ACM's Engagement in Education Policy

Bobby Schnabel,
CRA Leadership Meeting

Feb. 28 2011

Association for Computing Machinery

Advancing Computing as a Science & Profession

- ACM's Education Policy Committee
- State of K-12 CS Education
- Computing in the Core

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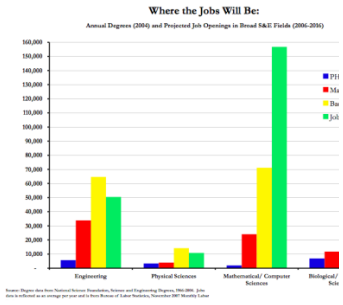
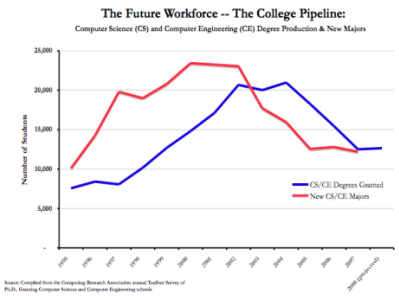
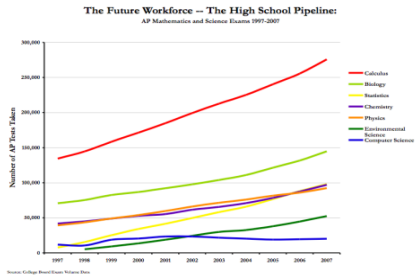
Emergence of the ACM EPC

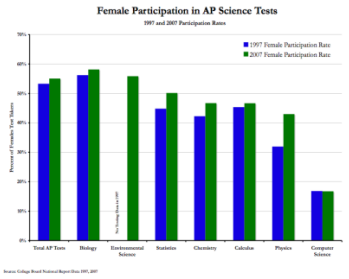
- **The context**
  - A confluence of several factors and reports raising concerns about the ability of the US to stay globally competitive
  - Increased focused on the need to invest in science/math education
  - Serious concern that computing and computer science would be left behind or misunderstood in discussions focused on investment in STEM education

