

Digital Divides

Computing ethics and the news: Google's new Googleplex

- <http://www.nytimes.com/2015/02/26/technology/google-plans-new-headquarters-and-a-city-fears-being-overrun.html>
- <http://www.cnn.com/interactive/2015/03/opinion/ctl-child-poverty/>
 - Obvious impacts of Google growing larger in MV
 - How to handle growth in tech companies from the community's perspective (traffic, services, real estate costs, etc.)
 - Contrast with the article dealing with SV's poor children

The Internet as a future "failed state"

- <http://arstechnica.com/information-technology/2015/02/fear-in-the-digital-city-why-the-internet-has-never-been-more-dangerous/>
 - Futuristic, but addresses many of the serious challenges the Internet, and privacy and security are now facing

Troubles with password sharing

- <http://www.bbc.com/news/technology-36772048>
- Users sharing ids and passwords to access resources (for examples movies from Netflix)
 - Someone charged with hacking under the Computer Fraud and Abuse Act (CFAA).
 - The case found the company issuing the password must give authorization, rather than the individual who may choose to share it.

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Thought Questions

1. In his campaign for the presidency in 2000, Al Gore talked about the growing gap between the digital “haves” and “have nots.” How would you decide whether that problem is in fact real today? What steps can one take to eliminate the gap?
2. Women now seem to have erased most of the gender gap that existed in terms of the *use* of computing technology. At the same time, women are falling even further behind in terms of their participation in the *creation* of that technology. What factors do you feel are most responsible for this situation?

Women CS graduates

- “The fraction of women among bachelor’s graduates decreased in CS, from 13.8 percent in 2009-10 to 11.7 percent in 2010-11.”
 - Taulbee Survey
 - http://www.cra.org/uploads/documents/resources/taulbee/CS_Degree_and_Enrollment_Trends_2010-11.pdf

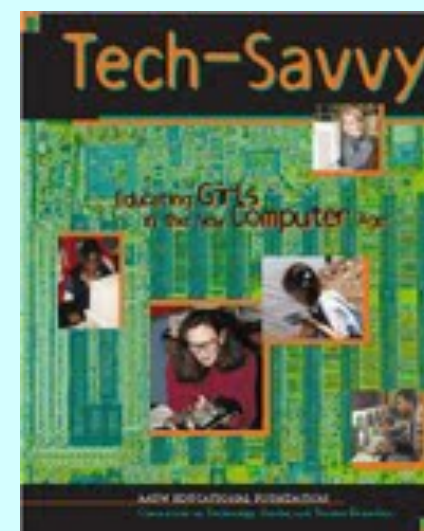
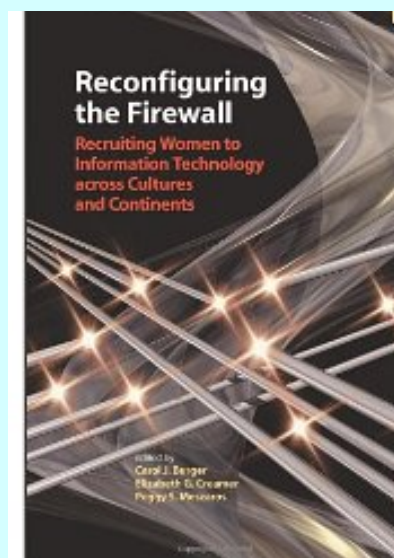
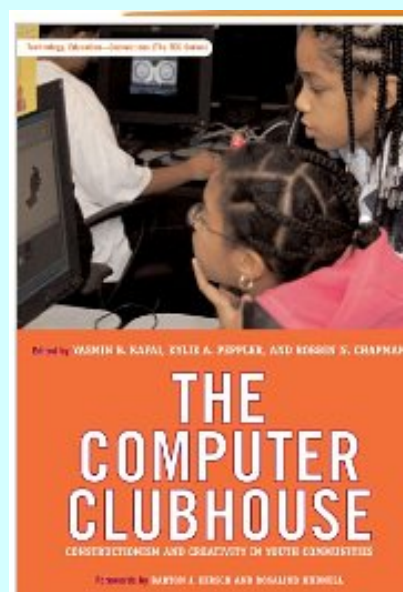
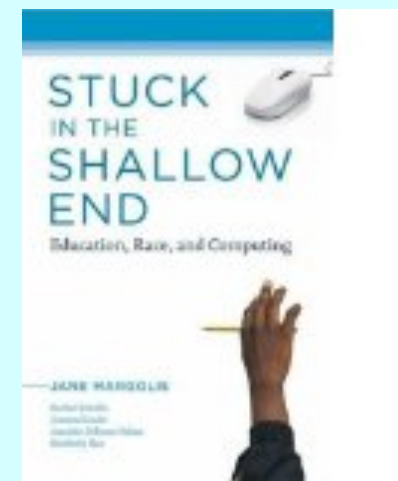
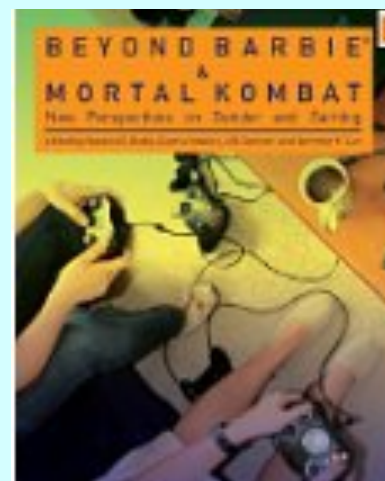
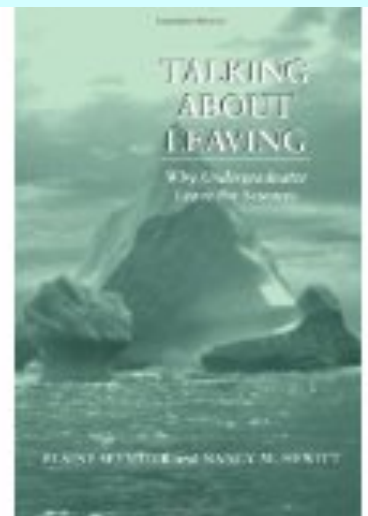
Minority CS graduation

