the senate and house of representatives on or before January 1, 2019, and each year thereafter, detailing the following:

-The number of grants awarded during the previous calendar year;
-The amount of each grant awarded to each grant recipient;
-The number of teachers in each district who benefitted from the grant;
-The uses of each grant, including postsecondary courses, degrees, training programs, or industry-recognized certificates completed and the education provider that provided the education; and
- The expected impact of the additional teacher training.

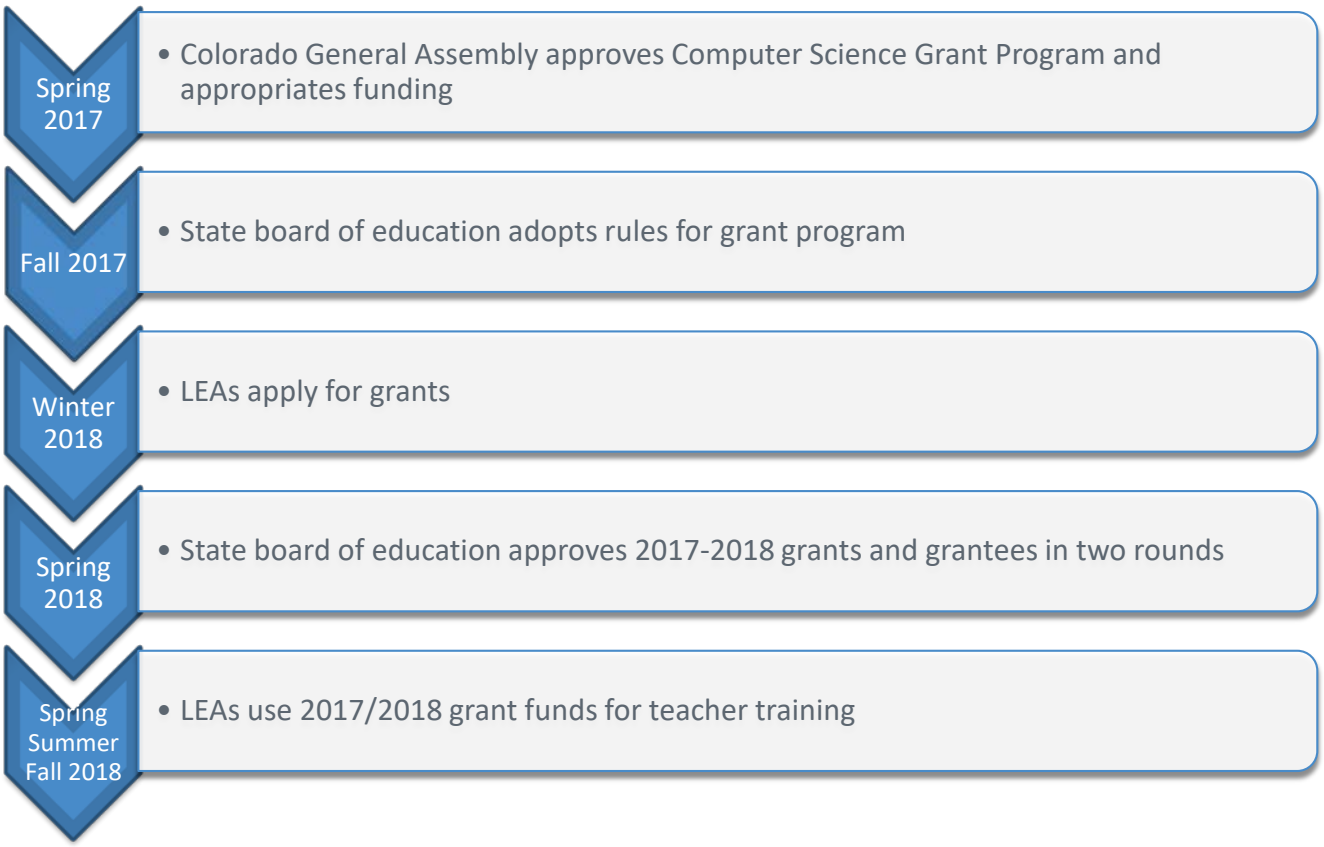
The Mesa Valley School District is pursuing a "rigorous and intentional Computer Science skill sequence across the district." They used their CSEd grant award of $14,200 to train 10 elementary and 26 middle and high school teachers to use the Code.org Discoveries (6-8) curriculum and AP Computer Science Principles. The education providers for these opportunities were mindSpark Learning and the Colorado Education Initiative AP Institute. Mesa Valley utilized in-district professional development to help teachers in five high schools, eight middle schools, and 24 elementary schools to train teachers on the computer science district curriculum.

