“Aligning ICT/DM Common Core to Employer Competency Expectations”

Oakland, California, Friday, March 22\textsuperscript{nd}, 2013

This event is funded in part by the National Science Foundation and the California Community College Chancellor’s Office
Hard Times

Economy

Schools

1%
21st Century
What is ICT?

An umbrella term to encompass all rapidly emerging, evolving & converging:

– computer,
– software,
– networking,
– telecommunications,
– Internet,
– programming,
– information systems, and
– digital media technologies.
ICT is a super-set term.

Does it use a computer chip?

Does it use electrons to allow people or devices to communicate?

It does not replace any sub-set terms.
ICT

Googlable
OH WOW! PARADIGM SHIFT!
<table>
<thead>
<tr>
<th>Rank</th>
<th>Name</th>
<th>Company</th>
<th>Net Worth</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Bill Gates,</td>
<td>Microsoft</td>
<td>$66B</td>
</tr>
<tr>
<td>#3</td>
<td>Larry Ellison,</td>
<td>Oracle</td>
<td>$41B</td>
</tr>
<tr>
<td>#11</td>
<td>Jeff Bezos,</td>
<td>Amazon</td>
<td>$23.2B</td>
</tr>
<tr>
<td>#13</td>
<td>Sergey Brin,</td>
<td>Google</td>
<td>$20.3B</td>
</tr>
<tr>
<td>#19</td>
<td>Steve Ballmer,</td>
<td>Microsoft</td>
<td>$15.9B</td>
</tr>
<tr>
<td>#20</td>
<td>Paul Allen</td>
<td>Microsoft</td>
<td>$15B</td>
</tr>
</tbody>
</table>

*ICT Industry = 35% of Top 20 Richest Americans*
“Black Ops II had crossed $1 billion in just 15 days, faster than the 16 days required for Modern Warfare 3 to reach the $1 billion mark”

‘Call of Duty’ Reaches $1 Billion Faster Than ‘Avatar’ - Bloomberg

passed $500 million in the first 24 hours.

1st entertainment property to set 5-day launch records 3 consecutive years across all forms of entertainment

sales for franchise >$8.4 billion worldwide, one of the most valuable franchises ever

<=$3 billion dollars worldwide, the most for any film trilogy
During the next eight years, the amount of digital data produced will exceed 40 zettabytes, which is the equivalent of 5,200 GB of data for every man, woman and child on Earth, according to an updated Digital Universe study...

To put it in perspective, 40 zettabytes is 40 trillion gigabytes -- estimated to be 57 times the amount of all the grains of sand on all the beaches on earth. To hit that figure, all data is expected to double every two years through 2020.

The majority of data between now and 2020 will not be produced by humans but by machines as they talk to each other over data networks. That would include, for example, machine sensors and smart devices communicating with other devices.

…the investment per gigabyte during that same period will drop from $2 to 20 cents.

the share of data attributable to emerging markets is now 36% and will be 62% by 2020. By then, China alone will generate 21% of the bit streams entering the digital universe.

*Computerworld, 12/11/12, Mearian*
Mobiles + Tablets = 24% of Online Shopping on Black Friday in 2012 (vs. 6% Two Years Ago), iOS 4x > than Android

% of USA Black Friday Internet Shopping Traffic From Mobile + Tablet Devices, 2010 – 2012

Note: Black Friday (11/23/12) is the day following Thanksgiving Day in USA, traditionally the beginning of the Christmas shopping season. On this day, most major retailers open early and offer promotional sales to kick off the holiday shopping season. Source: IBM Digital Analytics Benchmark

Mary Meeker, Venturebeat, December 2012
ICT

Students

ICT

Organizations

ICT

Workers

ICT

Society

ICT
Complex

Confusing

Competing Messages

Quickly Evolving

Converging

Diverging
MPICT’s Mission

to coordinate, improve and promote the quality of ICT education, with an emphasis on 2-year colleges, in:

• California,
• Nevada,
• Hawaii and
• the Pacific Territories.
Mission:

**advance ICT education programs at California community colleges and enable a diverse student population to succeed in meeting industry and business ICT workforce needs.**

This effort is funded by the Carl D. Perkins Act, administered by the Chancellor’s Office, California Community Colleges. Any opinions, findings, conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect those of the California Community College Chancellor’s office.
Champion the strategic importance of ICT:

- For economic growth and development
  - ICT industries
  - ICT employment in all industries
- For workforce development
  - ICT industries
  - ICT employment in all industries
- For education
  - ICT Workforce
  - Operations & Delivery
- For society
Tower of Babel
ICT in Education

- Improve School Operations
- Improve Teaching and Learning
- Digital Literacy
- ICT Workforce Preparation
- ICT Academic Education
How do we talk about ICT and ICT workforce in plain language everyone understands?
Breadth of Application of ICT Knowledge and Skills

ICT is Strategically Important and in Demand in Every Industry
Depth and Breadth of ICT Knowledge and Skills

ICT Users
- Everybody
  - Industry Specific
- ICT Helpers
  - Generally Applicable
- ICT Enablers
  - Enterprise Specific

ICT Creators
- R&D Innovators
  - Often Advanced Degrees

ICT Spreading
- IT Operations
  - Various Credentials

ICT Migration

Digital Literacy
California ICT Industry and Employment Outlook

ICT Industries Secondary Research

- About 46,000 companies
  - 4% of all companies
  - Ranked 12th of CA industries by firm count

Almost $172 billion in revenue
- 6% of CA private sector revenues
- 6th of CA industries by revenues

- About a million California workers
  - 4% of the workforce
  - 12th of CA industries by employee counts

- About $76 billion in wages
  - 12% of private sector wages
  - 2nd of private sector industries wages paid

- Wages per employee 2X the state average
- Significant job growth approaching 20% for ICT industries from 2006 to 2016
Combined ICT industry ranks 2nd in the state by 2008 employee wages

Source data: InfoUSA 2008
California companies anticipated 3.8% overall employment growth over the next two years, consistent with other California employment growth estimates.

However, companies that provide ICT goods and/or services expected 8.5% employment growth over the next two years, and those that did not expected overall employment to shrink by 0.4% over the next two years.
Labor Market Information

“All the IT jobs went to China and India.”

