Securing the Future of Maryland: Computer Science Education for All

ANNUAL REPORT 2019-2020

Maryland Center for Computing Education

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INTRODUCTION

The Maryland Center for Computing Education (MCCE) was formally established in statute and funded with the enactment of *Securing the Future: Computer Science Education for All* on July 1, 2018. The purpose of this annual report is twofold. First, the report provides a descriptive analysis for how MCCE is in compliance with the legislation. Second, the report offers a detailed account for how MCCE is using state funds to assist each of the 25 Maryland Local Education Agencies (LEAs) and the Institutions of Higher Education (IHEs) to strengthen the computing knowledge and skills of the teaching workforce in Maryland.

"Over its short two-year history, MCCE has already had a huge impact on computing education in Maryland, reaching every school district in the state. This footprint is vitally important, as we work to ensure equitable participation in computing education and equal access to teachers well-trained in it. Computer science and cybersecurity are critical workforce shortage areas in Maryland—but with the continued success of MCCE, we can close that gap. Every student in every region of the state deserves the chance to pursue a good-paying job in these high-growth fields and to fortify Maryland's innovative and economic strength."
Jay A. Perman, Chancellor, University System of Maryland, 2020

Implementation Plan Overview

§4-111.4 Education Article, Annotated Code of Maryland

Beginning in the 2021-2022 school year, each county board shall require each public high school in the county to offer at least one computer science course.

The MCCE Advisory Committee has defined a high school as a diploma granting Maryland public high school. The metric toward compliance is to monitor that all diploma granting Maryland public high schools offer at least one high quality CS course each year beginning in the 2021-2022 school year. During the 2018-2019 school year, 81% of the diploma granting high schools offered at least one CS course.

The computer science course shall be of high quality and meet or exceed the curriculum standards and requirements established by the State Board.

The MCCE high quality CS workgroup identified high quality CS courses which meet or exceed the Maryland's K-12 Computer Science Standards. The list of courses will be reviewed annually to account for any new courses.

The county board shall make efforts to:

1. Incorporate instruction in computer science in each public elementary and middle school in the county and;

2. Increase the enrollment in middle and high school computer science courses of:

I. Female

II. Students with disabilities

III. Students of ethnic, racial, and other demographic groups that are underrepresented in. the field of computer science as identified by the U.S. Equal Employment Opportunity Commission.

Maryland Local Education Agencies' Computing Education Plans

Each Maryland LEA created a pre-kindergarten through high school computing education vision and plan. The teams that developed these plans consisted of at least one representative from the central office administration, school-based administrators, and teachers. Each LEA gathered their own planning teams, and the team sizes varied from 4 to 18 planning team members. The plans provided insights into how the LEA intended to build the teacher capacity to offer high quality computing instruction from pre-kindergarten through high school. The two most often cited professional development (PD) and curriculum resources in the initial plans were Code.org and Project Lead the Way (PLTW). All of the LEAs are focused on providing computing education to all students with the purposeful intent to broaden participation in computing particularly at the high school level when students have more freedom to select computing courses.

There were a total of 75 educators who were listed as participants of a planning team. Of these planning team participants, only 23 educators (16 central office, 6 teachers, and 1 who did not identify their role) responded to the team planning survey. The teams from Anne Arundel (4) and St. Mary's (3) counties had the most team members participate. Overall, the central office administrators reported having more meetings than the teachers. Only three LEAs (Baltimore City, Montgomery County, and Prince George's County) reported having 6 or more meetings while the remaining survey respondents reported having 3 or fewer planning meetings in 2019. Each LEA, except for Somerset County, had a participant who responded that they used Code.org as a resource during team planning. The next most reported resources included Maryland's K-12 CS Standards and the MSDE CS toolkit website. Teacher respondents were either neutral or did not feel supported by most stakeholder

groups and levels within the school system while central office administrators felt more supported. Likewise, teacher survey respondents indicated lower confidence intervals for influencing decisions of CS curricula selection and software purchasing than the central office administrators. In 2020, more teams will complete the research-based Strategic CSforAll Resource and Implementation Planning Tool (SCRIPT) to strengthen their CS visions and continue to make or revise both short-term and long-term plans. The SCRIPT tool and planning process is designed to empower all stakeholders including teachers. We will administer the team planning survey annually to monitor each team's progress.

Student CS high school course enrollment numbers will be monitored for each student subgroup in partnership with the Maryland Longitudinal Data System Center (MLDSC). The data is currently being analyzed and will be publicly displayed online after approval from MLDSC and MCCE.

Maryland Computing Education Professional Development

MCCE provided extensive PD for pre-kindergarten-12 educators. The total PD attendance was **913** educators; however, there were **689** unique educators who attend PD sessions in 2019. Some of these educators attended a PD opportunity as part of a series of sessions (80 educators), opted to participate in more than one computing topic area (38 educators), or participated in both a series and at least one new topic area (23 educators). The MCCE and partner PD providers held a total of **118 days** of PD.

