students. However, reporting accuracy varies widely. Although some computing faculty may argue that public relations is not their job, one might ask "whose job is it?" If computing folks do not pay attention to public perceptions of their field, then who will?

- To what extent is it possible to connect daily headlines with specific course content?
- How can class work help students separate myths and misconceptions from facts in news stories?
  - Example: Despite many news reports regarding off shoring, the field of computing has remarkable potential for long-term careers. Within the United States, employment in the IT sector increased 17% from 1999 to 2004 --- even with all the news of the dot-com difficulties. Also, the U.S. Bureau of Labor Statistics projects that computing is the field with the greatest potential for growth through 2014.
  - Example: Money Magazine and Salary.com identified "software engineer" at the very top of their listings of the "Best Jobs in America." Further, number 7 on the listing was "computer/IT analysis". In describing the position of software engineer, www.calary.com wrote, "The profession's strong growth prospective, average pay of $80,500, and potential for creativity put it at the top of the list." www.salary.com

Additional facts regarding employment in computing may be found at http://computingcareers.acm.org/

Exams and Grading

Exams and grading scales send powerful messages to students regarding what is really important in our courses and our discipline.

- If computer science is not the same as programming, do exams have non-programming components?
- What actually gets credit on assignments and projects? (If all credit comes from correct code, the exams convey the clear message that only programming counts -- even if we say computer science is a much broader discipline.)
- If communication skills are important,
  - Does writing and oral presentation count in grading?
  - Can students lose points for bad writing?
- A common approach to grading separates content from presentation.
- If the presentation is muddled, however, how does an instructor know that the underlying thought isn't confused?
  - For years, I thought some poorly-worded responses on tests came from time constraints and pressure.
  - Later, in working directly with students in lab, I learned such responses often indicate confusion and misconceptions.
- Should it be possible to get an "A" on an assignment if the ideas suggest fine insight, but the presentation is mediocre?

In summary, courses must cover many topics at multiple levels. Although details can be captivating, class work offers an opportunity to connect those low-level details with high-level themes, principles, ethical considerations, and student motivations.

Community College Corner

Crafting a Compendium for Associated-Degree Computing Curricula

Elizabeth K. Hawthorne

Over the past two decades, the ACM Two-Year College Education Committee (TYCEC) has published associate-degree curricular guidelines that correspond to the five major disciplines clearly identifiable within the realm of computing: Computer Science, Computer Engineering, Software Engineering, Information Systems, and Information Technology. All of these reports have been approved by the ACM Education Board and are freely available from www.acmtyc.org/curricula.cfm. As an overview, the committee characterizes these five computing disciplines and corresponding curricula as follows.

Computer Science … involves design and innovation developed from computing principles. This curriculum focuses on the theoretical foundations of computing, algorithms, and programming techniques, as applied to operating systems, artificial intelligence, informatics, and the like.

Computer Engineering … involves the design and construction of processor-based systems comprised of hardware, software, and communications components. This curriculum focuses on the synthesis of electrical engineering and computer science as applied to the design of systems such as cellular communications, consumer electronics, medical imaging and devices, alarm systems and military technologies.

Software Engineering … involves the design, development and testing of large, complex and safety-critical software applications. This curriculum focuses on the integration of computer science principles with engineering practices as applied to constructing software systems for avionics,

healthcare applications, cryptography, traffic control, meteorological systems, and the like.

Information Systems … involves the application of computing principles to business processes, bridging the technical and management fields. This curriculum focuses on the design, implementation and testing of information systems as applied to business processes such as payroll, human resources, corporate databases, ecommerce, finance, customer relations management and decision support.

Information Technology … involves the design, implementation, and maintenance of technology solutions and support for users of such systems. This curriculum focuses on crafting hardware and software solutions as applied to networks, security, client-server and mobile computing, web applications, multimedia resources, communications systems, and the planning and management of the technology lifecycle.

The committee is now in the process of crafting a Compendium to accompany these curricular guidelines. The Compendium will contain pedagogical approaches for teaching computing curricula at associate-degree granting institutions. Some pedagogy examples for face-to-face instruction include team teaching, cooperative learning, problem-based learning, pairs programming, games programming, and 3D graphical programming environments, such as Alice and Scratch.

Moreover, special considerations unique to the two-year college environment will be included in the forthcoming Compendium. Although the milieu is briefly described already in each of the five curriculum reports, the specific issues addressed in the Compendium will embrace more completely the sensitivity of associate-degree granting institutions for:

- Serving under-prepared and under-represented students;
- Providing guidance to faculty and administrators;
- Sustaining a program of study;
- Recommending sufficient computing laboratory and classroom facilities;
- Limiting course proliferation and being efficient in class offerings;
- Offering students opportunities both for matriculation into baccalaureate programs and for direct entry into the workplace;
- Augmenting the technical curriculum with general education courses;
- Providing mathematics remediation and preparation;
- Offering service and bridge computing courses;
- Describing the role of professional practices, such as legal, ethical, and social issues in the computing curricula;
- Explaining the importance of science and the scientific method in the computing curricula;
- Ensuring students have the interpersonal and communication skills necessary to succeed in today's global society;
- Supporting student exploration of various educational and career choices;
- Serving the needs of local business and industry for a trained workforce; and
- Providing lifelong learning for personal and professional enrichment.

Pedagogical approaches are being collected now for inclusion in this Compendium. The Compendium for associate-degree computing curricula is expected to be available from the committee's website in late 2009. Please e-mail your pedagogy success stories to Elizabeth Hawthorne at ehawthorne@acm.org

Elizabeth K. Hawthorne
Chair, ACM Two-Year College
Education Committee

Distance Education

Opening Books

Judith Gal-Ezer

Opening Books for Academic Learning is a relative new trend, taking advantage of the potential of the Internet and computers.

In this issue I am honored to host a dear colleague, Dr. Yoav Yair, Head of the Center for Technology in Distance Education, at The Open University of Israel, who will describe a new initiative the university is engaged in, which might encourage other international academic institutions who haven't done so, to follow.

Dr. Yair is a physicist with the Department of Life and Natural Sciences at the Open University and specializes in lightning research on earth and other planets. He has a vast experience in Educational Technology with a focus on scientific visualizations in Astronomy and the Earth Sciences.

– Judith Gal-Ezer