An appropriation of $500,000 was provided to the CDE to administer the grant program and distribute grant funds through a competitive process for computer science teacher professional development during the 2017-2018 school year. Administrative costs were taken off the top, $60,000, and then grants totaling $440,000 were distributed to LEAs through two grant cycles during the first year of the program.

The CSEd grant program aligns with three key initiatives of the CDE's Strategic Plan: *All Means All* (Expand Access and Opportunity for Historically Underserved Students), *More Options* (Expand High School Options to Ensure All Students Are Ready for College and/or Living-Wage Jobs), and *Educators Matter* (Develop a Strong Pipeline of High-Quality Teachers and Principals and Provide Deeper Support for School and District Leaders).

Timeline

Upon the passage of Senate Bill 17-296, the Colorado State Board of Education promulgated rules for the CSEd that aligned with requirements contained within the legislation. In the winter of 2018 the competitive grant application was released allowing the state board of education to approve grants later that spring. Due to the availability of funds at the completion of the grant application process, the state board of education directed the department to conduct an additional grant application cycle. In June of 2018, the state board of education approved the second round of awards



Eligibility

Local education agencies that participate in the CSEd grant program are eligible to receive up to $30,000 for the purpose of providing teachers with professional development in computer science. These funds may be used for any of the following:

- Tuition, including fees,
- Professional development training program costs, or
- Professional development books and/or materials used by the teacher during professional development.

The authorizing legislation and CSEd grant rules stipulate that priority be given to rural LEAs and LEAs with high populations of minority and/or low-income students. To support these efforts, CDE provides participating LEAs with assistance in completing the application as well as in meeting their goals for establishing or bolstering their computer science programming.

Local Education Agency Participation

Thirty-six out of 178 Colorado School districts, including the Charter School Institute, applied for CSEd funding in 2018. The total amount of funding requested through those applications was $707,131. Four school districts applied for both rounds of the grant opportunity: Douglas County, Jefferson County, Ouray, and Thompson. Thirty-six CSEd grants were awarded in the 2017-2018 grant cycle totaling $437,310. The figure below illustrates where the grantees are located across Colorado.