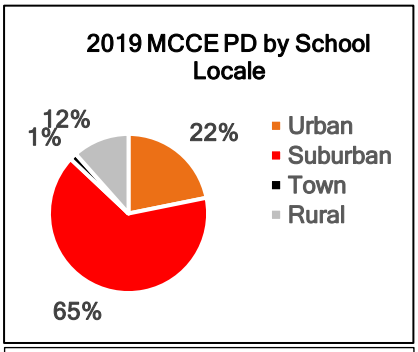


Figure 1: The percentage of schools by locale with educators who participated in MCCE PD.

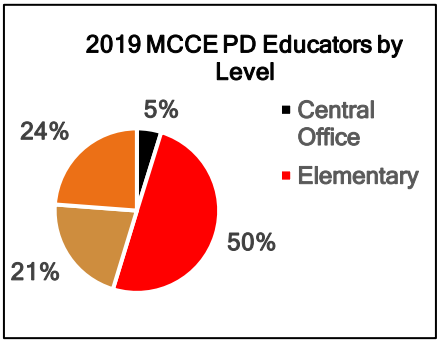
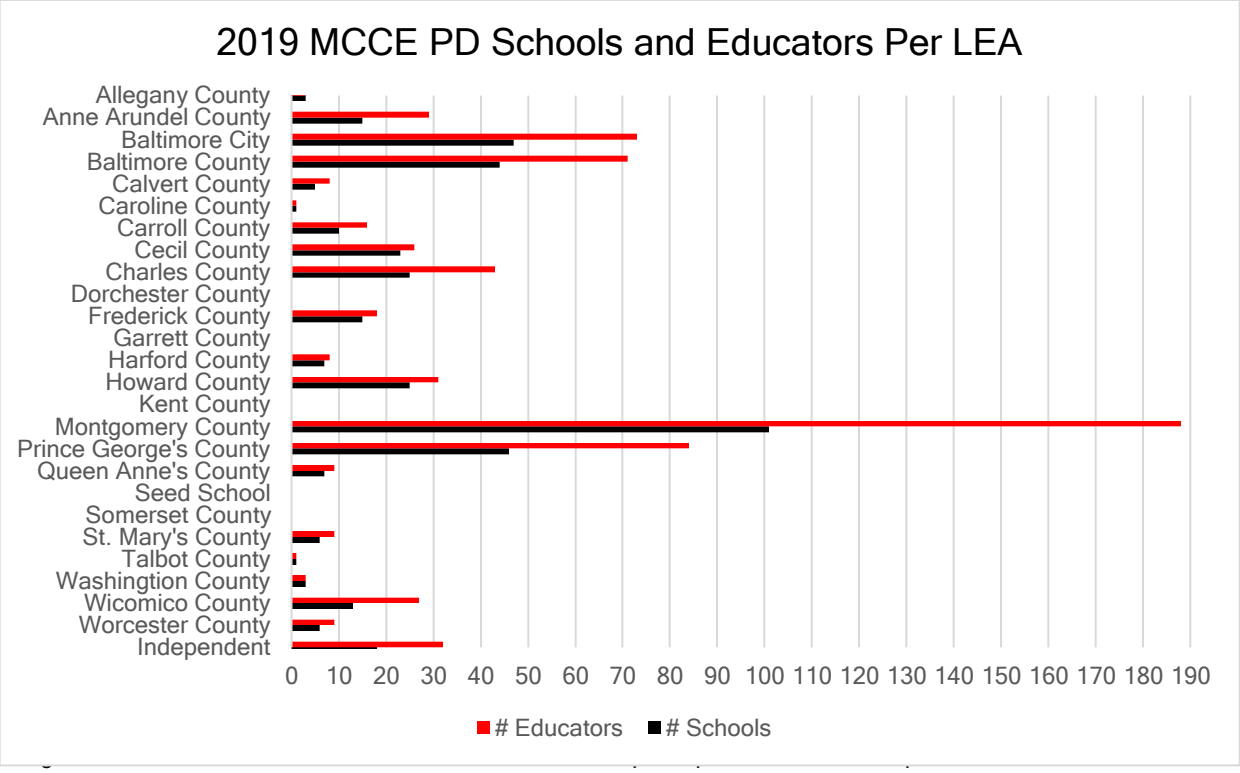


Figure 2: The percentage of educators by level who participated in MCCE PD.

Educator PD participants represented a total of **421 schools** with **47%** of these schools being **Title I schools**. Educators from 34 magnet schools, 12 charter schools, and 18 independent schools attended PD. Overall, the schools with participating educators included each type of school locale (22% urban, 65% suburban, 1% town, and 12% rural) as specified by the National Center for Education Statistics (NCES). (See Figure 1.) Of the 2019 PD educators, 50% were elementary educators, 21% were middle school

educators, 24% were high school educators, and 5% were central office administrators who attended PD sessions with their school-based educators. (See Figure 2.)