Excuse me, but I am curious as to the source of your misinformation.
The Need for Skilled IT Resources is Greater Than Ever

- In the current decade, the US, Europe, Japan, China and India will face a shortfall of 32M technical professionals
- The US needs 1.5 million additional skilled IT professionals by 2013
- Job growth around computing & business applications is increasing at 2x the rate of the overall workforce

Source: US Dept. of Labor, courtesy of IBM
Yet … the Talent Pipeline Has Been Shrinking

- Student enrollment in science & engineering has declined
- Incoming freshmen & transfer students who expressed an interest in majoring in computer science has plummeted by 59% in the last four years
- Women's interest in computer science has fallen 80% since 1998

Source: Higher Education Research Institute (HERI), courtesy of IBM
“The growing income generated by the high-tech sector and the strong employment growth that supports it are important contributors to regional economic development. This is illustrated by the local multiplier, which estimates that the creation of one job in the high-tech sector of a region is associated with the creation of 4.3 additional jobs in the local goods and services economy of the same region in the long run. That is more than three times the local multiplier for manufacturing, which at 1.4, is still quite high.”
• After dipping more than 5 percent between 2000 and 2002, employment in the computer and math sciences occupations expanded at a strong pace. Employment in this subgroup increased 23.1 percent between 2002 and 2011. The growth rate for all occupations was essentially flat during that same period. Employment in the computer and math sciences subgroup has grown by an impressive 8 percent since the beginning of the recession, a period when total employment has fallen by nearly 5 percent.

WOW!

• Of the 635,510 net STEM jobs that were added between 2000 and 2011, computer and math sciences occupations accounted for 79.8 percent. This rise increased the computer and math sciences occupations share of total STEM jobs to 55 percent in 2011, up from 52.3 percent in 2000.
In the U.S., about 7.6 million workers in 2008

- 5% of all private sector jobs
- 1 in 20 jobs
- employment growth of 14% between 2008-2018
- representing over one million new positions and 275,000 annual new and replacement jobs
In California, about 1 million jobs
- 5% of all jobs
- 1 in 20 jobs in 2010
- projections of 12% employment growth, or 130,000 new jobs between 2006 and 2016
- 46K annual new/replacement jobs
- Median ICT Workforce wage about 2X median wage for all California jobs
- 8th largest occupational cluster by # jobs.
Employers were asked about the strategic importance of ICT to the productivity of their organizations. Approximately 80% of firms either agree or strongly agree that information and communications technologies are important to the productivity of their organizations. ICT is generally more important to larger than smaller firms in the productivity of their organizations.
• ICT Companies expected 11.2% growth in ICT Workforce employment over the next two years, compared with overall employment growth expectations of 8.5%.

• Non-ICT companies expected -.4% overall employment growth, but they expected 3.7% growth in ICT workforce employment.
## Technology Salaries - United States

<table>
<thead>
<tr>
<th>Job Title</th>
<th>2012</th>
<th>2013</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Administration</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chief Information Officer (CIO)</td>
<td>$139,750 - $225,500</td>
<td>$145,500 - $234,750</td>
<td>4.1%</td>
</tr>
<tr>
<td>Chief Technology Officer (CTO)</td>
<td>$120,750 - $188,250</td>
<td>$125,500 - $195,500</td>
<td>3.9%</td>
</tr>
<tr>
<td>Chief Security Officer (CSO)</td>
<td>$115,000 - $172,250</td>
<td>$119,750 - $179,250</td>
<td>4.1%</td>
</tr>
<tr>
<td>Vice President of Information Technology</td>
<td>$123,000 - $179,750</td>
<td>$127,750 - $186,500</td>
<td>3.8%</td>
</tr>
<tr>
<td>Information Technology Manager</td>
<td>$91,000 - $130,750</td>
<td>$94,000 - $135,000</td>
<td>3.3%</td>
</tr>
<tr>
<td><strong>Applications Development (a)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manager</td>
<td>$91,750 - $130,000</td>
<td>$95,250 - $135,000</td>
<td>3.8%</td>
</tr>
<tr>
<td>Project Manager</td>
<td>$79,000 - $117,250</td>
<td>$83,500 - $124,000</td>
<td>5.7%</td>
</tr>
<tr>
<td>Systems Analyst</td>
<td>$68,500 - $97,750</td>
<td>$72,500 - $103,500</td>
<td>5.9%</td>
</tr>
<tr>
<td>Applications Architect</td>
<td>$97,500 - $132,000</td>
<td>$103,500 - $140,500</td>
<td>6.4%</td>
</tr>
<tr>
<td>Business Systems Analyst</td>
<td>$67,000 - $97,500</td>
<td>$71,000 - $103,250</td>
<td>5.9%</td>
</tr>
<tr>
<td>CRM Business Analyst</td>
<td>$71,750 - $97,750</td>
<td>$76,000 - $103,250</td>
<td>5.9%</td>
</tr>
<tr>
<td>CRM Technical Developer</td>
<td>$80,000 - $106,750</td>
<td>$84,000 - $112,750</td>
<td>5.1%</td>
</tr>
<tr>
<td>Developer/Programmer Analyst</td>
<td>$60,750 - $107,500</td>
<td>$64,750 - $114,500</td>
<td>6.5%</td>
</tr>
<tr>
<td>ERP Business Analyst</td>
<td>$75,000 - $103,250</td>
<td>$79,250 - $106,250</td>
<td>5.8%</td>
</tr>
<tr>
<td>ERP Technical/Functional Analyst</td>
<td>$80,750 - $112,000</td>
<td>$85,250 - $118,250</td>
<td>5.6%</td>
</tr>
<tr>
<td>ERP Technical Developer</td>
<td>$85,500 - $115,250</td>
<td>$88,250 - $122,000</td>
<td>5.8%</td>
</tr>
<tr>
<td>Lead Applications Developer</td>
<td>$89,250 - $123,500</td>
<td>$94,000 - $130,000</td>
<td>5.3%</td>
</tr>
<tr>
<td>Mobile Applications Developer</td>
<td>$85,000 - $122,500</td>
<td>$92,750 - $133,500</td>
<td>9.0%</td>
</tr>
<tr>
<td>Technical Writer</td>
<td>$49,500 - $78,250</td>
<td>$51,250 - $81,000</td>
<td>3.5%</td>
</tr>
<tr>
<td><strong>Consulting &amp; Systems Integration</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Director</td>
<td>$103,000 - $153,500</td>
<td>$107,250 - $160,000</td>
<td>4.2%</td>
</tr>
<tr>
<td>Practice Manager</td>
<td>$102,250 - $140,250</td>
<td>$106,750 - $146,500</td>
<td>4.4%</td>
</tr>
<tr>
<td>Project Manager/Senior Consultant</td>
<td>$94,750 - $121,750</td>
<td>$99,000 - $127,750</td>
<td>5.0%</td>
</tr>
<tr>
<td>Staff Consultant</td>
<td>$65,750 - $91,750</td>
<td>$69,250 - $96,500</td>
<td>5.2%</td>
</tr>
<tr>
<td>Senior IT Auditor</td>
<td>$94,000 - $130,000</td>
<td>$100,250 - $138,000</td>
<td>6.1%</td>
</tr>
<tr>
<td>IT Auditor</td>
<td>$81,500 - $113,250</td>
<td>$86,250 - $119,750</td>
<td>5.8%</td>
</tr>
</tbody>
</table>