- **The data**









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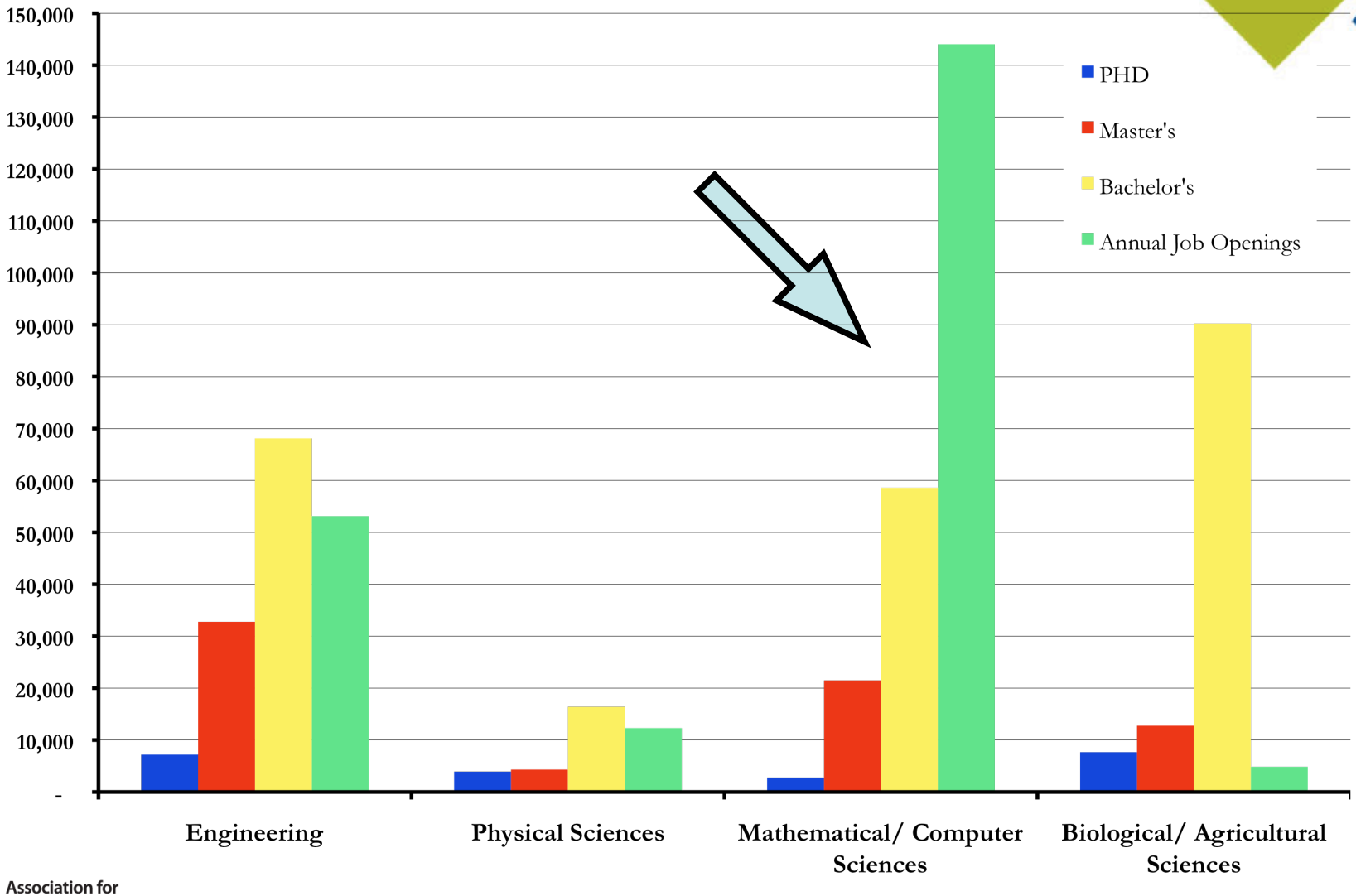
The Jobs Will Be In Computing

Annual Degree Production (2006) and Annual Projected Job Openings in S&E Fields (2008-2018)



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Access to Rigorous CS is Diminishing

Schools offering introductory (or pre-AP) Computer Science courses, change from 2005 baseline:

	2007	2009
Yes	**-6%**	**-17%**

Source: Computer Science Teachers Association survey data of high schools

Schools offering AP Computer Science courses, change from 2005 baseline:

	2007	2009
Yes	**-20%**	**-33%**

Source: Computer Science Teachers Association survey data of high schools

ACM Education Policy Committee

- Established by ACM Council in July 2007
- Members
  - Bobby Schnabel (Chair), Indiana University
  - Stacey Armstrong, AP Computer Science Teacher Cypress Woods HS
  - Robert D. Campbell, CUNY Graduate Center
  - Fred Chang, University of Texas
  - Joanna Goode, University of Oregon
  - Susan Rodger, Duke University
  - J Strother Moore, University of Texas
  - Mark Stehlik, Carnegie Mellon University
  - Chris Stephenson, Computer Science Teachers Association
  - Ex officio
    - Eugene Spafford, Purdue University (Chair, USACM)
    - John White, ACM CEO
    - Cameron Wilson, ACM Director of Public Policy

ACM Education Policy Committee

- **Organizations represented on the ACM EPC**
  - **CSTA**
  - **NCWIT**
  - **SIGCSE**
  - **Two-year colleges**
  - **CRA**
  - **High school computer science teachers**
  - **AP computer science community**
- **This reach enables the ACM EPC to speak/advocate on behalf of the community with a single voice**

State of K-12 CS Ed.

