



The Crisis in Computing

--

and is there something we can do about it?

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What's Gone Wrong With Computer Science?



What's Gone Wrong (1)?

We are not a "core" STEM discipline

We are connected to S, T, E, and M, but not wholly contained inside any of these

We are also much more technical than "just business"

We are scattered among several university units



What's Gone Wrong (2)?

The job market is too good

The job market complicates the 2-year/4-year issue

We have been too successful

- Hardware is fast/cheap/powerful

- Software is very powerful

- Computers can be seen to be magical

- Kids don't think of computers as unfinished products



What's Gone Wrong (3)?

“Computer science” versus “computer literacy”

AP CS is a “math” subject

All other courses are “business” subjects

Endorsement but not certification of teachers



What's Gone Wrong (4)?

SC "Pathways" brochure for STEM (cover)
(text)

SC "Pathways" brochure for IT (cover) (text)

NSB report on science teachers

South Carolina's "computer science"
requirement



Is South Carolina an Anomaly?



I suspect not...



Can We Fix the Problem?



Do we have a choice?



Some First Steps



At Least Some First Steps

New (maybe?) SC "Pathways" STEM brochure

New (maybe) SC "Pathways" IT brochure



Changes That Might Help



Suggestions for Change

Give computer science an “identity”—create a (virtual) Computer Science Department in all schools—*and create a CS major*

Get the courses labeled properly

- Literacy

- Computer science and computer programming

- Applications

- Hardware and systems

Get the university/technical college roles clarified in the minds of students and parents



Suggestions for Change

Push literacy to the middle school level
(ACM/CSTA Level I)

Develop a good ACM/CSTA Level II course as
the default “computer science requirement”

Establish a better path for teacher preparation

Get business behind the changes!



The Game Plan

University expertise for the intellectual background of the discipline

High school and College of Education involvement for the process issues

Business/industry backing for justification



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The End



Things I Tell Students



The World Changes

Compared to my *university's* computer when I was a graduate student, my *laptop* is

15,000 times cheaper

10,000 times physically smaller

with 500 times more memory

and 1000 times more hard disk

and is 1500 times faster

Storing Microsoft Vista on a disk takes about 1.4 million times more space than was present on the lunar landing module on 20 July 1969.



The Basic Game Plan

1. A solid technical background – because you won't be able to fake it.
2. The ability to read, write, and present technical information – because the CEO is likely to be a nontechnical person.
3. The ability to work with people – because nearly all projects are bigger than just one person can do.



What's Your Second Favorite Thing?

Most people don't just work on the computer—they use the computer to do something else.

Computer engineers deal with computing hardware, real-time, and the outside world.

Business applications people do business.

Computer scientists can do music, science, animation/graphics/art, biology, law, ...



Your Goals

Not just to be trained and get Microsoft/Oracle/Cisco certifications

But to be **educated** in computing

Not to learn to be a lifelong programmer

But to know programming so you can **manage** programmers ten years from now

Not to be trained on today's Package A

But to learn how to re-educate yourself with Package B in 2008, Package C in 2009, Package D in 2010, ...



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