(a) Add the percentage below, based on national averages, to IT salaries for the following skills:

- AJAX (Asynchronous JavaScript and XML) development skills: 6%
- Business Objects skills: 7%
- C development skills: 9%
- C++ development skills: 4%
- Hyperion skills: 7%
- Java development skills: 9%
- Java EE/J2EE development skills: 9%
- LAMP (Linux, Apache, MySQL and Perl/PHP/Python) skills: 8%
- .NET development skills: 8%
- PHP development skills: 9%
- SAP development skills: 8%
- SharePoint skills: 12%
- Visual Basic development skills: 4%
### Technology Salaries - United States

<table>
<thead>
<tr>
<th>Job Title</th>
<th>2012</th>
<th>2013</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DATA/DATABASE ADMINISTRATION (b)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Database Manager</td>
<td>$96,500-$133,500</td>
<td>$101,750-$140,750</td>
<td>5.4%</td>
</tr>
<tr>
<td>Database Developer</td>
<td>$82,000-$119,750</td>
<td>$86,500-$126,250</td>
<td>5.5%</td>
</tr>
<tr>
<td>Database Administrator</td>
<td>$79,000-$113,750</td>
<td>$83,000-$119,500</td>
<td>5.1%</td>
</tr>
<tr>
<td>Data Analyst/Report Writer</td>
<td>$61,000-$91,000</td>
<td>$64,250-$96,000</td>
<td>5.4%</td>
</tr>
<tr>
<td>Data Architect</td>
<td>$97,500-$134,250</td>
<td>$104,250-$143,500</td>
<td>6.9%</td>
</tr>
<tr>
<td>Data Modeler</td>
<td>$85,500-$117,750</td>
<td>$92,000-$126,750</td>
<td>7.6%</td>
</tr>
<tr>
<td>Data Warehouse Manager</td>
<td>$101,250-$135,750</td>
<td>$108,750-$145,750</td>
<td>7.4%</td>
</tr>
<tr>
<td>Data Warehouse Analyst</td>
<td>$88,000-$119,000</td>
<td>$93,250-$126,500</td>
<td>6.3%</td>
</tr>
<tr>
<td>Business Intelligence Analyst</td>
<td>$87,750-$123,500</td>
<td>$94,250-$132,500</td>
<td>7.3%</td>
</tr>
<tr>
<td>Portal Administrator</td>
<td>$80,500-$106,500</td>
<td>$86,500-$114,500</td>
<td>7.5%</td>
</tr>
<tr>
<td><strong>QUALITY ASSURANCE (QA) &amp; TESTING (c)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QA/Testing Manager</td>
<td>$80,250-$107,000</td>
<td>$83,250-$111,000</td>
<td>3.7%</td>
</tr>
<tr>
<td>QA Associate/Analyst</td>
<td>$55,250-$85,500</td>
<td>$57,500-$89,000</td>
<td>4.1%</td>
</tr>
<tr>
<td><strong>INTERNET &amp; E-COMMERCE (d)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior Web Developer</td>
<td>$85,750-$118,500</td>
<td>$92,000-$127,250</td>
<td>7.3%</td>
</tr>
<tr>
<td>Web Developer</td>
<td>$61,250-$99,250</td>
<td>$65,750-$106,500</td>
<td>7.3%</td>
</tr>
<tr>
<td>Web Administrator</td>
<td>$58,500-$88,250</td>
<td>$61,500-$92,750</td>
<td>5.1%</td>
</tr>
<tr>
<td>Web Designer</td>
<td>$53,750-$88,000</td>
<td>$57,000-$93,500</td>
<td>6.2%</td>
</tr>
<tr>
<td>Electronic Data Interchange (EDI) Specialist</td>
<td>$66,000-$93,500</td>
<td>$68,500-$97,000</td>
<td>3.8%</td>
</tr>
<tr>
<td>E-Commerce Analyst</td>
<td>$72,000-$103,750</td>
<td>$75,000-$108,250</td>
<td>4.3%</td>
</tr>
<tr>
<td>Messaging Administrator</td>
<td>$62,250-$90,750</td>
<td>$65,250-$96,000</td>
<td>4.7%</td>
</tr>
</tbody>
</table>

(b) Add the percentage below, based on national averages, to IT salaries for the following skills:
- IBM DB2 database skills 5%
- Microsoft SQL Server database skills 10%
- Oracle database skills 9%

(c) Add the percentage below, based on national averages, to IT salaries for the following skills:
- Performance testing (e.g., Mercury Interactive Tools) skills 5%

