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THEMES in the NEWS

IDEA's weekly commentary on education news

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State's AP Computer Science Exam: 29 African Americans, 21% Girls

by UCLA IDEA

In response to growing demands in the region, computer science has become the most popular major at Stanford University, "the intellectual heart of the Silicon Valley." Similarly, at UC Berkeley, electrical engineering and computer science are the top majors.

Stanford computer science professor Eric Roberts said the expansion of the program is good for both the university and the valley, which is home to Facebook, Google and hundreds of other technology corporations—large and small. "For years, the most common reaction I've gotten from industry leaders, both inside and outside the Valley, is that they love Stanford's program—but that we don't produce nearly enough graduates to meet the demand," Roberts said.

While these elite institutions of higher learning are responding to changing market needs, the k-12 system is not keeping pace. Nationally, computer science is the only STEM (science, technology, engineering and mathematics) field that has seen a decrease in student participation in the last 20 years. In California, less than 1 percent of all advanced placement exams taken in 2011 were in computer science. Moreover, student access to these courses is unequal and unrepresentative of the state's demographics. (See charts.)

According to College Board, which tracks AP exams, 3,101 students took the AP computer science exam in 2011. By comparison, about 35,000 students took AP government, 55,000 took U.S. history, and 58,500 students took English language. Of those who did take the computer science exam, 29 students were African American and only 21 percent were girls.

These low participation rates show that schools are failing to make STEM instruction interesting and/or accessible to a large majority of the state's youth. Although young people are deeply engaged in *using* new technologies and digital media, like Facebook, Twitter and Instagram, they're not getting the kind of schooling that builds on those everyday experiences to be realized in STEM-related jobs and careers. UCLA's Jane Margolis, who has researched computer access, points to the difference between merely having access and using it for powerful learning and life opportunities. "[T]hey're using it for communication, and that does not translate over to who is learning the computational thinking so they can create with technology," she said.

Various reasons can explain the low numbers of high school students in advanced computer science courses. First, not all high schools offer those courses, and not all the courses are taught by well-prepared teachers who can make the subject engaging to students. Too few children in the earliest grades have access to computer and technology experiences, and they grow up avoiding or lacking encouragement for the coding-heavy curricula of advanced computer science courses.

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Addressing all of these problems comprehensively is *Exploring Computer Science* (ECS), a "K-12/University partnership committed to democratizing computer science." This collaboration between UCLA, Los Angeles Unified and the National Science Foundation is bringing powerful technology fundamentals to more than 2,000 students in part by teaching them to create computer games and websites, build robots, aggregate datasets using smartphones, and more. Education and policy leaders can look to ECS and other initiatives as models for extending the technological competence of students and, eventually, the workforce.

But the challenge goes even beyond providing learning opportunities such as early access, appropriate materials and facilities, more interesting curriculum and well-prepared teachers. Schools and the broader society must counteract generations of racial and gender bias that construct a limited vision of who produces knowledge—particularly in the sciences. Equipped with appropriate learning opportunities and informed by models, like *Exploring Computer Science,* public schools can fashion novel experiences and open attitudes to show the majority of today's youth (girls and students of color) that "kids like me" can be computer scientists or engineers or just prepared to exploit technology in other jobs and professions.

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