- In 2010-2011, African-Americans earned:
 - 3.6% of Bachelors degrees
 - 1.6% of Masters degrees
 - 1.2% of PhD degrees
- In 2010-2011, Hispanics earned:
 - 5.4% of Bachelors degrees
 - 2.0% of Masters degrees
 - 1.7% of PhD degrees

According to the same Taulbee study

The Challenge of Achieving Diversity

- The percentage of women majoring in computer science is small relative to that of men.
- Participation by African American, Hispanic, and Native American students is typically even smaller.
- Statistics on diversity in computer science have not improved in recent years, despite gains in other fields.



Why Diversity is Important

- Equality of access is an important ethical principle.
- Greater diversity among those who create computing technology ensures that those technologies are relevant to and usable by a wider range of people.
- More specifically, the male-dominated tradition of computing leads to an overall culture of technological *machismo*, as evidenced by modern computer games.
- Becoming a high-productivity software developer requires a rare combination of skills, creativity, and temperament, making it all the more critical to look for such talent in as wide a population as possible.

C. P. Snow on Educating Women

It is one of our major follies that, whatever we say, we don't in reality regard women as suitable for scientific careers. We thus neatly divide our pool of potential talent by two.

— C. P. Snow, *The Two Cultures*, 1959

What Makes CS Different?

- Experience in computer use prior to college differs markedly with gender, ethnic background, and economic class; in other technical fields, prior exposure tends to be more balanced.
- The flexibility of software allows computers to reflect their cultural environment more strongly than other technologies do.
- The culture of the computing milieu is different from that found in most scientific communities. Although it is by no means universal, there is some truth in the stereotypical images attached to programming and programmers.
- Computer programming tends to encourage highly focused behavior, almost to the point of obsession.
- Differences in individual productivity are much more highly pronounced in computing than in most disciplines.

Strategies to Promote Diversity

- Work to increase the number of students taking computer science, which will tend to increase the diversity of the program.
- Redesign the introductory course sequences to make them accessible to a wider audience.
- Provide diverse role models for undergraduates at every level of the educational process, including those who are only one or two years more advanced in age and experience.
- Develop peer-support networks and offer funding for activities.
- Make sure students understand the range of opportunities in computer science.
- Establish bridge programs that target students who are at greatest risk of leaving technical fields.
- Engage undergraduates in both teaching and research.
- Give all students the opportunity to reach their own potential.

Case studies

- Stanford CS
- PACMACS
- Fondation Omar Dengo

Stanford CS

- Katie Redmond, Sarah Evans, Mehran Sahami. 2013. A Large-Scale Quantitative Study of Women in Computer Science at Stanford University. SIGCSE

Stanford CS

- Gender study of students taking introductory computing series at Stanford
- > 7,000 students from 1995-2012 who took CS106A

Factors that influenced female decisions to study CS

- Having parental (especially maternal) support
- Enjoying problem solving
- Comfort with asking questions in class
- When they took CS106A
- The use of tracks

Factors that didn't influence decisions to study CS

- Female instructors
- Women's confidence in their math abilities
- Prior experience in CS

Pathways to Careers in Math and CS (PACMACS)

- Minority HS outreach program
- West Philadelphia
- Top students from West Philadelphia, Overbrook, Lamberton, Fels, Roxborough, Martin Luther King
- Students take math and CS classes with SJU students
- Community support

PACMACS

- Seminars
 - Study skills, Being a minority on campus, Navigating college, Applying to college, Financial Aid, etc.
- Partnerships with area colleges
- Program ran 2001 – 2007
 - 10 students per year
- 50% success rate

PACMACS - assessment

- Successes
 - For the students
 - For the community
- Failures
 - Expense
 - Not outliving me

Foundacion Omar Dengo

- Costa Rican quasi-private/quasi-public foundation
- Training 60 teacher trainers
 - Single week-long workshop (with a follow-up the next year)
 - 35,000 9th graders programming with Alice

Fundacion Omar Dengo

- Challenges
 - Language
 - Diversity among Costa Rican schools
 - Teacher preparedness