(d) Add the percentage below, based on national averages, to IT salaries for the following skills:
- AJAX (Asynchronous Javascript and XML) development skills 6%
- ASP development skills 4%
- C# development skills 9%
- Cold Fusion development skills 5%
- Commerce management system (CMS) skills 7%
- DCOM/COM/ActiveX development skills 5%
- Java development skills 9%
- Java EE/J2EE development skills 9%
- LAMP (Linux, Apache, MySQL and Perl/PHP/Python) skills 8%
- .NET development skills 8%
- PHP development skills 9%
- Share Point skills 12%
- Virtualization skills 10%
- Web services development skills 6%
# Technology Salaries - United States

<table>
<thead>
<tr>
<th>Job Title</th>
<th>2012</th>
<th>2013</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Networking/Telecommunications (e)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network Architect</td>
<td>$95,500 - $137,000</td>
<td>$102,250 - $146,500</td>
<td>7.0%</td>
</tr>
<tr>
<td>Network Manager</td>
<td>$82,750 - $114,500</td>
<td>$88,500 - $122,500</td>
<td>7.0%</td>
</tr>
<tr>
<td>Network Engineer</td>
<td>$75,000 - $107,750</td>
<td>$80,750 - $116,250</td>
<td>7.8%</td>
</tr>
<tr>
<td>Wireless Network Engineer</td>
<td>$79,250 - $108,500</td>
<td>$85,500 - $117,000</td>
<td>7.9%</td>
</tr>
<tr>
<td>Network Administrator</td>
<td>$58,750 - $87,250</td>
<td>$62,750 - $93,250</td>
<td>6.8%</td>
</tr>
<tr>
<td>Pre-Sales Engineer/Technical Engineer</td>
<td>$71,750 - $101,500</td>
<td>$76,250 - $107,750</td>
<td>6.2%</td>
</tr>
<tr>
<td>Telecommunications Manager</td>
<td>$76,250 - $103,500</td>
<td>$78,500 - $106,750</td>
<td>3.1%</td>
</tr>
<tr>
<td>Telecommunications Specialist</td>
<td>$52,250 - $79,250</td>
<td>$54,000 - $82,000</td>
<td>3.4%</td>
</tr>
<tr>
<td><strong>Operations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manager</td>
<td>$60,500 - $84,000</td>
<td>$62,500 - $86,750</td>
<td>3.3%</td>
</tr>
<tr>
<td>Computer Operator</td>
<td>$32,250 - $44,500</td>
<td>$32,750 - $45,250</td>
<td>1.6%</td>
</tr>
<tr>
<td>Mainframe Systems Programmer</td>
<td>$56,250 - $78,250</td>
<td>$57,500 - $80,000</td>
<td>2.2%</td>
</tr>
<tr>
<td><strong>Security (f)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Security Analyst</td>
<td>$89,000 - $121,500</td>
<td>$95,000 - $129,750</td>
<td>6.8%</td>
</tr>
<tr>
<td>Systems Security Administrator</td>
<td>$85,250 - $117,750</td>
<td>$89,500 - $123,750</td>
<td>5.0%</td>
</tr>
<tr>
<td>Network Security Administrator</td>
<td>$85,000 - $116,750</td>
<td>$89,750 - $123,500</td>
<td>5.7%</td>
</tr>
<tr>
<td>Network Security Engineer</td>
<td>$88,500 - $116,750</td>
<td>$93,500 - $123,250</td>
<td>5.6%</td>
</tr>
<tr>
<td>Information Systems Security Manager</td>
<td>$103,500 - $143,500</td>
<td>$108,000 - $149,750</td>
<td>4.4%</td>
</tr>
</tbody>
</table>

---

**Notes:**

(e) Add the percentage below, based on national averages, to IT salaries for the following skills:

- Cisco network administration skills: 9%
- Linux/Unix administration skills: 8%
- Voice over Internet Protocol (VoIP) administration skills: 8%
- Windows 2000/Windows 2003/XP/Vista skills: 4%
- Windows Server 2008 skills: 6%
- Windows 7 skills: 7%

(f) Add the percentage below, based on national averages, to IT salaries for the following skills:

- Check Point Firewall administration skills: 7%
- Cisco network administration skills: 9%
- Linux/Unix administration skills: 8%
## Technology Salaries - United States

<table>
<thead>
<tr>
<th>JOB TITLE</th>
<th>2012</th>
<th>2013</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SOFTWARE DEVELOPMENT (g)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product Manager</td>
<td>$90,750 - $124,750</td>
<td>$95,250 - $130,750</td>
<td>4.9%</td>
</tr>
<tr>
<td>Software Engineer</td>
<td>$78,250 - $119,500</td>
<td>$83,500 - $127,750</td>
<td>6.8%</td>
</tr>
<tr>
<td>Software Developer</td>
<td>$70,000 - $111,000</td>
<td>$74,500 - $118,250</td>
<td>6.5%</td>
</tr>
<tr>
<td><strong>TECHNICAL SERVICES, HELP DESK &amp; TECHNICAL SUPPORT (h)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manager</td>
<td>$70,000 - $99,750</td>
<td>$72,750 - $103,750</td>
<td>4.0%</td>
</tr>
<tr>
<td>Desktop Support Analyst</td>
<td>$47,250 - $69,250</td>
<td>$48,250 - $70,750</td>
<td>2.1%</td>
</tr>
<tr>
<td>Systems Administrator</td>
<td>$56,250 - $87,500</td>
<td>$59,500 - $92,500</td>
<td>5.7%</td>
</tr>
<tr>
<td>Systems Engineer</td>
<td>$70,250 - $102,000</td>
<td>$74,000 - $107,500</td>
<td>5.4%</td>
</tr>
<tr>
<td>Help Desk Tier 3</td>
<td>$47,750 - $61,500</td>
<td>$50,250 - $64,750</td>
<td>5.3%</td>
</tr>
<tr>
<td>Help Desk Tier 2</td>
<td>$38,250 - $49,500</td>
<td>$40,000 - $52,500</td>
<td>4.8%</td>
</tr>
<tr>
<td>Help Desk Tier 1</td>
<td>$30,250 - $40,500</td>
<td>$31,750 - $42,500</td>
<td>4.9%</td>
</tr>
<tr>
<td>Instructor/Trainer</td>
<td>$48,500 - $77,000</td>
<td>$50,000 - $79,500</td>
<td>3.2%</td>
</tr>
<tr>
<td>PC Technician</td>
<td>$30,000 - $44,250</td>
<td>$31,250 - $46,000</td>
<td>4.0%</td>
</tr>
<tr>
<td>Business Continuity Analyst</td>
<td>$78,750 - $112,000</td>
<td>$83,250 - $118,500</td>
<td>5.8%</td>
</tr>
</tbody>
</table>

