Engaging the Snowbird Community in Supporting K-12 Computer Science

Chris Stephenson
Agenda

• Why CS K-12 education is important
• K-12 CS in the national landscape
• The need for a national efforts
A Little CSTA Context

• An international membership organization of 12,000 members
• 37 chapters in the U.S. and Canada
• Develops and publishes the de facto national standards for K-12 CS education
• Provides professional development for teachers
• Conducts and publishes research
• Provides classroom resources and CS promotional materials
Knowledge for Today and Beyond

We consider it critical that students be able to read and write and understand the fundamentals of math, biology, chemistry and physics. To be a well-educated citizen in today’s computing-intensive world, students must have a deeper understanding of the fundamentals of computing as well.
## Very Scary Numbers

### Schools Offering Introductory Computer Science

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2007</th>
<th>2009</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schools Offering Introductory Computer Science</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>78%</td>
<td>73%</td>
<td>65%</td>
<td>69%</td>
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</table>

### Schools Offering Advanced Placement Computer Science

<table>
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<th>2005</th>
<th>2007</th>
<th>2009</th>
<th>2011</th>
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<tr>
<td>Schools Offering Advanced Placement Computer Science</td>
<td></td>
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</tr>
<tr>
<td>%</td>
<td>40%</td>
<td>32%</td>
<td>27%</td>
<td>36%</td>
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</table>
High School Advanced Placement
Exams 1997-2011

Calculus 9.7%
Biology
Statistics
Physics
Chemistry
Envt'l Science

Calculus represents the combined data of Calculus AB and BC. Physics represents the combined data of Physics B, C: Electricity and Magnetism, and C: Mechanics. Computer Science represents combined data of Computer Science A and B.
CS and Social Justice

• Students from minority homes are far less likely to be exposed to computer science knowledge in their home environment.

• Schools with high numbers of underrepresented minority students are far less likely to have access to rigorous computer science courses in schools.

• Access to this privileged knowledge has become a social justice issue of the 21st century.
Female CS Test Takers

Joanne Cohoon, University of Virginia, 2012
National School Enrollment and APCS Exam Participation by Race and Gender

<table>
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<tr>
<th>Race/Gender</th>
<th>Enrollment</th>
<th>APCS Exams</th>
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</thead>
<tbody>
<tr>
<td>American Indian</td>
<td>1.3%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Asian</td>
<td>5%</td>
<td>23%</td>
</tr>
<tr>
<td>Black</td>
<td>17%</td>
<td>3%</td>
</tr>
<tr>
<td>Latino</td>
<td>19%</td>
<td>6%</td>
</tr>
<tr>
<td>White</td>
<td>57%</td>
<td>67%</td>
</tr>
<tr>
<td>Female</td>
<td>49%</td>
<td>15%</td>
</tr>
<tr>
<td>Male</td>
<td>51%</td>
<td>85%</td>
</tr>
</tbody>
</table>
Findings: Standards

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

http://www.acm.org/runningonempty/fullreport.pdf  2010
Tool Users vs Tool Builders

• Using technology tools is an important skill; however it is not where innovation happens.
  – Flying a plane is not the same as designing a plane.

• We need technology “tool builders” to create the tools that will solve problems and improve lives.

• Computer science creates tool builders.
Systemic Issues

• CS is an elective
• CS does not count for graduation
• CS is often listed as a Technology Credit
• Access to rigorous computer science courses is limited to high-end schools with low minority populations.
• Teacher certification is a mess.

If we are going to achieve a true renaissance in CS education in K-12 we need to make both curriculum and policy changes at the state and national level and we need to work together as a community with:

— Common goals
— A consistent message
— Focused effort at state and national level