Of the 25 LEAs in Maryland, 20 have had educators participate in PD provided by MCCE and our partner PD providers. The remaining 5 LEAs are still in the planning process and are also providing PD internally for their educators with MCCE funding assistance. The total number of schools with educators who participated in computing education varied. (See Figure 3.) For example, Montgomery County Public Schools had a total of 101 schools with 188 educators who participated in PD while both Talbot and Caroline Counties had only one educator attend a PD opportunity. Finally, the levels that the educators teach and the geographic locations, as shown in Figure 4, provide insights into the focus of each LEA and the distribution of educators who attended PD.



2019 MCCE Professional Development Map by School and Education Level

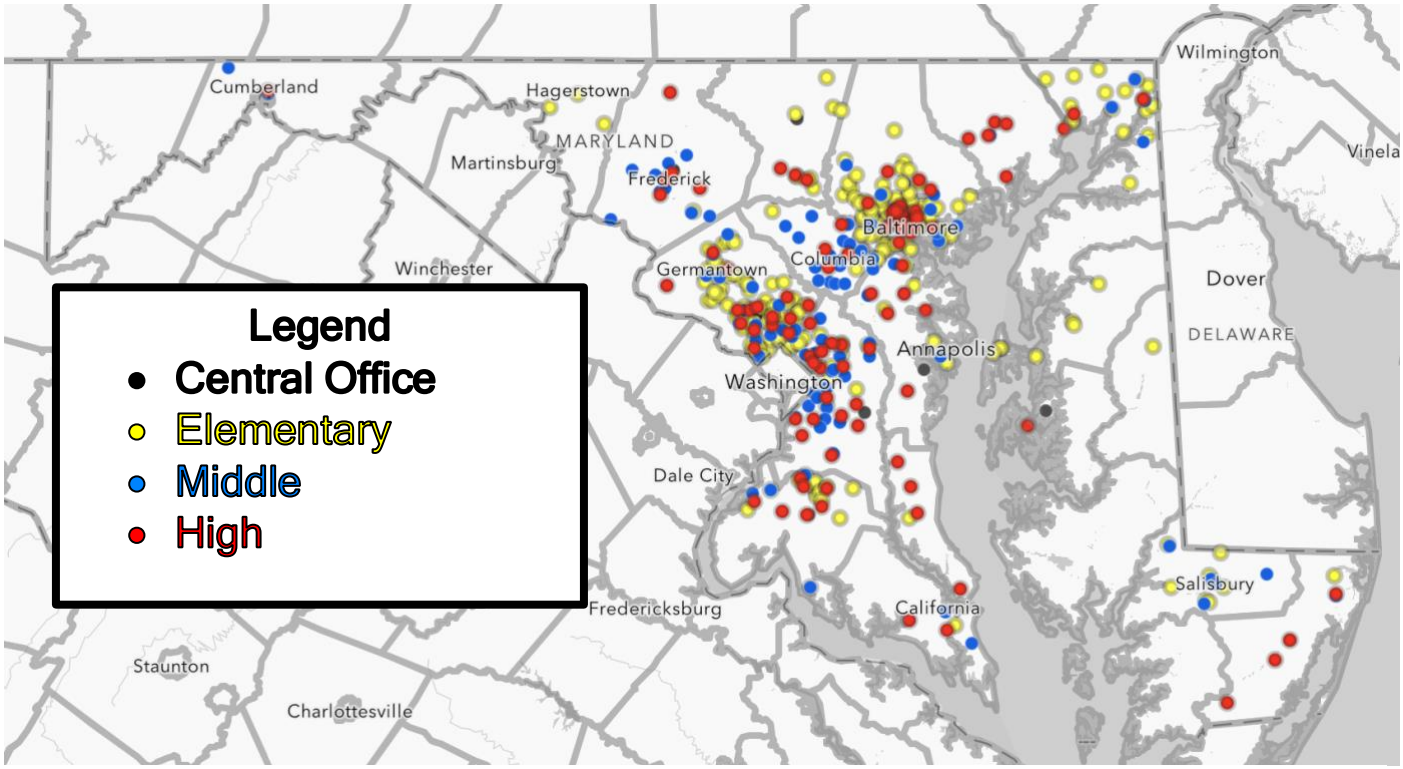


Figure 4: The MCCE map indicating the level of education and the school which had educators participate in PD.