**Notes:**

(g) Add the percentage below, based on national averages, to IT salaries for the following skills:

- ASP development skills: 4%
- C# development skills: 9%
- C++ development skills: 4%
- DCOM/COM/ActiveX development skills: 5%
- Java development skills: 9%
- Java EE/J2EE development skills: 9%
- .NET development skills: 8%
- PHP development skills: 9%
- Visual Basic development skills: 4%
- Web services development skills: 8%
“Doing What Matters for ICT Education”
Efficiently Develop the ICT Workforce Needed by Employers
Problem Statement
Big:

- Almost 1.2 million Californians in ICT Workforce Q1 '11
- 30K Net New ICT Workforce Jobs by 2013
- Through 80K ICT Workforce Job Openings
- High Relative Wages
- Many Requiring No More Than AS Degree
- Traditional Labor Market Information Problems
Real-time LMI for all ICT job openings in single market:

- All job boards, recruiters and corporate sites
- Primary ICT SOC Codes from Phase 2 Study
- Out of 2,380 total job listings
- 1,928 different job titles
- Most jobs are one-offs
- Makes it extremely difficult for ICT education to understand ICT workforce demand and plan academic offerings to meet that demand
ICT Workforce Supply

California Community College
ICT Student Enrollment and Demographics

A Study of Enrollments and Demographics Related to Information and Communication Technologies (ICT) In California Community Colleges 2008/09 – 2010/11
In CCCs in the 2010/11 academic year:

» 5,729 total faculty
» 2,604 full-time
» 3,125 part-time

– students enrolled in 562,575 for-credit and
– 116,726 noncredit courses related to ICT, totaling
– **679,301 ICT related enrollments** in the CCC system.
In the 2010/11 academic year:

- The 295 ICT related programs at 112 California Community Colleges issued **994 Associate (AS/AA) degrees**.
- Office Technology was Top Code leader, at 262 degrees, followed by Digital Media with 144, Computer Infrastructure and Support with 118, Drafting Technology with 102, Health Information Technology with 90, and Computer Software Development with 70.
- 9 Top Codes delivered between 1 & 19 degrees, and 4 awarded none.
- Wide range in #s of degrees produced by different colleges, ranging from 46 at Santa Barbara City College to zero at 15 colleges.
In the 2010/11 academic year:

- 1,919 for credit academic certificates and 264 non-credit certificates
- 2,201 ICT related certificates all together.
- Of those, 18 (1%) required 60 or more academic units, 504 (23%) 30-60 academic units, 689 (31%) 18-30 units, 71 (3%) 12-18 units and approved by CCC System Office, 635 (29%) required 6-18 units and not approved by CCC System Office, 20 (1%) required <6 units, and 264 (12%) non-credit certificates.
- San Francisco City College led number of awards at 113, San Diego Adult School had 92, American River and Chaffey had 90 and Palomar, 82.
- On the other hand, Canada, Napa Valley, Ventura, Feather River, Lassen Lemoore and Woodland awarded no ICT related certificates.
Between 2008/09 and 2010/11:

– Credit enrollment decreased 7% (40K) but passing rates increased 2% (5,701)
– Overall non-credit enrollment decreased by 47% (54,551)
– Female enrollment decreased 3%
– In a period in which enrollments were cut throughout the CCC system due to educational funding problems.

– Largest percentage Top Code enrollment increases were in Marketing and Distribution (+47%), Other Library Science (+25%) and Computer Science (Transfer) (+17%).

– Largest Top Code percentage enrollment decreases were in Computer Software Development (-24%), Educational Technology (-17%) and WWW Administration (-14%).

– Reductions in at least Software Development and WWW Administration enrollments do not reflect increasing ICT Workforce demand in those areas.
ICT Workforce Supply

California Community College
ICT Programs and Academic Credentials

A Study of Programs and Their Academic Credentials Related to Information and Communication Technologies (ICT) In California Community Colleges 2010/11
Studying ICT Offerings of all 112 CCCs. Results:

Departments:
- 295 different academic departments with 177 different names offer ICT related programs (average 2.6 per college)
- 149 department names used only once
- most common - Computer Science (CS) with 24 instances
- >46,000 different articulation degree possibilities

Degrees:
- 624 different associate level degrees with 438 unique degree titles
- 374 degree titles used only once
- most common - A.S. in Computer Science with 35 instances

Academic Certificates:
- 1,500 certificates with 1,183 unique titles
- 1,049 certificate titles used only once
- most common–Computer Information Systems, with 26 instances
Devalues all CCC academic ICT credentials, because employers do not understand what credential holders know and can do
ICT Workforce Problem
Supply and Demand Skills Mismatch
Over half of all firms report difficulty recruiting employees with appropriate ICT skills and training. These findings are surprising given the high rates of unemployment in the state.

- Two in three ICT-related firms and nearly half of non-ICT firms report some or great difficulty recruiting employees with appropriate ICT skills and training.
- Larger firms report more difficulty than smaller firms in recruiting qualified employees.
This issue is frequently characterized as a “Skills Gap Problem.” The workforce and potential employee pool do not have the skills needed by employers.

According to CompTIA’s State of the IT Skills Gap from February of 2012:
• Information Technology is increasingly strategically important to organizations in most industries.
According to CompTIA’s State of the IT Skills Gap from February of 2012:

- “The great majority of employers (93%) indicate there is an overall skills gap, the difference between existing and desired skill levels, among their IT staff.
- “Nearly 6 in 10 (56%) companies report being only moderately close or not even close to where they want to be with IT skills.
- “Respondents place the highest levels of importance on skills associated with what could be described as the IT foundation such as networks, servers, storage, security, database management, and IT support.
- “Most (80%) organizations indicate their IT skills gap affects at least one business area such as staff productivity (41%), customer service / customer engagement (32%), and security (31%).
- “Nearly half of respondents cite the dynamic nature of the tech space as a primary cause of skills gaps. Another top cause is the lack of resources for professional development.”
The IT skills gap is increasing and is bigger than in other functional areas.