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Initial Research

- Science, Engineering, Technology and Mathematics (STEM) education often doesn't include computer science
- Often considered the "T", but a poor fit
  - Doesn't technology literacy, technology IN education = computer science knowledge?
  - Computing in T often focused on the use of technology word processing/ spread sheets/web surfing
  - Definition of technology is slippery at best
  - T course are often focused on voc. edu., not college-bound students
- <u>Key Issue: CS is not part of the core</u>

EPC's Initial Agenda

- Reached out to national groups (CCSSO, NGA, Achieve, NRC, NSTA, etc.) to define what CS education is
- Developed Computer Science Education Week
- Developed the Computer Science Education Act
- Reached out to numerous agencies to:
  - clarify that K-12 CS should be based on conceptual knowledge and adopted standards by the community
  - clarify that CS should be eligible to participate in "STEM" focused programs

Ingredients for Success

- **Education policy must support:**
  - **Curricular standards and curriculum**
  - **Courses/Credit for Courses**
  - **Teachers**

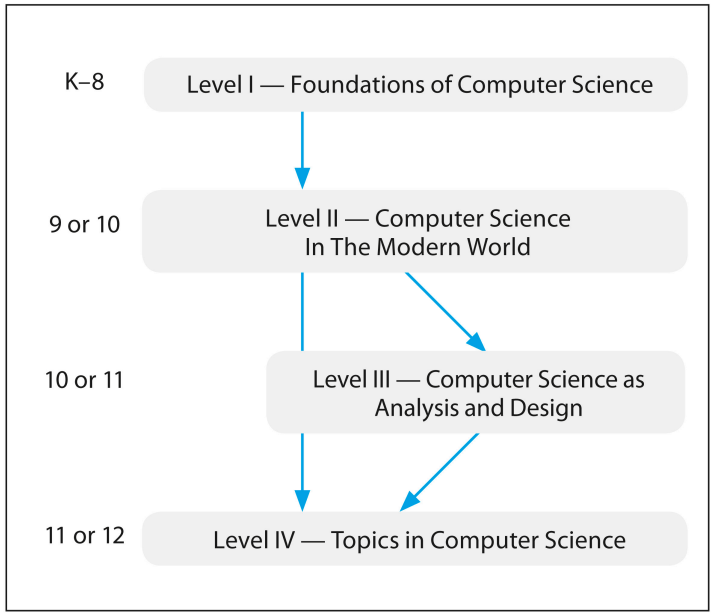
http://www.acm.org/runningonempty/

- **Survey of state education authority documents in all fifty states to answer two specific questions:**
  - **To what extent have states adopted the ACM/CSTA model curriculum standards?**
  - **How does the state treat high school computer science courses in terms of what it "counts" for a student's graduation requirements?**

What is Computer Science Education?