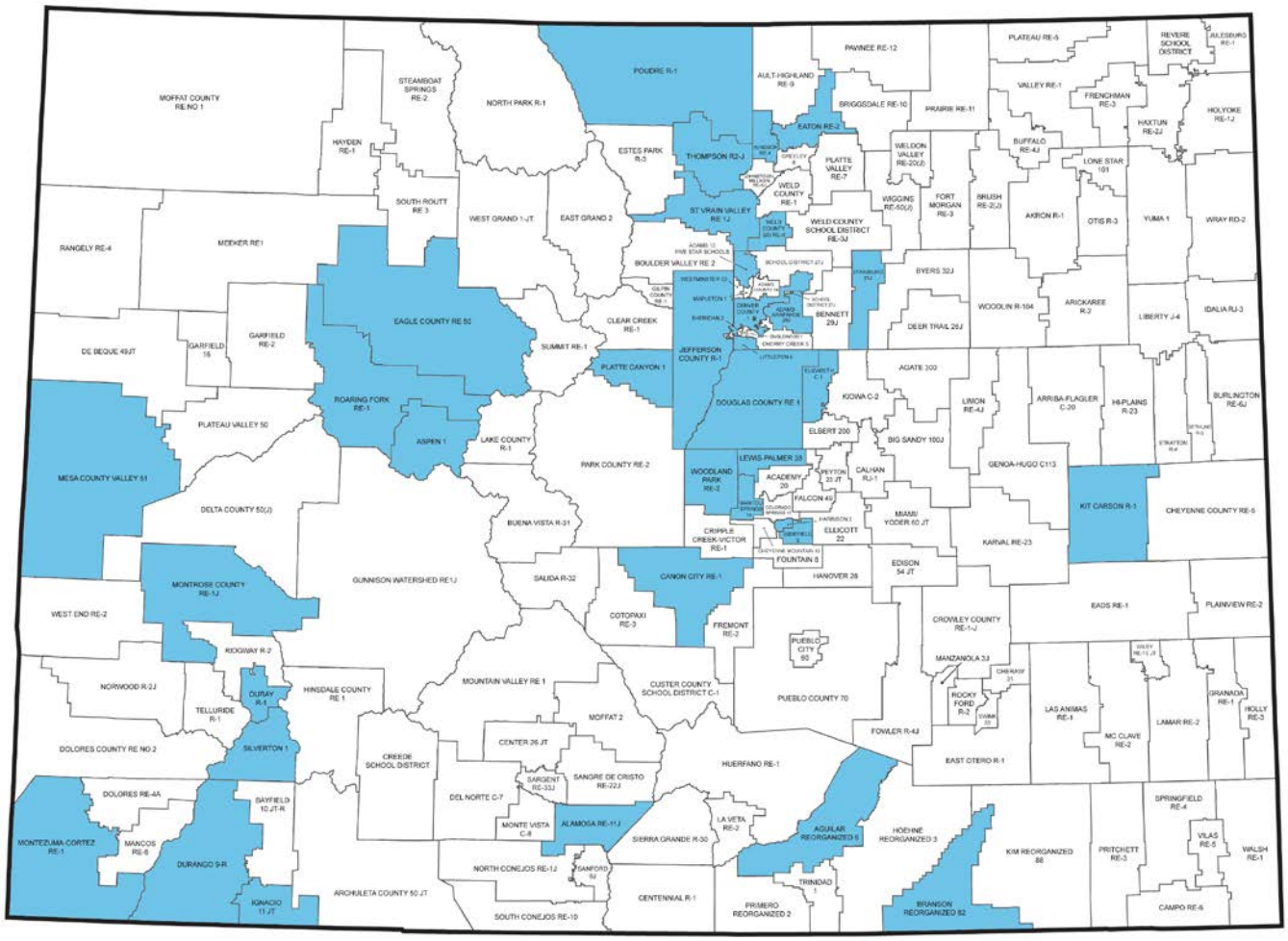


Figure 1: Geographic Location of CSEd Grantees across Colorado

Twenty of the 36 grantees are designated as rural or small rural districts according to CDE definitions.[1] Table 1 below lists all grantees, the number of teachers trained using grant funds and the priority area(s) each grantee met.

Table 1: Local Education Agencies Awarded through the CSEd Program

Local Education Agency	*Designated Rural*	*>50% Free or Reduced Lunch*	*>50% Minority*	*Total # Teachers Trained*
ADAMS 12 FIVE STAR SCHOOLS			x	40*
ADAMS ARAPAHOE 28J		x	x	4
AGUILAR RE-6	x	x		3
ALAMOSA RE-11J	x		x	1
ASPEN 1	x			4
BRANSON RE-82	x			4
CANON CITY RE-1	x	x		3
CHARTER SCHOOL INSTITUTE - Animas HS	x			7
DENVER COUNTY RE-1		x	x	16
DOUGLAS COUNTY RE-1				9
DURANGO 9-R	x			2
EAGLE COUNTY RE-50	x		x	4
EATON RE-2	x			43
ELIZABETH C-1	x			92*
HARRISON 2		x	x	26
IGNACIO 11-JT	x	x	x	6
JEFFERSON COUNTY R-1				31
KIT CARSON R-1	x			18
LEWIS-PALMER 38				7
LITTLETON 6				3
MANITOU SPRINGS 14				1
MESA COUNTY VALLEY 51				16
MONTEZUMA-CORTEZ RE-1	x	x	x	4
MONTROSE COUNTY RE-1J	x			10
OURAY R-1	x			5
PLATTE CANYON 1	x			1
POUDRE R-1				6
ROARING FORK RE-1	x		x	8
SILVERTON 1	x	x		1
ST VRAIN VALLEY RE-1J				17
STRASBURG 31-J	x			2
THOMPSON R2-J				4
WINDSOR RE-4	x			28
WELD RE-8	x	x	x	2
WIDEFIELD 3			x	10
WOODLAND PARK RE-2	x			4
TOTAL:				**442**

*NOTE: Educator participation numbers include some projections for participation in trainings to occur in the winter/spring of 2019.

[1] "A Colorado school district is determined to be rural based on the size of the district, the distance from the nearest large urban/urbanized area, and having a student enrollment of approximately 6,500 students or fewer. Small rural districts are those districts meeting these same criteria and having a student population of fewer than 1,000 students."

The majority of funds allocated to grantees were used for professional development through training programs; very few of the grantees allocated funds for tuition or fees towards endorsements or certifications. At the writing of this report, $429,205 of grant funds were expended. Table 2 illustrates the use of funds per grantee at the writing of this report.