Skills Gaps in IT on the Rise

- **Change in Overall IT Skills Gaps Over Past 2 Years**
  - NET Decrease in IT Skills Gaps: 29%
  - No Change: 19%
  - NET Increase in IT Skills Gaps: 42%
  - 9% Increased Significantly
  - 33% Increased Moderately

- **Skills Gaps in IT Compared to Other Functional Areas**
  - NET Lower Level of Skills Gaps in IT: 18%
  - About the Same Level: 43%
  - NET Higher Level of Skills Gaps in IT: 30%
  - 7% Significantly Higher in IT
  - 23% Moderately Higher in IT

Source: CompTIA’s IT Skills Gap study
Base: 500 U.S. IT and Business Executives
ICT Workforce Problem
Supply and Demand Skills Mismatch

What Should I Teach?
U.S. DOL IT Competency Model

- Developed in a collaboration, primarily, between the U.S. Department of Labor (DOL) Employment and Training Administration (ETA) and the Information Technology Association of America (ITAA). (ITAA has since merged with TechAmerica.)
- November 2007 focus groups at four locations across the country to shape the model: Seattle, Boston, Minneapolis, and Washington, D.C.
- In part, perhaps, because there was no recognized representation from California in developing the model, lack of employer validation in California, lack of active efforts to market and recruit engagement with the model in California, lack of exposure to and acknowledgement of the model by educators in California and/or lack of any requirements to do so, in any event, the DOL/ETA/ITAA model has not been widely adopted in California – by industry, educators or employers.
- Summer of 2012, DOL updated the IT Competency Model, by engaging a panel of Subject Matter Experts in a series of email exchanges and telephone conferences.
- That model was re-released in the Fall of 2012 and posted on the career-one-stop site, along with similar models for other industries, related links, tutorials, general instructions, worksheets and instructions for linking with O*Net occupations.
The Employment and Training Administration (ETA) has worked with the Office of Disability Employment Policy (ODEP) and technical and subject matter experts from education, business, and industry to update a comprehensive competency model for the Information Technology (IT) industry. While the model identifies the knowledge, skills, and abilities needed for workers to perform successfully in the field of IT, it is not intended that IT workers possess all of the competencies listed. The model is rather a compilation of competencies that can be included as a basis for preparation in an IT occupation. The National Convergence Technology Center (CTC), Broadening Advanced Technological Education Connections (BATEC), the National Center for Information and Communications Technology (ICT), the Mid-Pacific Information and Communication Technologies Center (MPICT), California Community Colleges Information and Communication Technologies Collaborative (ICT), and CompTIA provided input and will ensure that the model evolves to accommodate changing skill requirements.

US DOL
IT Competencies Framework
Develop employer-generated, clearly defined competencies expected of future ICT Workforce, to create better consistency across CCC programs and employer needs.

Focused at foundational level, knowledge and skills for all ICT Workforce, regardless of specialized role.

**ACTION REQUESTED:**

- If California employer with direct knowledge of ICT Workforce needs, online survey at [www.caictresearch.com](http://www.caictresearch.com). Half an hour, opt to receive $50 reward.
- If not, invite your California business and industry contacts!

In cooperation with . . .
Methodology:

- **Sampling Plan:**
  - Geographic Diversity
  - Company Size Diversity
  - Industry Diversity

- **Outreach:**
  - Web and Email Networking
  - Call Center

- **782 Responses**

### Regional Data

<table>
<thead>
<tr>
<th>REGION</th>
<th># of Responses</th>
<th>% of Total</th>
<th>Confidence Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern California</td>
<td>361</td>
<td>46%</td>
<td>94%</td>
</tr>
<tr>
<td>Bay Area</td>
<td>231</td>
<td>30%</td>
<td>87%</td>
</tr>
<tr>
<td>Other</td>
<td>190</td>
<td>24%</td>
<td>83%</td>
</tr>
</tbody>
</table>

### Employment Size

<table>
<thead>
<tr>
<th>NUMBER OF EMPLOYEES</th>
<th># of Responses</th>
<th>% of Total</th>
<th>Confidence Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 4 employees</td>
<td>292</td>
<td>37%</td>
<td>91%</td>
</tr>
<tr>
<td>5 to 24 employees</td>
<td>202</td>
<td>26%</td>
<td>84%</td>
</tr>
<tr>
<td>25 to 99 employees</td>
<td>136</td>
<td>17%</td>
<td>75%</td>
</tr>
<tr>
<td>100 or more employees</td>
<td>152</td>
<td>19%</td>
<td>78%</td>
</tr>
</tbody>
</table>

### Industry Group

<table>
<thead>
<tr>
<th>INDUSTRY GROUP</th>
<th># of Responses</th>
<th>% of Total</th>
<th>Confidence Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Technology</td>
<td>201</td>
<td>26%</td>
<td>84%</td>
</tr>
<tr>
<td>Medium Technology</td>
<td>213</td>
<td>27%</td>
<td>85%</td>
</tr>
<tr>
<td>Low Technology</td>
<td>186</td>
<td>24%</td>
<td>82%</td>
</tr>
<tr>
<td>Healthcare</td>
<td>80</td>
<td>10%</td>
<td>-</td>
</tr>
<tr>
<td>Government</td>
<td>74</td>
<td>9%</td>
<td>-</td>
</tr>
<tr>
<td>Non-classified</td>
<td>28</td>
<td>4%</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>782</strong></td>
<td><strong>100%</strong></td>
<td><strong>99%</strong></td>
</tr>
</tbody>
</table>
California Employer Competencies Demand

• 99% level of confidence California employer representatives with direct knowledge of ICT workforce needs:

  – 74% agree, 5% disagree:

California’s ICT Workforce labor market would work better if there was a detailed, agreed-upon and structured framework for employer ICT Workforce competency demand, which educators and trainers used to prepare ICT Workforce in consistent ways, and employers used to communicate ICT Workforce and ICT job needs.
99% level of confidence California employer representatives with direct knowledge of ICT workforce needs:

- 71% agree, 5% disagree:

Our organization would appreciate and be much more willing to entertain hiring students with ICT related credentials from California Community Colleges for ICT Workforce roles if there was a consistent, system-wide, validated foundation of knowledge and skills for ICT education and workforce development programs that addressed both technical and non-technical competency expectations.
California Employer Competencies Demand

- 99% level of confidence California employer representatives with direct knowledge of ICT workforce needs:
  - 68% agree, 6% disagree:

If there was a detailed, agreed-upon and structured framework for ICT Workforce competencies, our organization would be willing to reference them in future job announcements for ICT Workers, so applicants could better understand our requirements and match them to their own education and experience, and so we could better map applicant education and experience to our own needs.
California Employer Competencies Demand

- 99% level of confidence California employer representatives with direct knowledge of ICT workforce needs:
  - 76% agree, and only 8% disagree:

Non-technical (soft, workplace or employability) skills are at least as important as technical skills in what we look for in our ICT Workforce.
California Employer Competencies Demand

- 99% level of confidence California employer representatives with direct knowledge of ICT workforce needs:
  
  - 71% agree, 9% disagree:

  Information and communication technologies (ICT) competencies are increasingly important for most of our employees, regardless of role. If there was an agreed-upon standard for "digital literacy", or ICT competencies expected of all workers, regardless of workplace role, my organization would value a credential based on that standard as a way of validating ICT skills for non-ICT workers.
California Employer Competencies Demand

• 99% level of confidence California employer representatives with direct knowledge of ICT workforce needs:
  – 85% agree, and only 6% disagree:

In the 21st century, an ability to work with information and communication technologies is becoming as essential to education, life and workplace success as “reading, writing and arithmetic.” ICT Digital Literacy should be considered a basic skill by educational systems, something taught to and assessed for all students.
Digital Literacy = Everybody in Society

Enterprise Users = Employed in that Organization or Enterprise
Digital Literacy

- Basic Skills Everyone Develops as part of K-12 Education
- Remediated in College, if Necessary
- Taught to Everyone

- Not Really Part of NCLB
- Not Defined
- No Standards
- No Teacher Development

I WANT YOU
To embrace digital literacy in your classroom!
Digital Literacy

44 Competencies:

1: General Computer, Software, ICT Knowledge and Skills
   • 9 competencies - average 92% approval, max 96% min 81.5%.

2: Digital Media Literacy
   • 4 competencies average 84% approval, max 91% min 76%.

3: Common IT Applications
   • 12 competencies average 91% approval, max 97% min 74%.

4: Cyber Safety
   • 10 competencies average 94% approval, max 98% min 89%.

5: Information and Research Literacy
   • 7 competencies average 94% approval, max 98% min 90%.

6: Hardware
   • 7 competencies average 89% approval, max 92% min 84.
# Digital Literacy

## Fundamental IT User Skills or "Digital Literacy"

**Area 1: General Computer, Software, Information and Communication Technology Knowledge and Skills**

<table>
<thead>
<tr>
<th>#</th>
<th>Competency</th>
<th>N</th>
<th>Keep</th>
<th>Remove</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Demonstrate familiarity with the fundamental capabilities of computers, software, information systems, and communication systems</td>
<td>276</td>
<td>96.0%</td>
<td>1.4%</td>
<td>2.5%</td>
</tr>
<tr>
<td>2</td>
<td>Demonstrate familiarity with the fundamental principles of accessible technology, including universal design, as they relate to users of computerized content who have disabilities, sensory and/or functional limitations</td>
<td>276</td>
<td>81.5%</td>
<td>15.9%</td>
<td>2.5%</td>
</tr>
<tr>
<td>3</td>
<td>Understand terminology and function of common computer, software, information and communication technology devices, components, and concepts</td>
<td>276</td>
<td>96.4%</td>
<td>2.9%</td>
<td>0.7%</td>
</tr>
<tr>
<td>4</td>
<td>Understand common terminology related to the use of technology by people with disabilities and/or sensory and functional limitations, including accessible IT, assistive technology, and universal design</td>
<td>276</td>
<td>83.7%</td>
<td>14.1%</td>
<td>2.2%</td>
</tr>
<tr>
<td>5</td>
<td>Understand and efficiently use common computer hardware (e.g. desktops, laptops, tablets, PC components, cabling), software (e.g., operating systems, applications, communication, collaboration and productivity software) and</td>
<td>276</td>
<td>95.7%</td>
<td>2.9%</td>
<td>1.4%</td>
</tr>
<tr>
<td>6</td>
<td>Be able to connect common User devices to networks and secure them appropriately</td>
<td>276</td>
<td>92.4%</td>
<td>5.4%</td>
<td>2.2%</td>
</tr>
<tr>
<td>7</td>
<td>Understand and be able to use with appropriate etiquette common communications media, including wired and wireless telephones, audio conferences, videoconferences and online collaboration tools</td>
<td>276</td>
<td>93.5%</td>
<td>4.7%</td>
<td>1.8%</td>
</tr>
<tr>
<td>8</td>
<td>Use a computer to search for online information and interact with websites and web applications (enterprise solutions, online stores, blogs, social networks, wikis)</td>
<td>276</td>
<td>92.0%</td>
<td>5.8%</td>
<td>2.2%</td>
</tr>
<tr>
<td>9</td>
<td>Understand how to critically evaluate online information and be aware of relevant copyright and data protection issues</td>
<td>276</td>
<td>94.2%</td>
<td>5.8%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

**Average** | **91.7%** | **6.6%** | **1.7%**
**Max**     | **96.4%** | **15.9%** | **2.5%**
**Min**     | **81.5%** | **1.4%**  | **0.0%**
Employers from across all regions, industry sectors and business sizes in California have resoundingly approved foundational IT workforce technical competencies of the federal DOL IT Competency Model through a rigorous survey method and research process. For the nine sections of Layer 4, the average level of employer agreement that the competencies in the section should be kept in the model are:

- **Principles of Information Technology**: 90%
- **Databases and Applications**: 92%
- **Networks, Telecom, Wireless and Mobility**: 91%
- **Software Development and Management**: 89%
- **User and Customer Support**: 93%
- **Digital Media and Visualization**: 91%
- **Compliance**: 92%
- **Risk Management, Security, and Information Assurance**: 90%
Foundational Technical Competencies

High quality input on suggested competency wording changes and additions

California Standard that is higher than U.S.?
Use that to create consistent foundation for ICT Education Supply:

1. Translate Study demand competencies into Student Learning Outcomes (SLOs)
2. Gather CCC educators to organize foundational “common core” for IT programs
3. Disseminate and create adoption for that common core across CCCs
4. Help market those programs and help people understand them
5. Outcomes include consistency across programs, which creates harmonization, improved understanding of the programs, increased value of academic credentials based on them, better articulation and transfer, and better efficiencies across the CCC system
6. Common checklist for department Advisory meetings, articulation/transfer negotiations, etc.

