The Impact of Meaningful High School Computer Science Experiences in the Chicago Public Schools

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Bureau of Labor Statistics

- Computer and mathematical occupations group 5th fastest growing of 22, only behind categories with substantially lower wages.
- Computer and mathematical group 3rd highest in income, with wages about 3 times as large as category leading in growth projections.
- 7 of the 10 largest STEM occupations are related to computers.
- 93 of the 100 STEM occupations had mean wages significantly above the all-occupations average.
## Underrepresented groups

<table>
<thead>
<tr>
<th>Category</th>
<th>Women</th>
<th>African-Americans</th>
<th>Hispanics</th>
</tr>
</thead>
<tbody>
<tr>
<td>computer/mathematical jobs</td>
<td>25.6%</td>
<td>8.3%</td>
<td>6.6%</td>
</tr>
<tr>
<td>population</td>
<td>50.8%</td>
<td>12.6%</td>
<td>16.3%</td>
</tr>
<tr>
<td>computing B.S. degrees</td>
<td>15%</td>
<td>4%</td>
<td>8%</td>
</tr>
<tr>
<td>CS enrollments</td>
<td>21%</td>
<td>5.6%</td>
<td>9.6%</td>
</tr>
</tbody>
</table>
Exploring Computer Science curriculum

● Developed and initiated in Los Angeles
● In over two dozen Chicago high schools in 2012--13 and continuing to grow.
● Significant impacts on student interest and motivation. (Cognitive impacts at a more incipient stage of investigation.)
349 students from 7 teachers (48% female, 36% Hispanic, 19% African-American) asked for

- gender, year, race, math grades
- interest in taking another CS course
- interest in various college majors
- responses on a 5-point Likert scale to various attitudinal items:
Likert categories

- awareness of the computing field and its diversity ($\alpha = 0.84$)
- perceived value of the ECS course ($\alpha = 0.74$)
- utility of computer science as a field ($\alpha = 0.72$)
- persistence in solving computer science problems ($\alpha = 0.63$).

$\alpha =$ Cronbach reliability
Results

- Perceived value of the class 3.9 out of 5, with no gender or racial/ethnic differences
- High rating reinforced by open-ended comments.
- 74% of students indicated increased interest in taking another computer science course as well as in majoring in computer science.
- Re majoring in science, engineering, and mathematics, somewhat of an increase of interest, but neutral responses two to three times as common.
Two policy-related findings

- Counselors should capitalize on across-the-board increased interest in taking another class by ensuring that this interest translates into registrations for subsequent computer science courses.
- Starting early with ECS capitalizes on higher feelings of utility during sophomore year and creates a trajectory for students to take AP computer science as seniors.