Table 2: Local Education Agency Total Grant Award and Use of Funds

Local Education Agency	Total Grant Award*	Amount towards *Tuition/Fees*	Amount towards *Training Programs*	Amount towards *Books and/or Materials*	Amount towards *Stipends/Sub Pay*
ADAMS 12 FIVE STAR SCHOOLS	$24,052		$24,052		
ADAMS ARAPAHOE 28-J	$19,870		$6,400		$13,470
AGUILAR RE-6	$10,000		$5,970		
ALAMOSA RE-11J	$10,800		$7,594	$3,206	
ASPEN 1	$10,000		$10,000		
BRANSON RE-82	$14,836		$13,223	$1,613	
CANON CITY RE-1	$9,985		$9,785	$200	
CHARTER SCHOOL INSTITUTE- Animas HS	$7,500		$7,500		
DENVER COUNTY RE-1	$24,114		$24,114		
DOUGLAS COUNTY RE-1	$12,312		$12,312		
DURANGO 9-R	$3,045		$3,045		
EAGLE COUNTY RE-50	$9,090		$2,950	$6,140	
EATON RE-2	$10,000		$1,800	$6,100	$2,100
ELIZABETH C-1	$15,672		$12,000	$3,672	
HARRISON 2	$9,999		$9,909	$90	
IGNACIO 11-JT	$10,000		$8,500		$1,500
JEFFERSON COUNTY R-1	$14,130		$5,130		$9,000
KIT CARSON R-1	$10,000		$6,000	$3,000	$1,000
LEWIS-PALMER 38	$10,600		$10,600		
LITTLETON 6	$10,000		$10,000		
MANITOU SPRINGS 14	$3,645		$675	$2,970	
MESA COUNTY VALLEY 51	$14,200		$7,845	$6,355	
MONTEZUMA-CORTEZ RE-1	$10,000		$7,325	$325	$2,350
MONTROSE COUNTY RE-1J	$10,000		$8,085	$1,915	
OURAY R-1	$7,600		$5,600		$2,000
PLATTE CANYON 1	$4,025		$2,350		
POUDRE R-1	$20,000		$15,950		$4,050
ROARING FORK RE-1	$10,000		$7,500	$2,500	
SILVERTON 1	$14,275	$7,875		$4,000	$2,400
ST VRAIN VALLEY RE-1J	$24,130	10,000	$14,130		
STRASBURG 31-J	$11,300		$3,000	$5,900	
THOMPSON R2-J	$14,130		$10,000	$4,000	$130
WINDSOR RE-4	$20,000		$19,053	$947	
WELD S/D RE-8	$8,000		$7,400	$600	
WIDEFIELD 3	$10,000		$8,000	$750	$1,250
WOODLAND PARK RE-2	$10,000		$9,140	$860	
TOTALS	**$437,310**	**$17,875**	**$316,937**	**$55,143**	**$39,250**

*Some subtotals do not add to total grant amounts due to grant funds yet to be expended.

Program Implementation Activities

Grantees were able to choose professional development opportunities that worked best for their teachers; therefore, a variety of professional development options were requested to be funded. Grant funds could be used either by the district to contract with a provider to train their teachers, or districts could allocate money to specific teachers to travel to trainings by various providers. For example, teachers could select from a large number of the professional development opportunities that were led by Colorado School of Mines, University of Colorado at Colorado Springs, Code.org in partnership with mindSpark Learning, and the Colorado Education Initiative. In addition, teachers were able to access on-line courses through various vendors (e.g., Coursera, Code High School). Depending on the professional development option chosen, teachers gained curricular ideas for their classroom, hardware and/or software to use to implement the new skills they gained, and/or an understanding of various levels of computer science principles. Table 3 illustrates the types of training teachers received by grade level across all grantees.

Table 3: Implementation Activities by Grade Level

Type of Professional Development	***Grade Level***		
	High School	**Middle School**	**Elementary School**
University Course	Mobile Computer Science Principles	Project Lead the Way at University of Colorado at Colorado Springs	Computational Launch at Colorado School of Mines
	CSTART-Colorado School of Mines		Project Lead the Way at University of Colorado at Colorado Springs
	Bootstrap Algebra		
	Python		
Workshop	Advanced Placement Computer Science Principles	Code.org CS Discoveries	Code.org CS Fundamentals
	Advanced Placement Computer Science A	Rocky Mountain Education Design (Scratch and Makey Makey)	Rocky Mountain Education Design (Scratch and Makey Makey)
Online Course	Coursera	LaunchCS	LaunchCS
	Open CV and Processing		
	Microsoft on-line trainings and certifications		
	VEX on-line Robotics hardware trainings		
	Code High School		
	Western Academy Support and Training for Cisco		
	Computing Technology Industry Association (CompTIA) A+		
	HeadTrix Training		
	MakerLab		
	Kadenze		

The mindSpark training that I attended was an invaluable experience. It provided a guided opportunity to delve deep into the Computer Science Discoveries curriculum and rich collaboration with colleagues. I left the trainings with additional content knowledge, effective strategies, and could confidently implement engaging lessons in order to take my students on their coding journey.