Maryland Elementary School CS Coaches' Program

The purpose of the Elementary CS Coaches program is to develop a statewide cohort of elementary school leaders to be the experts and champions for CS. Elementary CS coaches will:

- Review and give feedback on curriculum resources and integrated lessons
- Align instructional materials to Maryland's K-12 Computer Science Standards
- Design and engage in CS instruction (for both integrated, as well as, stand-alone delivery)
- Customize resources for their LEA
- Apply best practices in CS instructional methods
- Share what they have learned with other coaches and their LEA

This year, MCCE conducted several PD events specifically for elementary CS coaches. The year kicked-off with a Summer Academy with our first cohort of coaches. The academy was a 3-day opportunity which built coach capacity in technology, pedagogy, and CS content. The work was led by the project manager with support from four regional facilitators. The first Cohort had 11 participants representing 7 LEAs. In January, the second Cohort had 9 participants representing 5 new LEAs. This cohort attended a compressed version of the Academy. Both cohorts received a class set of floor robots and copies of three CS read-aloud

titles. In February, we brought together both cohorts for additional PD focused on gaining a deeper understanding of how to integrate CS with core-content instruction. Additionally, throughout the year, periodic virtual webinars were conducted to sustain learning. (See Table 1.)

Table 1: The Maryland Elementary School CS Coaches' Program session types and hours of PD for 2019-2020.

Session Type	Leadership Team	Cohort 1	Cohort 2	Hours Online	Hours Face-to-Face	Total Hours
Planning and PD Preparation	1	0	0	6	1	7
Summer Academy	1	1	0	0	21	21
On-boarding Cohort 1	1	0	1	7	7	14
Mid-year Follow-up	1	1	1	0	7	7
Periodic Virtual Workshops	1	1	1	5	0	5
Total	**5**	**3**	**3**	**18**	**36**	**54**

The vision of the MD ES CS Coaches program is that CS is evolving rapidly, so the coaches need to be adaptable and have a propensity for learning as new advances emerge. Thus, we have provided space for coaches to leverage quality instructional resources where they are readily available and supplement them with innovative resources to fill any identified gaps. Regional Facilitators led this work by drafting crosswalks between the CS standards and core-content standards. All participants then curated quality resources and documented them for shared use in a repository. Participants also wrote additional lessons which were made available in a crowd-sourced fashion in the repository. Presently, this repository has over 300 unique lessons. Each Regional Facilitator also developed a module (unit) of approximately 10 lessons with a cohesive scope and sequence. These modules are also housed within the repository.

The leadership team (project manager and regional facilitators) coordinate with LEAs, recruit participants, communicate expectations, and track the project (budget, costs, materials purchased, payments, and deadlines/obligations met). Coaches in the program are supported and mentored by their regional facilitators and the program manager. Coaches have opportunities to present best practices, share their challenges with their peers, collaborate on

standards alignment, and explore ways to advocate for improved CS. The program launched with a budget of $100,000 of which $97,542.01 has been spent.

Category	Total
Professional Development	$ 49,164.60
Instructional Design	$ 18,510.00
Mentoring and Collaboration	$ 5,510.00
Oversight and Support	$ 24,357.41
Grand Total	**$ 97,542.01**

Maryland's K-12 CS Standard Annotations

In order for Maryland educators to utilize the Maryland's K-12 Computer Science Standards in local curricula and in daily lesson plans, annotations are being developed. The first set of annotated standards were for second grade and included a explanation of the standard, essential vocabulary, skills and questions as well as sample lessons aligned with crosswalks to other content curricular standards. A draft of those annotations has been sent to stakeholders, including members of the original standards development team, for review. The annotations of the 8th grade standards are currently in process and reviewers have been recruited. A team is being recruited to write annotations for all grades, K-5 by the end of 2020. A similar process will be used to develop the middle and high school standards.

ESSA Computational Thinking/Learning Requirement

MSDE included a requirement for all public middle school students to receive computational thinking/learning (CT/L) as part of a well-rounded middle school education within the Every Student Succeeds Act (ESSA) state plan. MSDE in collaboration with MCCE created a tool with which districts can align curricula to CT/L requirements. In recognition of the fact that we are just beginning to teach CT/L, the tool contains 3 levels (beginning, approaching, and meeting the 8th grade standard) with examples at each level. Courses that have been found to be well aligned are Code.org CS Discoveries and StartUp Tech (an IB STEM course).

The listing of courses that align to the CT/L requirement was updated with a course called Integrated Computational Thinking. This allows districts to create courses where CT/L is integrated into another curricular content courses. The content should align to that curricular area's content standards as well as to the Computational Thinking tool. MSDE must approve the curriculum in advance of it being taught.

A survey was conducted in the fall of 2019, and all LEAs replied as did the Maryland School for the Blind (MSB) and the Maryland School for the Deaf (MSD). Of the respondents, ten LEAs and MSD taught Code.org courses and seven LEAs as well as MSB and MSD taught

Scratch or another programming course. Fourteen LEAs had at least some of their middle school students enrolled in Project Lead the Way (PLTW) courses and seven LEAs and MSB had a robotics program. There are at least six LEAs that combine CS and engineering at the middle school level. The pandemic emergency school closures in March, 2020 were extremely difficult on districts; however, reports from the LEAs were that teachers continued teaching the CT/L. LEAs have done a remarkable job of shifting to equivalent CT/L online delivery when learning had to continue at home in mid-March through the end of the school year. Teachers delivered the content online, they found virtual robotics platforms that could substitute for in-person experiences, and schools attempted to provide unplugged activities where students were not able to connect online.

