

OACTE 2008

Science **T**echnology **E**ngineering **M**ath

*With All Your Concerns, Why
Should You Care?*

STEM Nationally

**"Five years ago, we had 2,000
undergraduates majoring in computer
sciences. Today we have 850," said J.
Strother Moore, who chairs the
computer sciences department at UT.**

By ANDREW SMITH / The Dallas Morning News

*Care because you can use STEM & CTE
to reinforce teaching & learning*

1. Better School **Report Cards**
2. Avenues to meet new **graduation requirements**
3. Access funding, leverage **resources**
4. Prepare students for high wage/demand **careers**
5. Connect academic learning to the **real world**
6. Provide **scholarship** opportunities for students
7. **All level** of students

1. School Report Cards

- CTE students score higher on NAEP and Oregon benchmark tests
- Students taking multiple CTE classes are less likely to drop out



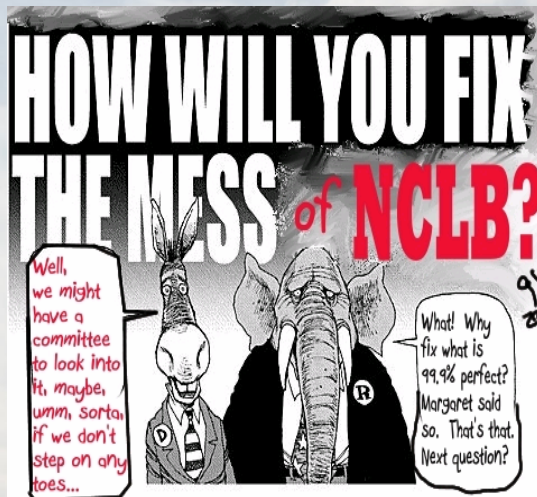
YAP - NCLB

ODE's CTE Snapshot

CTE repeater students
(more than one course)
score higher than the
general population, 2006-
2007

Anecdotal

MECA,
North's Computer stats



Project Lead the Way

1. Is achieving proportional representation of races /ethnicities, and is doing much better than universities.
2. The rate at which PLTW graduates immediately enroll in college is 10% higher than the national average.
3. The rate at which PLTW graduates pursue math, science, engineering and technology is three times higher than the national average.
4. It appears that PLTW students do well in their first year of college.

2. New Graduation Requirements

- Reinforce and practice algebra and above
- Learn about careers
- Fulfill the World Language/Fine Arts/CTE requirement
- Project-based learning
- Credit by proficiency opportunities

3. Funding, Leverage Resources

- Funding Opportunities
 - Perkins IV
 - School Improvement Funds – CTE an approved use
- Leverage Resources
 - Local Consortia (e.g, PAVTEC, MWEC)
 - Community Colleges – College Credit Now
 - PLTW/OIT, Industrial groups

4. High-Wage, High-Demand Careers

- Employment ready = College ready
- Family-wage jobs/careers need post-secondary training
- 21st century skills are STEM skills
- STEM jobs – Engineering and computer science jobs are growing and pay well



Matt Clinebell (left) & Terrence Woods

Jobs are there and will be there

COMPUTING PROFESSIONS

Projected Job Growth from 2006 to 2016: **806 Thousand Jobs**

While the computing professions have far more flexible entry requirements than engineering, **computing has become the job growth gorilla of the 21st century. In fact, computer-related majors are now challenging engineering majors for the distinction of having the highest starting salaries for bachelor degree graduates.**

ENGINEERING

Projected Job Growth from 2006 to 2016: **171 Thousand Jobs**

GENERAL DESCRIPTION: *Engineering is the second largest profession in the United States (K-12 teaching is number one)* and typically has demanded the highest starting salaries for new bachelor's degree graduates (a position now challenged by computer science majors). The job market encompasses the entire United States and so engineers can almost always get work if they are willing to move.

Opportunities

Didn't the opportunities in the field disappear when the dot-com bubble collapsed in 2000?