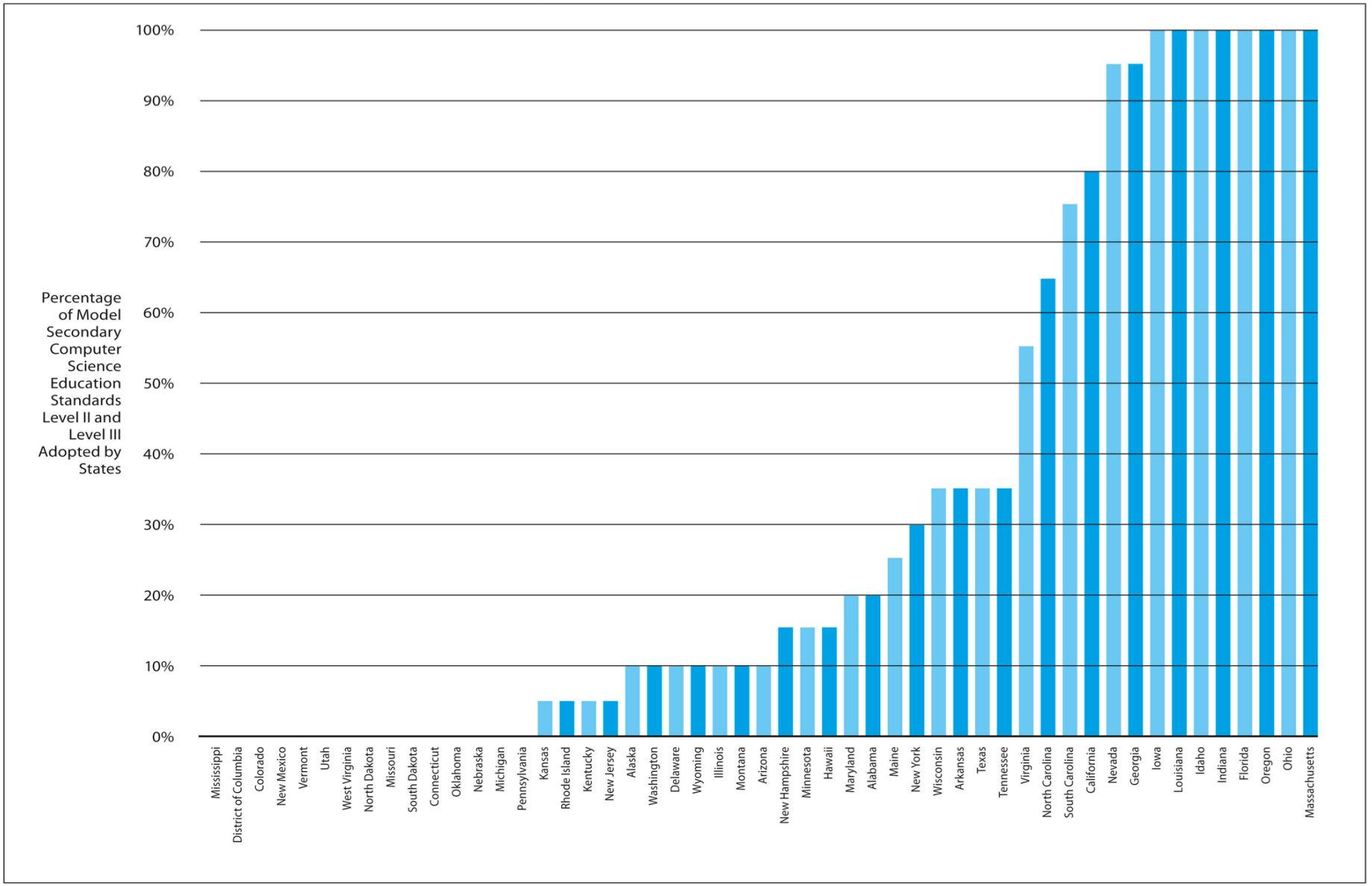
- A deep amount of confusion with terms:
  - Computer science
  - Technology literacy and fluency
  - Information Technology
  - Education technology/computing across the curriculum
  - Computing education
- ACM/CSTA has grade appropriate model standards for computer science education help define computer science. (Figure 1)

FIGURE 1 **Framework for ACM/CSTA Model Computer Science Standards**



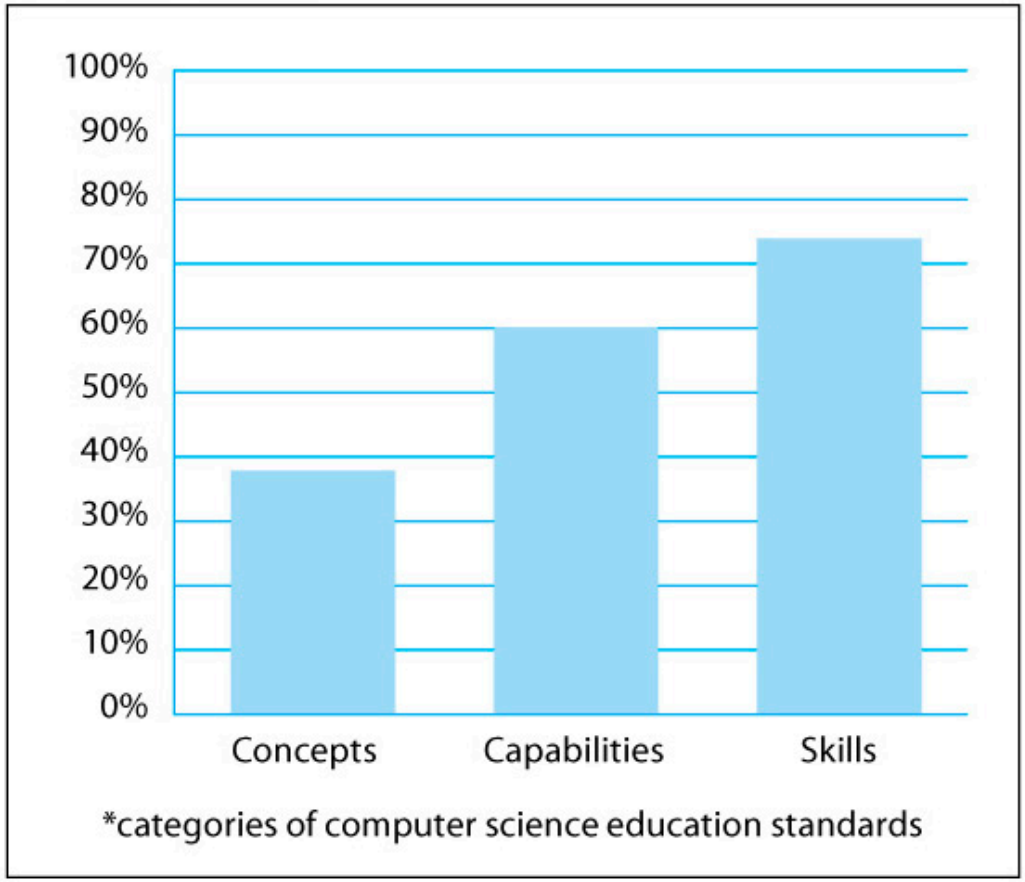
Findings: Standards

FIGURE 3 **Secondary School Standards Level II and Level III Adoption by State**



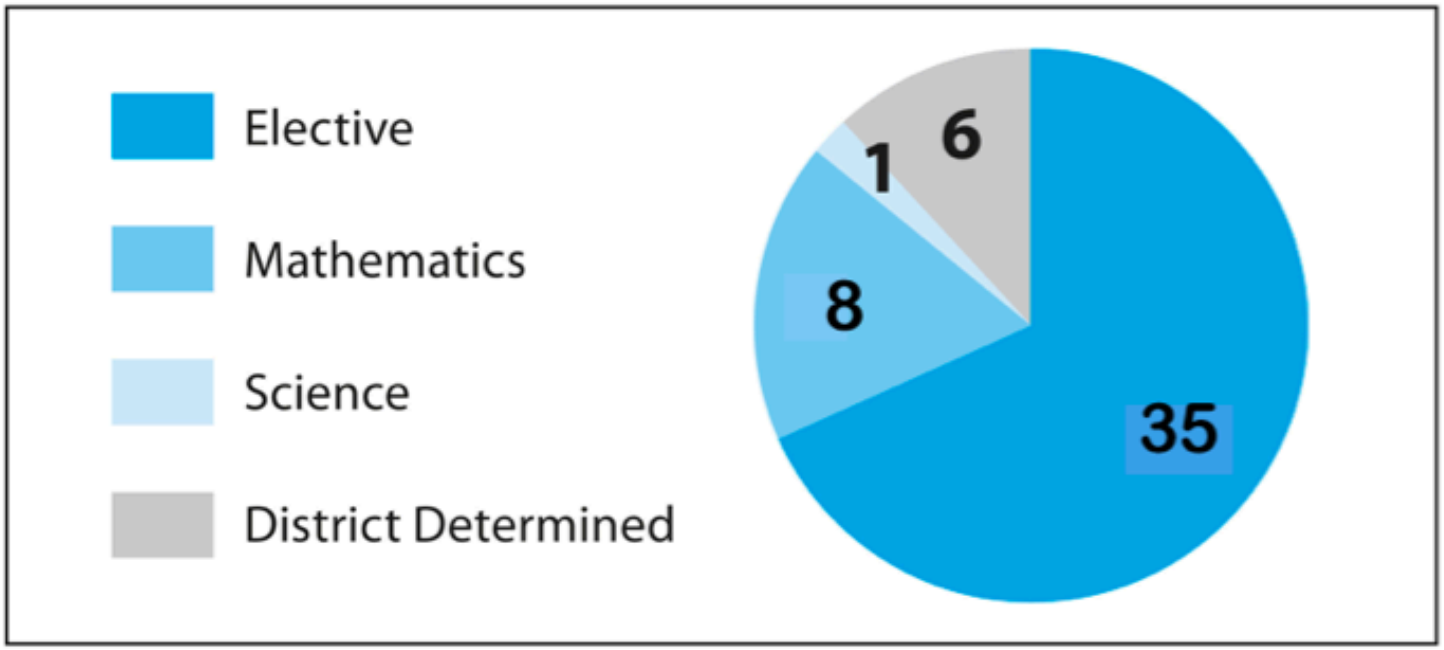
Findings: Standards

FIGURE 2 National Snapshot: Adoption of Computer Science Standards*



Findings: Graduation Credits

FIGURE 12 How Computer Science Courses Count Toward Graduation Requirements



Teacher Certification

