

An Action Plan for the Computing Competitiveness Council
13 September 2007

Our Claim: Students, parents, and citizens of South Carolina are being poorly served because they are not being sent a correct and coherent message about what computing really is, what the career opportunities are in the computing professions, and what the paths should be to those careers.

Justification: Computer science (or just “computing”) is important:

- It is crucial to economic development and the knowledge economy; in industry and business, the application of computing is as common as that of algebra.
- The employment prospects are very strong (17% of all new jobs nationally).
- Salaries are among the highest of all professions.

But computer science in South Carolina is in trouble:

- University enrollments are down (by 40% to 70% since 2001 nationally, and in SC as well).
- Computer science is not presented or marketed properly in the K-12 school systems.
- Only 170 students took an AP Comp Sci class in 2006, compared to 2766 in Calculus.

Some specifics that shed light on the situation:

- Computing as a discipline is connected to Science, Technology, Engineering, and Mathematics (STEM), and to business, but not entirely contained within any of these.
- AP Computer Science is a “math” course in South Carolina, but computer science coursework or expertise is not a requirement for math certification.
- Other “programming” and computer applications courses are “business” courses.
- “Computer science” and “computer literacy” are used interchangeably.
- Many “applications” courses count towards the “computer science” requirement.
- The STEM *Pathways* brochure didn’t contain the word “computer”. (Past tense?)
- The IT *Pathways* brochure largely focused on 2-year colleges and certifications.

Our Proposal: We feel the Department of Education should examine how it presents computer science. Issues to be addressed include the following.

- Computer science should be presented (in some fashion) as a discipline unto itself, with many applications areas (business, science, hardware/embedded systems, media/animation, etc.).
- Clear guidance is needed on educational and career paths that involve computing.
- The STEM and IT *Pathways* brochures should have a computer science major.
- The existing “computer literacy” courses should be re-examined in light of professional recommendations and should make a clear distinction between “computer science” and “use of applications software”.
- Certification/endorsement processes for teachers should be re-examined (universities will help).
- Other subjects (math, science, social studies, ...) should be examined for areas where “computing across the curriculum” would be valuable.

These suggestions are supported by the larger departments of computer science in the universities and the technical college system, and we believe have the support of South Carolina businesses. The universities and colleges are committed to a combined and coordinated effort to explore pilot programs with school districts and to provide students, parents, and counselors with information packets and training in this regard.

A Straw Man Goal

Schools would have an identifiable “computing” department, just as they have a Mathematics, Science, Language, etc., department. Thinking realistically, and especially for rural schools, this could be a virtual department comprising teachers from the other areas, but the *identification of computing as a discipline* would serve to coordinate the message. The university participants are willing to commit to work on distance delivery options as a way of mitigating the problems in rural schools; it need not be necessary that all schools have all the needed teachers on staff.

Subtopics for courses in the Computing Department would include and the department would be organized to present as “computing” to K-12 students something like the following:

- Foundations (the ACM/CSTA Level II course), intended for 9th or 10th grade as an introduction to the discipline
- Software (including the current AP Computer Science and the Programming courses)
- Use of Applications and Tools
 - Computer literacy (Word, Excel, etc.)
 - Web design
 - Business applications
- Hardware and Systems
 - Cisco and other networking classes
 - A+ certification

Hand in hand with identifying “computing” would be a need to re-examine the certification and endorsement process of teacher preparation.

Perhaps the single most important thing to work toward would be the development of the Foundations course. Much more than just a Microsoft tools literacy course, this could be used in place of what appear to be three different literacy courses currently being taught and could be stressed as the best way for the better students to satisfy the current state requirement. Students who followed the Foundations course with any of the programming courses would be well positioned not just to study computer science but also for university majors in science, mathematics, engineering, and the use of information systems in business.

South Carolina could be a leader:

We are not aware that this kind of coordinated program is at all common across the country. South Carolina could in fact be a national leader in this regard.

Summary:

The Department of Education would sponsor this initiative.

The universities, teachers, and DoE would create curricula, plans for change, etc.

Industry would be involved to guarantee relevance to economic development.