Brief #5

This is the fifth brief in a series from CSforAll-MN which provides an overview of regional and national computer science (CS) professional learning opportunities for K-12 teachers and teacher educators. Very few preservice teacher training programs include computer science, so the vast majority of K-12 teachers and teacher educators need CS professional learning. Minnesota principals report that two of the largest barriers to offering computer science are the lack of teachers trained in CS and a lack of funding to train them.[1] We hope this brief helps educators identify opportunities that align with their CS learning and teaching needs as well as potential ways to support the costs of these opportunities.

Identifying Focus Areas for Professional Learning

There are many focus areas for CS professional learning including CS content knowledge, pedagogical knowledge, frameworks and standards, strategies that support equity and inclusion, hands-on experience with technology-based resources and software, and curriculum exploration and development. To help organizations identify the professional learning needs for educators who are new to CS as well as who are experienced in CS, the CS education community has developed several helpful tools and resources. Connecting with others at CS professional learning events can also be informative in identifying additional opportunities for professional learning.

Computer Science Teachers Association (CSTA) developed the Guidance for Reflective Teachers, based on the Standards for CS Teachers. These resources include a Self-Reflection Checklist and the Roadmap for Professional Learning that can assist teachers in identifying needs and setting goals. Resources are also provided for supporting teachers’ professional development through coaching and administrator guidance. CSTA also provides independent reviews of professional learning opportunities - see CSTA Quality PD.

SCRIPT: Strategic CSforALL Planning Tool for School Districts is a framework to guide district teams in developing a vision for CS, including a set of rubrics to self-assess several areas including Materials and Curriculum Selection and Content Refinement as well as Teacher Capacity and Development.

The CAPE Framework for Assessing Equity in Computer Science Education helps education leaders and policy makers assess equity in CS education at multiple levels of an educational system (school, district, state). The framework addresses four key components of CS education: Capacity for, Access to, Participation in, and Experience of CS education (CAPE).

The TEC Rubric is a curriculum evaluation rubric that can help K-12 educators and curriculum designers that are new to computer science develop and select CS curricula. The rubric examines three major categories within introductory computing curricula: Teacher Accessibility, Equity, and Content (TEC).
CS Professional Learning Events

**Minnesota**
- CSTA-MN Chapter hosts monthly meetings
- MNCodes Summit is hosted annually in May by CodeSavvy
- Impact Education Conference is hosted annually in December by Sourcewell

**National**
- CSTA Annual Conference is held each July in varying locations around the county
- Pathfinders Institute is hosted by Infosys Foundation and includes Winter and Summer opportunities

Funding for CS Professional Learning

Because so few K-12 teachers have a background in computing, many teachers need professional learning in order to integrate CS in other subject areas or teach standalone CS courses. Currently, Minnesota does not have specific funding set aside to support CS professional learning; however, the following list shares existing funding sources that districts can use for CS professional learning.

**Federal and State Funds:**
- **Title II, Part A - Supporting Effective Instruction:** These federal funds are allocated to every Local Educational Agency (school district and charter school) in Minnesota. Districts and charter schools go through an application process to get access to the funds. In Minnesota, a district’s Title II, Part A investment should align with the Minnesota World’s Best Work Force goals. CS professional learning may support closing racial and economic achievement gaps between students and/or preparing students for career and college.
- **Title IV, Part A - Student Support and Academic Enrichment:** Local Educational Agencies (school districts and charter schools) that qualify for Title I, Part A receive a Title IV, Part A allocation. Districts and charter schools go through an application process to get access to the funds. These funds are an opportunity to innovate, pilot, and collaborate on activities, services, or programs related to the areas of well-rounded education, safe and healthy schools and effective use of technology to improve equity, opportunity and outcomes for all students. Computer science activities and programs can be funded under well-rounded education and the funds can go toward professional learning, curriculum or software purchases, increasing access to Advanced Placement and dual enrollment programs, etc. More information on using funds to support CS-related activities is available in the **Title IV, Part A Well-Rounded Education Reference Sheet**.
- **Advanced Placement:** Exam reimbursements and Teacher Training Scholarships are available to support AP CS course offerings.
- **Perkins V - General Guidance for Local Uses of Funds:** Contact your local Perkins Consortium as the use of funds will need to align with the current plan or be integrated in a future plan.
- **Guide to Using ESSR Funds for Computer Science:** Prepared by Code.org, this guide suggests ways that state and local education agencies can leverage emergency funds from the Department of Education to support CS efforts

**Models of State-Level CS Professional Learning:**

Increasing the availability of state-level funding for CS professional learning has potential to increase access to K-12 CS. This is crucial for Minnesota where only 19% of high schools offer CS, which is the lowest rate in the country.[2] In particular, in 2019 Minnesota had only 605 students take Computer Science Principles, a high school course designed specifically to broaden participation in computing.[3] Recent research shows that states with state-level funding to support CS professional learning teach CS in 52% of high schools. In contrast, in states without state-level funding, only 40% of high schools teach CS in states.[2]

$55 million

Total spending by all U.S. states for CS professional learning in FY21

Many states are offering statewide CS Professional Development Weeks (CS PD Weeks) with opportunities for elementary, middle, and high school teachers, administrators, counselors, and sometimes teacher educators. For example, with initial funding from the state and CSTA, Arizona offered a CS PD Week in 2019 for K-12 teachers and counselors. California has offered the Summer of CS for several years, composed of workshops co-created by school districts, universities, and industry CS specialists. Colorado hosted its first CS PD Week in 2016 which continues to bring educators from Colorado and across the country together for a residential experience that creates a sense of community and shared purpose. Minnesota hosted a CS PD Week for CSP teachers and counselors in 2018. Recommendations for establishing state-level funding models for CS professional learning can be found at bit.ly/modelsforfundings.
Looking Forward

While Minnesota has significant room for improvement in computer science education, the region is home to a number of nationally-recognized and high-quality CS professional learning providers for inservice K-12 educators. This brief provides information for districts and teachers on how to evaluate which opportunities might further CS for all goals, how to access these opportunities, and how to fund teacher participation. The more inservice teachers who participate in CS professional learning opportunities, the more schools will have trained teachers who can provide CS learning opportunities for all of Minnesota’s students. Professional learning is a critical component to supporting all students in our state because Minnesota currently has no preservice teacher licensure specific to CS (see Briefs #3 and #4). As CS is beginning to be integrated into state-level content standards, CS professional learning for inservice teachers is crucial to supporting them in teaching CS. In upcoming briefs, CSforAll-MN will examine the relationship between K-12 CS education and the current state of computing in higher education and industry.

References: