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SDSC, UCSD Focus on Sustainable Computer Science Courses

NSF-Funded project builds on high school-level pilot program

The San Diego Supercomputer Center (SDSC) at the University of California, San Diego, has been awarded a three-year National Science Foundation (NSF) grant valued at almost \$1 million to help three of the region's school districts develop model "villages" for introducing and sustaining up-to-date computer science courses in their curriculum.

This district-supported approach of sustainable professional development programs and qualified master teachers is intended to allow UC San Diego to provide timely course content updates and help prepare master teachers to share it with their peers, and through them, with students. The project tests this model, which could be more widely used to help high schools throughout the region, as well as the nation, teach current and meaningful computer science courses.



The new initiative, called 'Computer Science (CS)-Creating a Village for Educators, or CS-CaVE,' addresses a persistent problem created by the vastly different rates of change between technology innovation and the pre-college public educational curriculum. Statewide curriculum standards undergo major revision roughly once a decade. In contrast, technology introduces new paradigms and discoveries much faster – on the order of months to a couple of

years.

"Workforce training must evolve with technology innovations to maintain a vibrant economy," said Diane Baxter, SDSC's associate director for education and principal investigator for the project. "The slower pace of K-12 curriculum revision poses a significant systemic challenge to

an innovation-driven U.S. economy.”

The CS-*CaVE* initiative explores how the model might help introduce new, technology-driven curriculum content at a faster pace compared to current systemic cycles of educational reform. The goal: expanded regional and national communities of educators with peer and university support elements that can be sustained indefinitely within operational district and school budgets.

“Curricular reform often requires complex changes and supports at the district level, first for initial implementation and subsequently to scale and sustain the changes,” noted Susan Yonezawa, associate director for UC San Diego’s Center for Research on Educational Equity, Assessment, and Teaching (CREATE), and also a project co-PI. “They are essential in helping schools and teachers interpret and enact reform within contexts of local and state policy and administrative requirements.”

CS-*CaVE* uses nationally-proven curriculum, including one developed through a UC San Diego Computer Science Principles (CSP) pilot program led by Beth Simon, senior associate director of Learning Sciences and Technology at the Center for Teaching Development in UC San Diego’s Computer Science and Engineering Department, and a co-PI of the CS: *CaVE* project. CSP provides students with a foundational understanding of the problem-solving approaches related to computational thinking.

CS-*CaVE* supports and studies how the three districts integrate this course into a broader K-12 strategy for introducing computing into the pre-college curriculum, incorporating the [national “Hour of Code” activities](#), as well as those developed through other proven programs. The district-based model is also intended to provide master teachers with in-person and virtual peer support to help them continue to introduce new curricular and pedagogical content. It is based on district-university partnerships that can persist after external funding ends.

“The Sweetwater Union High School District is honored and excited to be a part of this innovative program,” said Manual Rubio, the district’s director of grants and communications. “By providing valuable professional development, our teachers, staff, and administrators will be better able to provide students with courses in computer science that will prove to be invaluable to their futures.”

The CS: *CaVE* project is also designed to address one of the outstanding challenges facing the [national CS10K project](#), which is integrating an engaging computer science course into public high schools in the most expeditious way available: a new AP CS Principles test.

“A successful, district-based model should rapidly enhance the skills and knowledge of teachers to teach CS Principles to diverse students, while providing them sustained support for content and pedagogy that may be new to them,” said Yonezawa. “This model could prove valuable to schools across the country not only for introducing the new AP CS Principles course, but for evolving the model as technology and workforce skills change.”

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