Teacher Certification Support Program for the Praxis II Exam

The purpose of the Praxis study program is to provide Maryland CS teachers with support and resources to equip them to pass the CS Praxis 5652 Exam and earn the endorsement to teach CS in Maryland. MCCE currently accepts applications seasonally and cohorts meet for 5 weeks on Saturdays to review the 5 areas of the exam. A total of 112 teachers joined a study cohort and 15 teachers passed the exam. (Note: The exam became unavailable for 4 months during the COVID-19 pandemic). To incentivize teachers, we received a $25,000 grant from Microsoft to offer a $1,000 stipend for 25 teachers from underrepresented groups or who teach in a high need, rural, or urban district. Teachers who are not eligible for the Microsoft grant can apply to receive a $1,000 stipend from the MCCE Praxis grant fund.

STAKEHOLDER REPRESENTATION

§12-118 Education Article, Annotated Code of Maryland

(1) There is a Maryland Center for Computing Education in the University System of Maryland.

(2) The purpose of the Center is to expand access to high-quality computer science education in grades prekindergarten through 12 by strengthening the skills of educators and increasing the number of computer science teachers in elementary and secondary education.

(3) In carrying out the powers and duties granted under this section, the Center shall work in consultation and collaboration with institutions of higher education in the State, including:

(I) Historically black colleges and universities;

(II) Other public senior higher education institutions;

(III) Independent institutions of higher education; and

(IV) Community colleges.

MCCE has two stakeholder groups, the Maryland Computing Education Steering Committee and the MCCE Advisory Committee. Both groups provide valuable feedback and critical insights into the state of computing education in Maryland. The MCCE relies on the regular meetings and subcommittee workgroups to help set priorities.

MCCE Steering Committee

The larger MCCE Steering Committee, which began meeting 6 years ago, has representation from government, K-12 LEAs including classroom teachers and administrators, non-profits, industry, community colleges, and public, private, and historically black four-year colleges and universities. (See Appendix A for the full membership.)

MCCE Advisory Committee

The MCCE Advisory Committee is co-chaired Dr. Nancy Shapiro, Associate Vice Chancellor for Education and Outreach Special Assistant to the Chancellor for P-20 Education at the University System of Maryland and Dr. Carol Williamson, Chief Academic Officer, Deputy State Superintendent, Office of Teaching and Learning ag the Maryland State Department of Education (MSDE). The committee includes the following members:

- Dr. Daniel D. Curry, Superintendent, Calvert County Public Schools and President, Public School Superintendents' Association of Maryland (PSSAM),
- Jennifer Frank, Vice President of Academic Affairs, Maryland Independent College and University Association (MICUA),
- Alexandra Dorman, Senior Manager, Education Strategy at Microsoft, Microsoft,
- Dr. Lethia Jackson, Chair and Professor Department of Technology and Security, Bowie State University,
- Jack McLaughlin, Dean and Professor, School of Technology, Art, & Design, Community College of Baltimore College,
- Dr. Jan Plane, University of Maryland College Park and MCCE Steering Committee Chair,
- Jennifer Smith, President, Computer Science Teachers' Association, Maryland Chapter and high school CS teacher, and
- Pat Yongpradit, Chief Academic Officer, Code.org.

MCCE LEADERSHIP AND STAFF

The MCCE leadership includes a variety of education and computing expertise which strengthens the collaborative processes required to move computing education forward in Maryland. The collaborative processes occur within and between the levels of education as well as with our industry, government, and non-profit partnerships. Below are the MCCE leader and their roles.

Leadership **Dr. Nancy Shapiro (USM)** **Dr. Carol Williamson (MSDE)** **Dewayne Morgan (USM)** **Advisory Committee**	**Guidance** **Dr. Jan Plane (UMD)** **Steering Committee**
Budget, equitable distribution, financial distribution, implementation plan, grant processes	Assess statewide needs, recommend next steps, engage stakeholders
Implementation **Dianne O'Grady-Cunniff, Director**	**Research** **Dr. Megean Garvin, Director of Research and Assessment**
District meetings, professional development, teacher support, resource appraisement, national connections	Data, reports, publications, grant writing, assessment, monitor statewide policy changes
Administrative Assistant **Joelle Bennett**	**Computer Science Specialist** **Elissa Hozore (MSDE)**
Manage facilitator accounts, submit and track grant funding and invoice payments, support for professional development workshops, track attendance, communications and social media	District and teacher support, clarification of requirements and MD CS standards, collaboration with content area specialists and other state education personnel from MD and other states

MCCE added an administrative assistant to the staff this year and is currently funding the first Computer Science Specialist at MSDE.

