Working Together to Improve K-12 Computer Science Education: Building New Partnerships

The Computer Science Teachers Association
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Speaker Introductions

• Robb Cutler:
  – Chair, Computer Science Teachers Association

• Chris Stephenson:
  – Executive Director, Computer Science Teachers Association
Agenda

• CSTA: How and Why
• Welcome to My World
• Identifying the Issues that Affect K-12 and College/University
• Working Together to Provide Solutions
Brief History

- 1999 Discussion at NECC regarding possible support ACM could provide to high school CS educators
- 2000 ACM Forms the K-12 Education Task Force
- 2000 first CS&IT Symposium held for high school teachers (hosted by ACM and ISTE in Atlanta)
- 2002 Curriculum Task Force begins meeting: Chaired by Allen Tucker
- 2002 Survey of AP high school teachers to determine OO learning needs
- 2002 JETT project launched in partnership with universities
- 2003 Task Force publishes *ACM Model Curriculum for K-12 Computer Science Education*.
- 2004 Task Force conducts first National Survey of High School Computer Science Education to determine current issues in high school CS education
- 2005 CSTA launched as a membership organization representing K-12 computer science
Why CSTA

• ACM members were expressing concern about K-12 computer science education and wished ACM to take a larger role
• The K-12 Education Task Force had uncovered a series of systemic problems that required immediate attention
• There was no existing body that spoke to the issue of K-12 computer science education from the perspective of the practitioners
• It was clear that pre-computer science education was under attack and at risk of disappearing if action was not taken to address core concerns
• There was a profound need for both action and advocacy
Key Issues Identified by Research

- Shrinking pipeline
- Underrepresented populations
- No national curriculum standards
- Inappropriate and ineffective teacher certification
- Teachers feeling isolated and in need of community
- No opportunities for skills upgrading
- A feeling of disconnect between K-12 CS educators and their college/university colleagues
- No strong voice to educate administrators, legislators, and congressional committees about the link between supporting K-12 computer science education and international economic issues
What Is CSTA?

- CSTA is a limited liability organization under the auspices of ACM
- CSTA is a membership organization
- CSTA is an advocacy organization
- CSTA is a provider of professional development opportunities for teachers
- CSTA is a provider of research
- CSTA is a provider of resources
- CSTA is many things to many people
What Is CSTA’s Mission?

The Computer Science Teachers Association is a membership organization that supports and promotes the teaching of computer science and other computing disciplines. CSTA provides opportunities for K-12 teachers and students to better understand the computing disciplines and to more successfully prepare themselves to teach and learn.
CSTA’s Goals and Objectives

Creating a community of individuals and organizations working together to address critical issues in K-12 computer science education.

- **Promote a Better Understanding of Computer Science**: Provide visibility, influence policy, and generate resources that illuminate computer science as an essential academic discipline.
- **Develop Research and Resources**: Conduct original research and serve as a direct-to-practitioner channel for the dissemination of research and resources that addresses current knowledge gaps.
- **Support National Standards**: Facilitate the implementation of national curriculum and teacher certification standards to support consistent excellence in learning and teaching.
- **Support Teacher Excellence**: Provide multiple levels of professional development to improve teachers’ technical knowledge and pedagogical skills.
- **Opportunities**: Promote computer science as a field of study and as a career destination that provides a wealth of opportunities to students regardless of their gender, race, or socio-economic status.
CSTA’s Structure

- CSTA Executive Director
  - Newsletter Editor
  - JETT Coordinator
- CSTA Chair
  - Vice-Chair
  - Directors
    - Standing Committee Chairs
    - Project Chairs
    - Volunteers
- CSTA Advisory Council
Welcome to My World: A Day in the Life of a High School CS Teacher

- Class sizes
- The number of teaching periods per day
- Requirement to teach students of vastly different learning levels in a single class
- Requirement to teach all students, not just those who like or are good at computer science
- Feeling like the only CS teacher in the world
- The battle for respect
- The battle for funding
- Playing politics
Shared Issues for K-12 and University

• Trying to find a curriculum that meets student’s needs and ensure adequate preparation for the next level

• Making sure that high school educators are prepared to address the discipline:
  – Why we care about teacher certification
  – Why we care about professional development
  – Why we care about a dialogue between K-12 and post-secondary

• Working together on pipeline issues (it all begins in K-12)
Curriculum Solutions

• *The ACM Model Curriculum for K-12 Computer Science*  
  http://csta.acm.org/Curriculum/sub/ACMK12CSModel.html

• Online resource materials to support the ACM Model Curriculum:  
  The Outlines and Objectives Documents  
  http://csta.acm.org/Curriculum/sub/ACMK12CSModel.html

• *The New Educational Imperative: Improving High School Computer Science Education*: a comprehensive white paper bringing together U.S. and international research to provide practical solutions for achieving long-term systemic improvement  
  (in press)
Teacher Preparation Solutions

• JETT: Java Engagement for Teacher Training workshops offered in partnership with colleges and universities across the country (60 workshops held to date)
  
  http://jett.acm.org/

• TECS: Teacher Engagement for Computer Science introductory CS workshops offered in partnership with colleges and universities across the country (11 workshops held to date)
  
  http://tecs.acm.org/

• The annual Computer Science and Information Technology Symposium (professional development for over 700 teachers across the country). 7th CSIT Symposium: July 8th in San Diego
  
Resource & Information Solutions

• The Teacher Certification database: a state-by-state list of computer science teacher certification requirements and contacts (now under construction)

• The CSTA web repository: A national repository of resources and learning materials (now under construction)

• National research initiatives providing cutting edge data on the state of K-12 computer science education

• Careers in Computing Poster (for high school and middle school classrooms): in partnership with ACM-W
Resource & Information Solutions cont.

• The CSTA Voice: a quarterly newsletter focusing on key issues and resources for computer science educators
  http://csta.acm.org/Publications/Publications.html#ptop

• CSTA Advocate Blog: a informal blog for discussion of key organizational issues and programs
  http://blog.acm.org/csta/

• CSTA Information brochure for policy-makers

• Building an international community
Key Partnerships

• Other key ACM Educational Constituents:
  SIGCSE
  ACM Education Board
  ACM-W

• CSTA Advisory Council
  Fran Allen (IBM)       Gail Chapman (The College Board)
  Phillip Gibbons (Intel) Maria Klawe (Princeton)
  Carroll McGillin (Cisco) Greg Papadapoulos (Sun)
  Debra Richardson (U Cal Irvine) Eric Roberts (Stanford)
  Kevin Schofield (Microsoft)

• Corporate Sponsors:
  IBM            Microsoft       Sun
Why Work Together?

• The pipeline issues begin long before they get to your doors
• Improved communication channels mean everyone is better informed
• K-12 teachers need you to understand their issues
• K-12 teachers need your support to keep their knowledge and skills current
• Improvements to K-12 computer science education will improve student preparation for college and university
• Your research can inform our work
• Our research can give you a better understanding of K-12 computer science
• There is more than enough work to do
Ways to Work Together

• Become an individual member
• Have your department become an institutional member
• Work on a CSTA volunteer committee (curriculum, equity, professional development, publications, policy, standards and certification)
• Host a JETT or a TECS workshop
• Offer to present at a CSTA event
• Serve on the CSTA Board of Directors
Contact Information

Robb Cutler
Chair, CSTA
Phone: 408-345-9252
Fax: 408-984-2325
robbcutler@csta.acm.org
cstephenson@csta.acm.org

Chris Stephenson
Executive Director, CSTA
Phone: 1-800-401-1799
Fax: 1-541-687-1840