

COMMUNITY COLLEGE CORNER

Elizabeth K. Hawthorne

pen: make that ice skater fall through the hole in the ice (thanks for the inspiration Steve Cooper!), direct those fish to gobble up ocean pollution. Meanwhile classic topics such as randomization, looping, and iteration were being absorbed. You get the idea?

What ties all these examples together is the ability to cut through (not at all) the helpful protections and enable the new student to manipulate something and see the positive or negative results – without being overly protected from themselves or having to suffer through a bureaucracy of bloated systems. They feel empowered and their curiosity kicks into high gear.

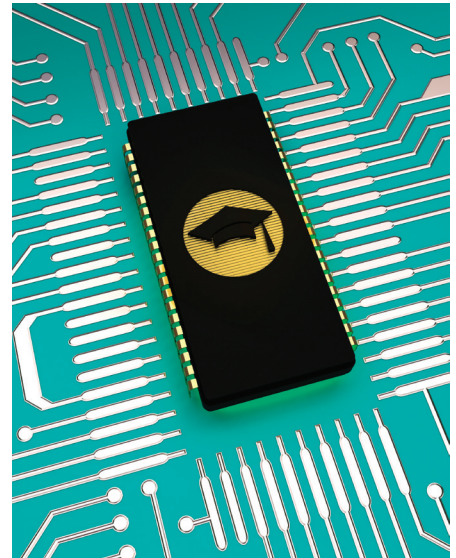
Thus, you have witnessed my small contribution to the ongoing debates about CS1. I wonder if perhaps some students (I won't be arrogant enough to say all) also find many current approaches to CS1 stifling. Has anyone asked them this question in this way? A research project ... I sense a research project for someone. "Is CS1 stifling?" Have we thought about CS1 and enrollments, recruitment and retention in this way? We as a community are talking about CS1 every other way imaginable. I am suggesting that at least some students who have so-called misperceptions of computing are not as far off as they might be, or we think they are, at least when it comes to CS1. If you are one of those faculty members who find it no longer as much fun or stimulating to teach CS1 as you used to, percolate about what changed for you. Don't assume that you are getting frumpy, aged, stuffy, or just plain old. I may be approaching that big birthday with something new and strange stuck on my nose, but I feel quite young and passionate thank you. Given the right circumstances, I'd be happy to teach CS1 again. **lr**



Lisa C. Kaczmarczyk
Consultant
San Diego, California 92130 USA
lisak@acm.org

DOI: 10.1145/1963533.1963542
Copyright held by author.

Call for Action: Digitally Enhancing America's Community Colleges



Strategic Opportunities for Computing Education

IN APRIL 2010, the ACM Committee for Computing Education in Community Colleges (formerly the Two-Year College Education Committee) conducted a *Strategic Summit on the Computing Education Challenges at Community Colleges* funded by the National Science Foundation's "Advanced Technological Education" (NSF ATE) program. The goal of the Summit was to identify the major challenges facing computing education in America's community colleges with the express intent of providing a foundation and impetus for future grant proposals, initiatives and partnerships led by community college computing faculty and academic administrators.

The *Summit* participants included a diverse group of thirty-three professionals from two-year colleges, four-year colleges,

high schools, industry, and the federal government. To seed ideas, designated panelists from among these experts delivered succinct presentations from different perspectives: employer, faculty, and student. Immediately after the panel presentations, the participants assembled into three small groups to engage in spirited discourse and intellectual exchange of ideas. All presentations and breakout discussions were digitally recorded and the many hours of captured conversation along with pre-*Summit* blog postings served as the foundation for "Digitally Enhancing America's Community Colleges: Strategic Opportunities for Computing Education."

This report of findings identifies twenty specific challenges and associated opportunities that are elucidated by participant

Call For Action: Digitally Enhancing America’s Community Colleges, Strategic Opportunities For Computing Education

quotations captured during the Summit deliberations. The report is available from both the ACM CCECC website (acmccecc.org) and the Ensemble national digital library for computing education (computingportal.org). The supplemental resources in support of this report are available from the ACM CCECC “CAP Space” website:

- Computing Education Resources (www.capspace.org/CompEdResources)
- Scholarly References (www.capspace.org/References)
- Potential Strategic Planning Initiatives & Funding Opportunities (www.capspace.org/StrtgcPlnngMatls)
- Strategic Planning Template ... a poster-sized format of the 20 Findings intended to foster interactive discussion and follow-up activities; printed copies of the Report and Template are available upon request via the “Contact Us” form (www.capspace.org/contactus)

A few overarching themes are consistent throughout the findings. They include:

- The unique characteristics of computing education in community colleges require approaches and solutions specifically tailored to this field of study.
- Well-defined computing nomenclature, curricula, assessment techniques and educational pathways are required to position the computing disciplines as first choice career options for two-year college students and to facilitate student achievement.
- Active collaboration is required among the various sectors of education - high school, two-year colleges, four-year colleges and universities - together with business and industry, to address the challenges identified and achieve the opportunities noted.