- **In 2008, CSTA released a major report assessing state certification programs for computer science teachers:**
  - **The current computer science teacher certification system lacks clarity, understanding, and consistency.**
  - **Where certification or endorsement requirements do exist, they often have no connection to computer science content.**

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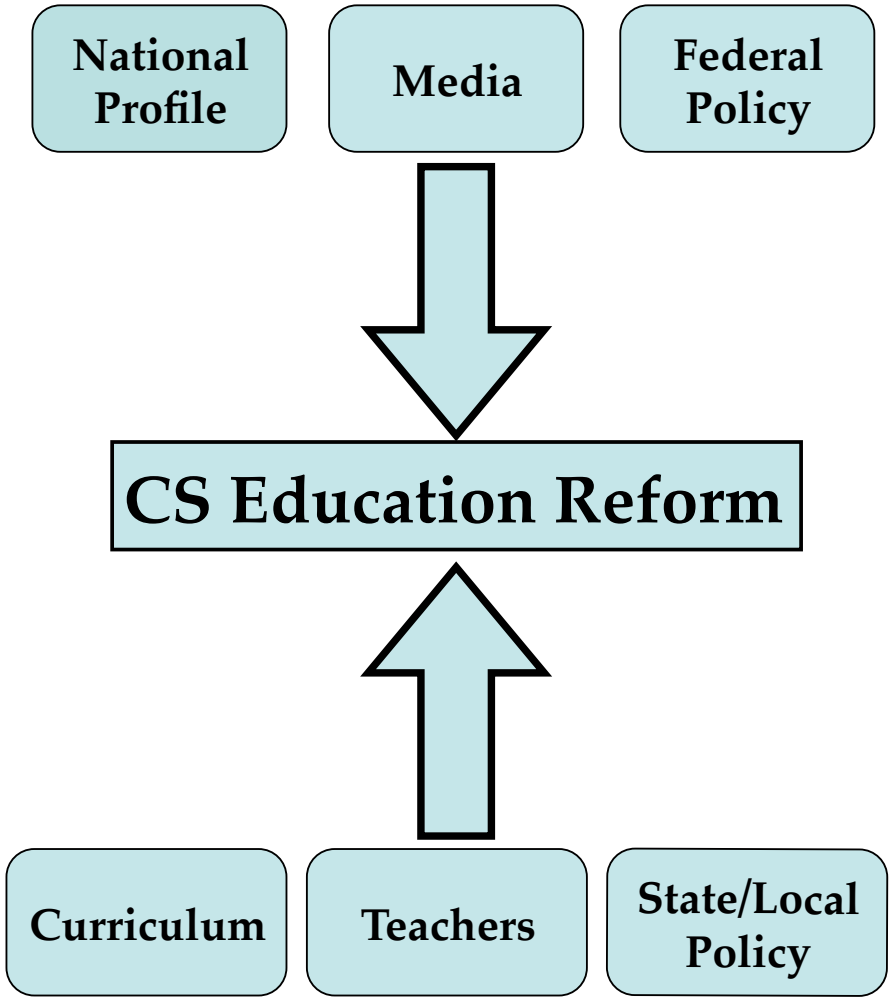
Strategy for Reform