MCCE GOALS AND METRICS

§12-118 Education Article, Annotated Code of Maryland

The Plan shall identify:

(I) Specific actions, resources, metrics, and benchmarks to create a long-term sustainable pipeline of computer science teachers.

The MCCE Steering Committee created goals and metrics for computing education in Maryland in 2017. They were then further updated and approved by the steering committee in 2018. These goals are also reflected in the *Securing the Future: Computer Science Education for All* Act. The ultimate goal is to have CS recognized as a content discipline in K-12 Maryland Public School classrooms with significant reduction in gaps among student subgroups who have access to and participate in CS classes.

	2021-2026 5-10 Years	**2027-2030 11-14 Years**	**2031 Final 15 Year Goals**
Student Access and Participation	CS course offerings, including AP, taught by trained teachers in every high school. Gaps have been reduced by 50% from baseline. CT integrated from preK-8th grade.	Rigorous computing courses and content offered in every P-12 school.	CS is offered to every student throughout their P-12 education. Gaps have been reduced by 90% from baseline.
Professional Training	At least three undergraduate and three graduate programs offering CS certification.	Training universally available. All P-12 pre-service programs require a CS course.	All full-time secondary CS teachers are certified in CS. Offerings are continually updated.
Curriculum and Standards	P-12 CS curriculum in every school system aligned with state CS standards.	Graduation requirements include CS. All P-12 CS standards implemented in all schools.	Review board established and in effect to continually update P-12 standards.

MCCE is on track or exceeds the milestones established by these goals. Working with our partners and aligning the resources across the state, computing education will be available to all Maryland public school students in every LEA. There are now 13 IHEs who are piloting how to incorporate computing education into pre-service programs to increase the likelihood of having at least three approved CS teacher programs in Maryland in the next two years.

MCCE GRANTS

§12-118 Education Article, Annotated Code of Maryland

(3) (I) The Center shall administer a grant program to support professional development in computer science education.

(II) The grant program shall:

1. Be administered through an open and competitive process;

2. Prioritize applications from county boards of education and institutions of higher education ; and

3. Prioritize applications that focus on serving:

A. Areas with high poverty;

B. Rural areas; or

C. Areas with large minority or diverse student populations including female students, students with disabilities, and students of ethnic, racial, or other demographic groups that are underrepresented in the field of computer science as identified by the U.S. Equal Employment Opportunity Commission.

The MCCE administers two grant programs. The first grant process provides pilot study research for IHEs to update pre-service teacher education programs to include CS. The second grant process provides a series of grants to LEAs in order for each of the 25 Maryland public LEAs to reach full compliance with this law.

IHE Pre-service Teacher Education Program Grants

The IHE Pre-service Teacher Education Program grants address the need for long-term solutions to prepare pre-service teachers at all levels of K-12 instruction to enter Maryland public school classrooms with CS knowledge and skills. Each pre-service teacher education program needs to incorporate the Maryland's K-12 CS Standards and CS pedagogy with an emphasis on equity, inclusion, and diversity. The grant requires faculty from CS and education to collaborate, IHEs to collaborate with LEAs, and for grant teams from across the institutions to collaborate and learn from each other. The grantees determined which level (primary, secondary, or both) that they would begin with for the pilot study. The overall total funding per the fiscal note for this effort $500,000. Therefore, initial funding per IHE to apply for was set at two levels, $20,000 and $50,000. Each IHE determined which level to pursue and submitted a request for funding to MCCE. MCCE sent the solicitation to all IHEs in Maryland. There are 13 IHEs which applied and were awarded grants. (See Appendix B.)

LEA Grants

As CS builds into a K-12 content discipline, the infrastructure and support at each level (classroom, school, central office, and state) must also grow. MCCE is poised to assist in the growth process at all levels. MCCE offered regional meetings consisting of multiple LEAs and individual LEA planning meetings to clarify CS and CT/L, recommend appropriate resources, share best practices, develop district CS visions, and answer questions. These meetings leveraged expertise and provided the first step toward developing regional collaborations between LEAs and between LEAs and IHEs. Three LEAs (Anne Arundel County, Baltimore County, and Prince George's County) have designated a CS specific central office administrator. The remaining LEAs have central office administrators who designate only a portion of their time to CS. Likewise, CS trained teachers typically feel isolated as they are often the only CS teacher in their building. MCCE is poised to assist with the CSTA, Maruland chapter in the development of CS educator communities of practice within each LEA and across LEAs.