Josephine Robles
Computer Science Teacher

Expected Impact of the Computer Science Teacher Training

Based on information available at the writing of this report, a total of 355 teachers were trained through the CSEd program. However, the total projected number of teachers to be trained across the state is 442 as additional teachers receive training in 2019. The average cost of the training is $1,003 per teacher[1]. Due to the use of CSEd grant funds to train teachers in computer science, more Colorado students will have access to improved and/or first-time courses in computer science education. Thirty of the grantees already had some version of computer science in place in their district and used the funds to improve programming or increase access to computer science courses. Six of the grantees will be creating courses or using computer science principles in courses this year for the first time with students. With the increase of an additional $500,000 in the appropriation for the CSEd grant for the 2018-2019 school year, the number of different LEAs receiving grant funds, the number of teachers trained, and the number of students impacted should increase accordingly. Table 4 illustrates the aggregated total numbers of teachers trained by grade level and the total number of students impacted across all grantees.

Table 4: Aggregated Totals for CSEd Grantees

Total # of Grantees	Total # of Rural Grantees	Total # of Teachers Trained	Total # of Elementary Teachers Trained	Total # of Middle School Teachers Trained	Total # of High School Teachers Trained	Total # of Students Directly or Indirectly Impacted[2]
36	20	355	151	98	106	60,984

The Ouray School District recognized that with 134 PK-12 students in one building they had a unique opportunity to foster computer science knowledge within all students. The school district administration and staff chose to implement computer science in all grades. Ouray applied their $7,600 CSEd grant funds to send three high school math, science, and CTE instructors to the Colorado School of Mines week-long summer CSTART workshops for Computer Science teachers and hire a trainer to facilitate district curriculum and planning. Ouray has a multi-year plan to train all teachers in computer science.

[1] The total number of teachers served and the approximate cost per teacher include some projections by districts still working with unobligated funds through the Winter/Spring of 2019.

[2] This number comes from self-reporting by the LEAs in their end-of-cycle grant reports.

Conclusion

In its first year, the LEAs in the CSEd grant program have made positive strides in the number of teachers trained to teach computer science to kindergarten through 12th grade students across Colorado. Thirty-six LEAs have used grant funds to provide professional development for their teachers and increase the number of courses being taught using computer science principles in their schools. The LEAs receiving funds within the 2017-2018 school year have now collected baseline data to better understand their teachers' needs and areas of improvement in offering computer science courses within their schools.

Based on feedback from the field and grantees, several significant improvements have been implemented for the 2018-2019 CSEd grant cycle. The review criteria have been condensed and specified, which should aide grant reviewers with the review process. The grant application has also been modified into an on-line format designed to take less than an hour to complete, which is intended to help educators more easily complete the application. Also, the timeline has been adjusted to start earlier than the 2017-2018 grant cycle, allowing districts and teachers more time to utilize grant funds.

Given the short time that the 2017-2018 grant was publicized and available, the nascence of the grant, and the short time with which districts had to spend funds, the first year of the Computer Science Grants for Teachers Program demonstrated marked success.

Eaton School District was awarded $10,000 in CSEd grant funds which they used to increase the knowledge of their high school computer science teacher at the Colorado School of Mines CSTART summer workshops. Additionally, they hired a STEM trainer to provide in-district training resulting in 40 teachers offering Computer Science to over 800 more K-12 students in the 2018-2019 schoolyear.

Douglas County School District chose to utilize $14,130 in CSEd grant funds to kick start a five- year computer science education initiative. Douglas County is using their grant awards to fund nine Computer Science Teacher Leads to train teachers at the building level throughout the school district.

The Roaring Fork School District used the $10,000 in CSEd grant funds and additional school district contributions, STEM teachers from grades 3-8 created aligned computer science modules for their existing STEM curriculum and CSTA standards using Edison robots and Makey Makey's.