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sas


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COMPUTING IN THE CORE

– a non-partisan advocacy coalition of associations, corporations, scientific societies, and other non-profits that strive to elevate computer science education to a core academic subject in K-12 education, giving young people the college- and career-readiness skills necessary in a technology-focused society. CinC encourages awareness building activities, policy changes, and research at national, state, and local levels to build a strong foundation for the future of computer science instruction. It will engage federal and state policy makers, educators, the public, and the media to meet these goals. www.computinginthecore.org

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10/6 Launch


National
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Club
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Norm Augustine


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Computing in the Core

- **Three strategic goals:**
  - **Influence Federal Policy to Strengthen K-12 CS Education**
  - **Raise Awareness**
  - **Influence State Policy to Strengthen K-12 CS Education**

- **Some Key Messages:**
  - **Job projections are strong**
  - **Pipeline is stressed and K-12 CS is fading**
  - **CS is critical to innovation**
  - **Need to refocus curriculum on exposing students to creating technology, not just consuming it**

CinC Strategic Goal #1 -- Federal Policy

- **Computer Science Education Act**
- **Regulatory/Implementation Issues**

111TH CONGRESS
2D SESSION

H. R. 5929

To provide grants to State educational agencies and institutions of higher education to strengthen elementary and secondary computer science education, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

JULY 29, 2010

Mr. POLIS of Colorado introduced the following bill; which was referred to the Committee on Education and Labor

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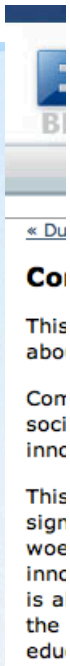
A BILL

To provide grants to State educational agencies and institutions of higher education to strengthen elementary and secondary computer science education, and for other purposes.

CinC Strategic Goal #2 -- Awareness



- **Snapshot for 2010, some metrics:**
  - **1733+ "pledges"**
  - **+100 events "around the world"**
  - **+150 activity pledges**
  - **Pledges from at least 34 other countries, including events/activities in other countriesCanada was especially active, with their own website highlighting 25 campuses hosting events**
  - **34% of the support pledges came from K-12 students, 17% from college/univ. students, 15% from college/univ. professor or staff, 8% corporate professionals, 13% from K-12 teachers, 5% parent or community member, 1% K-12 administrator or counselor.**
  - **97 resources**
  - **Social Media:**
    - **Facebook: 2,047 likes**
    - **Twitter: 708 followers**
    - **YouTube: 6,547 channel views**
    - **Website (from Nov. 22 through Dec. 12):**
      - **11,999 visits**
      - **39,756 page views**
      - **Average pages per visit: 3.45**
      - **Average time: over 3 minutes**

traffic from 100 countries

Perry. At Bradley University in Illinois, students organized a digital gaming competition. And in Palo Alto, CA,

Next Steps for CinC

Overarching Goal:

- Expand our reach, bring more partners into CinC

#1. Fed Policy:
- Senate focusing on ESEA
  - Visits/Outreach on issues
  - Hill briefing on March 1
  - Retooling the CSEA

#2. Awareness:
- CSEdWeek '11:
  - Set partners and vision
  - ID resources
  - Broaden Engagement
- Continue RoE Outreach
- Specific communications projects focused on building useable resources

#3. States:
- Support where we can:
  - Texas
  - CSTA Leadership Cohort
- Focused outreach
  - CA is interesting
- Looking strategically for other engagement (end of '11, early '12)