



## Meeting the Need for Computer Science Skills

GUEST EDITORIAL

**H**igh school computer science education across the nation is mixed with good news and bad news. Although more courses are being offered with diverse content in computer studies, there is still a lack of emphasis on computer science as a requirement for graduation. This is very bad news for anyone who understands our current educational/employment pipeline crisis.

The mixed news comes from the recent survey by the Computer Science Teachers Association (CSTA) of 14,000 high school computer studies teachers. The survey results (available at [http://www.csta.acm.org/Research/sub/survey\\_pdfs/CSTASurveyResAnaly.pdf](http://www.csta.acm.org/Research/sub/survey_pdfs/CSTASurveyResAnaly.pdf)) indicate CS is introduced early in high schools, but primarily as an elective. Students may be required to take at least one course in computer-related studies (26%), but beyond that, other courses fulfill no graduation requirement. Because students are faced with many elective options and many requirements, having the latitude to “fit it in” becomes the biggest challenge (43%). This is especially problematic because, despite the media focus on offshoring, the U.S. Department of Labor and most companies are seeing a rise in information technology-related careers and a continuing shortage of skilled workers to fill those jobs.

On the surface, the pre-Advanced Placement (AP) course content appears to mirror what is needed in the IT profession. The top topics include programming (68%), hardware (60%), ethics (56%), graphics (46%), Web development (43%), and databases (35%). On the other hand, only 11% of the courses teach logic. Additionally, 10% included applications and spreadsheets. An

emphasis on productivity software is clearly monopolizing the content of pre-AP courses even though students use this software throughout their K–12 education. Given the lag of technology within the classroom compared to that in most homes as well as the repetitiveness of topics, students may become frustrated with content if they are simply learning how to use tools. Computer studies education should therefore be based in logic (programming), critical thinking (problem solving), and ethics and should stress purposeful use of technology.

In essence, we have two problems in computer science education: students cannot fit elective computing courses into their schedules and the courses we are currently teaching do not address the learning needs of our students.

High schools and universities can work together to solve the first problem. Universities should require students entering computer science programs to have taken at least one real computer science course in high school. Schools can also help students fit this course into their programs by making introductory computer science a mandatory (rather than elective) course or by providing a math or science credit for computer science.

Teachers can address this challenge by focusing on key skills. I encourage all K–12 educators to emphasize logic and critical thinking instead of creation of pictures, documents, and static Web pages. CS teachers can also take advantage of new software tools that focus on these core concepts while teaching the science of CS. This will help all students develop the skills they need to thrive in the global economy.

**By Angela Klein**

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