Building the capacity for LEAs to provide high quality K-12 CS instruction will take time, funding, and teacher PD. MCCE provided the first phase of grants to LEAs which were designated funds for each LEA to build a CS planning team consisting of at least one central office administrator, a school-based administrator, a teacher at the secondary level, and a teacher at the primary level. Each LEA team determined how to incorporate CS into the existing district structure and identified what, if any, changes need to be made, and develop two to four short-term CS goals (i.e. determine types of CS classes or units, select or create CS curricula, align curricula to the Maryland's K-12 CS Standards, or determine types of teacher PD). This was the first step which will be a series of steps utilizing the SCRIPT (Strategic CSforALL Resource and Implementation Planning Tool) research-based framework designed for school districts to expand CS to all students. This empowers each LEA to develop a vision for CS throughout each level of their district and to develop measurable goals in five key areas: (1) Leadership, (2) Teacher Capacity and Development, (3) Curriculum and Materials Selection and Refinement, (4) Partners, and (5) Community. Funds were granted to allow LEA teams the time to meet, set goals, and take initial actions towards meeting those goals. LEAs vary in terms of where they each are in the development process. Awards were sent from MCCE directly to the LEAs over the last two years. (See Appendix C for the LEA Total Grants.)

PARTNERSHIPS

§12-118 Education Article, Annotated Code of Maryland
The Plan shall identify:

> ***(II)*** *Activities to obtain and sustain public and private partnerships for funding, mentoring, and internships for teachers.*

MCCE has established and maintained partnerships with each of the 25 LEAs, numerous IHEs, non-profits, and industry representatives. In addition to the numerous members of the steering committee and advisory committees, MCCE has partnered with the following:

Four-year IHEs
- Bowie State University
- Chesapeake College
- College of Southern Maryland
- Frostburg State University
- Hood College
- Johns Hopkins University
- Morgan State University
- Mount St. Mary's University
- Salisbury University
- St Mary's College of Maryland
- Towson University
  - Clark Center for Cybersecurity
- University of Maryland, College Park
- University of Maryland, Global Campus
- Washington College

Two-year IHEs
- Anne Arundel Community College
- Hagerstown Community College
- Montgomery College

Government
- Maryland Governor's Workforce Development Board
- Maryland Longitudinal Data System Center
- National Aeronautics and Space Administration
- National Security Agency

Industry
- Apple, Inc.
- Microsoft Corporation
- Microsoft TEALS

Associations
- Association for the Advancement of Artificial Intelligence
  - AI4K12 Working Group
- Computer Science Teachers Association
- CSforAll
- Expanding Computing Education Pathways
- International Society for Technology in Education
- National Center for Women in Technology
- National Center for Computer Science Education

Non-Profit Organizations
- Code in the Schools
- Code.org
- College Board
- Digital Harbor Foundation
- Girls Who Code
- Maryland MESA (Mathematics Engineering Science Achievement)
- Maryland Public Libraries

We encourage our partners not only to work with us directly but to also work with the LEAs and IHEs directly. Some of the engaging events that have occurred include afterschool clubs and activities, family code nights, teacher PD workshops, mentoring of teachers, competitions, and contests.

MCCE BUDGET

The overall MCCE budget reflects funds spent through June 30, 2020. Due to the current regulation which limits the number of employees hired at the University System of Maryland (USM), the MCCE needed to partner with the University of Maryland, Baltimore County (UMBC) in order to hire both director positions. Due to the logistics of the memorandum of understanding (MOU), and the hiring process, it took time to establish the initial positions. Likewise, the MOU with MSDE, transfer of funds, and hiring logistics took several months to resolve, and the first CS specialist at MSDE began work in August, 2019. A full-time administrative assistant also began work in August, 2019. Below is the budget overview including the basic budget categories: administrative operating costs, IHE grants, and LEA grants.

Budget Overview

Administrative Operating Costs	158,864.15$
MCCE Professional Development Costs	382,770.90$
IHE Grants	$669,164.58
LSS Grants	$638,348.51
Total	**$1,848,148.14**

The administrative operating costs include several categories. Salaries and fringe benefits are the most significant operating costs followed by the website design and maintenance, office supplies, and in-state travel. The MCCE PD costs include state-wide initiatives, such as computing teacher mentoring programs, PD workshops available to all teachers, regional SCRIPT meetings, and the state summit.

Both the IHE and LEA grants reflect the total funds spent through June 30, 2020. The IHE grant is currently capped at $500,000 per the fiscal note; however, a portion of the additional two million is allocated toward this effort. The Advisory Committee will discuss this option during the 2020-2021 committee meetings. MCCE will also submit additional external grant funding for this important institutional reform effort in order to increase the number of pre-service teachers who graduate with the necessary CS knowledge and skills.