A small sampling of the twenty Findings appears below.

Promoting Computing Education in Community Colleges

CHALLENGE: America’s two-year college computing education programs are frequently undervalued. High school graduates may not consider them as their first

option for college. Baccalaureate institutions may not embrace them as sources of transfer students into upper-division computing programs. And employers may not perceive them as producers of qualified graduates. Misimpressions arise from negative stereotypes and the failure to recognize the value of associate degrees in computing.

OPPORTUNITY: Two-year computing faculty, program coordinators and administrators should collaborate and communicate with colleagues in other educational institutions and in the business sector to raise awareness of the program outcomes and assessments of student learning that define associate-degree computing programs.

POTENTIAL INITIATIVES:

- establish assessment-based articulation agreements between two-year and four-year colleges
- establish credit in escrow agreements with high schools
- establish community-based experiential learning opportunities with employers

Demystifying Computing Disciplines and Professions

CHALLENGE: The mélange of course and program titles and requirements throughout computing education confounds students, parents, faculty, academic advisors, guidance counselors, administrators, employers and practitioners.

OPPORTUNITY: Stakeholders should collaborate to produce clear and consistent guidance regarding the breadth and depth of computing education and careers. Improved standardization should be pursued to enable students to progress along well-defined pathways leading from their initial interest in computing to attaining a college degree to launching a career in computing.

POTENTIAL INITIATIVES:

- standardize computing nomenclature and learning outcomes
- engage local business and industry in DACUM activities for emerging technologies
- offer one-day workshops and week-long summer programs to local civic groups

Actualizing Pathways in Computing Education

CHALLENGE: Students are limited in their opportunities to avail themselves of computing curricula in a cost effective and time-efficient manner due to inconsistencies and complexities that span student progression from high school to two-year college program completion to baccalaureate articulation and transfer.

OPPORTUNITY: Educational institutions should employ multi-faceted strategies that move students seamlessly through their computing education studies from the secondary level through the associate degree to the baccalaureate degree.

POTENTIAL INITIATIVES:

- standardize education and career pathways in computing
- organize mentoring and information sessions for middle and high school students on career opportunities in computing
- create online tutoring services and self-service advisement systems

Applying Learning Research to Computing Education

CHALLENGE: There is insufficient information available to two-year college computing faculty about how students today synthesize technical knowledge and acquire the inductive and deductive reasoning skills required of computing professionals.

OPPORTUNITY: Cognitive learning research in computing should be used to positively inform and influence faculty approaches to course design and delivery for active learning computing education.

POTENTIAL INITIATIVES:

- partner with cognitive learning researchers to create alternative pedagogy models for learning styles of 21st-century computing students
- pilot active learning approaches for computing courses
- design assessment techniques for inductive and deductive reasoning skills required of computing students

This report calls for actions across the breadth of associate-level computing programs that reflect the multi-faceted role of two-year colleges: to serve stu-

dents entering the local workforce, to serve students transferring into baccalaureate programs and to serve students pursuing continuing skills development. The extraordinary rate of technological change, the current trends in sustainable computing, mobility, cloud computing, cybersecurity, as well as the impact of technology on the fundamental notions of higher education foreshadow the transition underway from the Information Age of the last century to the Creative Age of the current century. Correspondingly, the President of the United States, in noting that “community colleges are one of the keys to the future of our country,” has called for the production of college graduates who “possess 21st century skills like problem-solving and critical thinking, entrepreneurship and creativity” together with “new ways for businesses and community colleges to work together.”

America’s community colleges have never had a higher profile or shouldered a higher expectation than today at the local, state and federal levels. We live in an exceptional age, one that provides numerous challenges to past practices and mindsets and offers untold opportunities to shape the future. “Digitally Enhancing America’s Community Colleges: Strategic Opportunities for Computing Education” undergirds this vital call for action.

On a personal note, I pause publically to thank the members of the CCECC for working tirelessly over the past two years to convey these key Findings to the computing education communities in which the committee serves. The final report and all its accompanying materials would not have been possible without the perseverance of Robert Campbell, Karl Klee, and Anita Wright. **Ir**



Elizabeth K. Hawthorne
 Computer Science Department
 Union County College
 Cranford, New Jersey 07016 USA
 Hawthorne@ucc.edu

DOI: 10.1145/1963533.1963543

Copyright held by author.

Associate-Degree Computing Curricula



Overview Report

<http://www.acmtyc.org/curricula.cfm>



Computer Engineering

<http://www.acmtyc.org/WebReports/CEreport/>



Computer Science

<http://www.acmtyc.org/WebReports/CSreport/>



Information Systems

<http://www.acmtyc.org/WebReports/ISreport/>



Information Technology

<http://www.acmtyc.org/WebReports/ITreport/>



Software Engineering

<http://www.acmtyc.org/WebReports/SEreport/>