In fact, most analysts predict that the number of people trained for jobs in the computing industry will fall far short of the employment demand. An article in the July 24, 2006 issue of Forbes cites statistics indicating that "U.S. businesses will need 135,000 new computer professionals each year, but colleges and universities are graduating only about 49,000 computer science majors annually"—less than half the number needed. As a result of this shortfall, job prospects for graduates in the computing disciplines are expected to remain excellent throughout the next decade. ¹

Opportunities

Aren't all high-tech jobs moving to India and China?

* This myth appears to be entirely without foundation. Because of the enormous demand for people with strong information technology and computing skills, the opportunities for software engineers and other information technology professionals are expanding in Asia, just as they are everywhere else. The available evidence shows that **even though some jobs are being moved offshore, the number of new computing jobs created in the United States is substantially higher**. ²

* Traditional computer programmer jobs are declining in the United States and many are moving overseas. **However, jobs dealing with data bases, software engineering, systems support and administration, as well as systems analysts are booming.**

* Revenues from the **gaming industry alone have now past revenues from Hollywood movies**. But, with computer generated graphics and animation, even Hollywood has become infused with computing related jobs.

Not all STEM jobs are in High Tech

- 53% of “high tech” jobs are **not** in high tech per Oregon Employment Department:
 - Computer jobs: financial, insurance, retail, transportation and other industries – they are more likely to require a college degree than in previous years.
 - Engineering and technician jobs available in manufacturing, transportation, public works.
 - Human Genome project - the computer is becoming a 21st century microscope for analyzing data in the life sciences.
 - Computer science is a foundational and marketable tool for almost any college major.

Salaries

Oregon
Jobs

US
Jobs

5. *Real World*

- Job shadows
- Work/study credit :
 - In-house interns
 - Other schools, businesses
- Internships paid:
 - school
 - businesses

6. *Scholarships*

Foundations:

Gates – Jose Alvarado, Martha Martinez
Society of Women Engineers
Saturday Academy ASE
Computer Science Teachers Association
Other Matt Clinebell - Barco



Internships:

OSU, PSU, OIT – MECOP/CECOP program – many student interns earn \$30,000 in internships in a five year Bachelor's program

7. All Levels of Students

Elementary, Middle school:

Robotics – www.ortop.org

Alice, Scratch {Scratch link: <http://scratch.mit.edu/about>}

High school:

Cisco – CCNA certification

Project Lead the Way (PLTW)

Interns:

Help desk, networking, instruction:

Working for State – Michael Hornaday I4

ACM K-12 in progress



All Levels of Students

Community College:

Networking: CCNA, CCNP

Nanotechnology

...

University:

AP Computer Science – Physics – Calculus...

Existing programs/standards:



Covering Costs

Labs:

Use existing equipment to create

Software – Free!!!

Alice, Scratch → elementary-mid

Python → mid-high school

Java → high school



Funding

- Perkins IV
- Education consortia supporting CTE – MWEC and Chemeketa
- School improvement funds – improving CTE an approved use
- OPAS
- Potential:
 - OIT
 - TechStart



Footnotes

- 1: ACM → http://computingcareers.acm.org/?page_id=5
- 2: ACM → http://computingcareers.acm.org/?page_id=5
- 3: The [U.S. Department of Labor Bureau of Labor Statistics Occupational Outlook Handbook](#) 2008-2009 Edition.

Links to Useful Sites

1. **ITEA:** <http://www.iteaconnect.org/TAA/TAA.html>
2. **ISTE:** <http://www.iste.org/AM/Template.cfm?Section=NETS>
3. **ACM:**
 1. Curriculum: <http://csta.acm.org/Curriculum/sub/ACMK12CSModel.html>
 2. Jobs-Salaries: <http://computingcareers.acm.org/>
4. **ODE-CTE:**
http://opas.ous.edu/Committees/Resources/Publications/ODE_OR_CTEataGlance_2006-07.pdf
5. **OPAS:**
http://opas.ous.edu///Committees/Resources/Publications/PLTWProgramEvaluation_2006-07.pdf