APPENDIX A: STEERING COMMITTEE

Member	Title	Organization
Alison Procopio	Executive Director of Policy Implementation and Best Practices	College Board
Christine Barrow	Dean of STEM	PGCC
Elizabeth Bell	Information Technology Foundation Specialist	Montgomery County Public Schools
Kathy Benson	Retired Elementary Teacher and STEM Integration Consultant	Immersive STEAM
Tiara Booker-Dwyer	Assistant State Superintendent, Division of Career & College Readiness	MSDE
Dwight Carr	JHU - APL STEM Program Manager	Johns Hopkins APL
Linda Cooper	Associate Professor UTeach Co-Director	Towson University
Tara Corona	Continuous Improvement Specialist	MSDE
Michael R. DiGiacomo	Executive Director, Governor's Workforce Development Board (GWDB)	DLLR
Val Emrich	Director of Instructional Technology Instructional Technology, School Library Media, and Mathematics	MSDE
Marquita Friday	Career & Technology Education Lead Specialist	MSDE
Joe Greenawalt	Test developer	ETS
Courtney Hodge	TEALS	Microsoft
Elissa Hozore	Computer Science Education Specialist	MSDE
Ali Keane	Policy Advisor	Office of Maryland Governor Larry Hogan
Diane Ketelhut	Associate Professor Teaching & Learning, Policy & Leadership	UMD
Deborah Kariuki	Department of Education	UMBC
Sharon Kramer	Coordinator, Career and Technology Education	Howard County Public School System
Heather Lageman	Executive Director of Leadership Development	Baltimore County Public Schools
Amanda Lattimore	High School Teacher	Baltimore County Public Schools
Velma Latson	Instructional Technology lecturer	Bowie State
Gretchen LeGrand	Executive Director	Code in the Schools
Raquel Marshall	Program Specialist Office of Education	NASA
Felicia Martin Latief	STEM Supervisor	Prince George's County Public Schools
Richard W. (Bill) MacDonald	High School Teacher	Roland Park Country School
Bria McElroy Barry	Regional Manager, MidAtlantic	Code.org
David McGann	Cloud Migration Offering Leader - Federal CIC Delivery Excellence Leader - Rocket Center Senior Managing Consultant Global Business Services	IBM
Scott Nichols	Acting Coordinator of Career Programs, STEM, and Computer Science	MSDE
Jan Plane	Steering Committee Chair Principal Lecturer Department of CS	UMD
Brandon Riesett	Technology Accessibility Specialist	MSDE
Jennifer Smith	CS Teacher Digital Harbor High School	Baltimore City Public Schools
Sarah Spross	Assistant State Superintendent, Division of Educator Effectiveness	MSDE
Chuck Trautwein	Technology Resource Teacher	Garrett County Public Schools
Greg Von Lehman	Advisor to the President of UMUC for Cybersecurity & CCEI Board Member	UMUC & CCEI
David Weintrop	Assistant Professor Teaching & Learning, Policy & Leadership College of Education College of Information Studies	UMD
Pat Yongpradit	Chief Academic Officer	Code.org

APPENDIX B: TOTAL IHE PRE-SERVICE TEACHER EDCUATION GRANTS

IHE	MCCE Grant	Principle Investigators
Bowie State University	$10,000.00	Hoda El-Sayed
Frostburg State University	$84,662.00	Michael Flinn Jennifer Bishoff Jennifer Rankin
Hood College	$135,772.89	Jennifer Cuddapah
Loyola University	$49,561.00	Kelly Keane Irene Bal
Morgan State University	$34,350.00	Christian Anderson Edward Dillion Simone Gibson
Mount St. Mary's University	$109,979.00	Laura Frazier Stacey Brown-Hobbs
Saint Mary's College of Maryland	$19,049.00	Alan Jamieson Lindsay Jamieson
Salisbury University	$58,240.00	Sophie Wang
Towson University	$49,980.00	Linda Cooper
University of Maryland, Baltimore County	$49,511.00	Patricia Young Deborah Kariuki
University of Maryland, Eastern Shore	$10,000.00	Patricia Goslee
University of Maryland, College Park	$39,799.69	Jan Plane David Weintrop
Washington College	$17,350.00	Erin Counihan Shaun Ramsey
Total	**$668,164.58**	

APPENDIX C: LEA TOTAL CS GRANTS

LEA	Phase I Grant
Allegany	$6,612.64
Anne Arundel County	$21,837.29
Baltimore City	$124,900.00
Baltimore County	$5,000.00
Calvert County	$31,364.62
Caroline County	$6,225.00
Carroll County	$40,344.43
Cecil County	$35,884.00
Charles County	$36,274.20
Dorchester County	$4,712.04
Frederick County	$24,400.00
Garrett County	$200.00
Harford County	$7,000.00
Howard County	$29,745.75
Kent County	$7,195.50
Montgomery County	$55,885.46
Prince George's County	$115,650.00
Queen Anne's County	$5,534.10
Seed School County	$0.00
Somerset County	$4,475.00
St. Mary's County	$6,000.00
Talbot County	$562.97
Washington County	$28,239.40
Wicomico County	$29,401.53
Worcester County	$22,904.94
MD School for the Blind	$5,000.00
Total	**$638,348.51**