Spring/Summer 2013 Effort
CALIFORNIA COMMUNITY COLLEGES
CHANCELLOR’S OFFICE

CALIFORNIA COMMUNITY COLLEGES
Doing What MATTERS™
FOR JOBS AND THE ECONOMY
• **Phase 1: Doing What MATTERS for Jobs & Economy Framework**
  – Target incentive investment (EWD, SB70, Perkins 1B)
    • Sector
    • Region
    • Technical Assistance
  – Braided RFA
  – Common accountability metrics

• **Phase 2: Moving the Needle**

• **Phase 3: Scaling Excellence**
## Consolidation of regional submissions

<table>
<thead>
<tr>
<th>Region</th>
<th>Health</th>
<th>Advanced Manufacturing</th>
<th>Agriculture, Water, &amp; Environmental Tech</th>
<th>Life Sciences/Biotech</th>
<th>ICT/Digital Media</th>
<th>Retail/Hospitality/Tourism 'Learn and Earn'</th>
<th>Advanced Transportation &amp; Renewables</th>
<th>Energy (Efficiency) &amp; Utilities</th>
<th>Small Business</th>
<th>Global Trade &amp; Logistics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>North/Far North</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greater Sacto</td>
<td>P</td>
<td>E</td>
<td>P</td>
<td></td>
<td>E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern Coastal</td>
<td>P</td>
<td>E</td>
<td>P</td>
<td></td>
<td>E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern Inland</td>
<td>P</td>
<td>E</td>
<td>P</td>
<td></td>
<td>E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Bay/Interior Bay</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SF/San Mateo</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>P</td>
<td>P</td>
<td>E</td>
</tr>
<tr>
<td>East Bay</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>P</td>
<td>P</td>
<td>E</td>
</tr>
<tr>
<td>Silicon Valley</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>P</td>
<td>P</td>
<td>E</td>
</tr>
<tr>
<td>North Bay</td>
<td>E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>P</td>
<td>P</td>
<td>E</td>
</tr>
<tr>
<td>SC/Monterey</td>
<td>E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>P</td>
<td>P</td>
<td>E</td>
</tr>
<tr>
<td><strong>Central</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Valley</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother Lode</td>
<td>E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LA/OC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LA County</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orange County</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>San Diego/Imperial</td>
<td>P</td>
<td>E</td>
<td>P</td>
<td></td>
<td>E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desert/Inland Empire</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Central</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key:**

- *P* = Priority sector
- *E* = Emergent sector

The jobs & economy challenge…

Sector Navigators
Regional Consortia Chairs

Deputy Sector Navigators

Sector Advisories
Collaborative Communities

TA Providers
Q&A

Mid-Pacific ICT (MPICT) Center
CCC ICT Collaborative
City College of San Francisco
50 Phelan Avenue, S107
San Francisco, CA 94112
(415) 239-3600
www.mpict.org  www.cccict.org

Pierre Thiry
MPICT PI
ICT Collaborative Director
pthiry@mpict.org

James Jones
MPICT Director
jjones@mpict.org

Olivia Herriford
MPICT Assoc. Director
oherriford@mpict.org

Karen Stanton
CCC ICT Collaborative
SoCal Regional Coordinator
Karen.Stanton@canyons.edu

Center of Excellence
San Francisco Bay Area

John Carrese, Director
City College of San Francisco
50 Phelan Avenue
San Francisco, CA 94112
jcarrese@ccsf.edu
Website

- www.mpict.org
- >300 Pages of Static Content
- Excellent ICT Educator Resources
- Phase 2 and Phase 3 California ICT Studies
- ICT Labor Market Information for All MPICT States
- Links to Social Media Sites
- Major Communication and Dissemination Vehicle
- more than 55,000 page views so far, by more than 23,000 different people

- www.cccict.org
Info on ICT Related Programs at all CCCs

http://www.mpict.org/ict_education_northern_california_community_colleges.html

ICT Education In California Community Colleges

With 72 districts and 110 colleges, California Community Colleges are the largest higher education system in the U.S., serving more than 2.9 million students annually. Community Colleges offer associate's degrees and academic and industry certificates, prepare students for transfer to four-year institutions, provide opportunities for lifelong learning, and train the workforce that sustains California's economy.

At $26 per academic unit credit, California community colleges are the most cost-effective way to gain strategic ICT knowledge and skills. By focusing on California communities to benefit California businesses, industries, and economies, out-of-state and international tuition is much less affordable. At $179 per unit, California Community Colleges are not yet participating in the Western Undergraduate Exchange Program.

Check out these extraordinary statistics on the California Community College system.

California Community Colleges provide outstanding resources for California ICT educators.

Following is a list of California Community Colleges. Click on each for a summary and links to additional information on ICT related programs at that college:

- Allen Hancock College
- American River College
- Antelope Valley College
- Bakersfield College
- Barstow Community College
- Santa Maria
- Sacramento
- Lancaster
- Bakersfield
- Barstow
ICT in the University of Hawaii System

Established in 1907, the University of Hawaii System now serves almost 55,000 students at:

- 3 universities (Manoa on Oahu, Hilo on Hawaii and West O'ahu on Oahu),
- 7 community colleges (4 on Oahu, 1 each on Maui, Kauai and Hawaii),
- 9 community-based learning centers, and
- Distance learning

Four year university campus ICT related offerings include:

<table>
<thead>
<tr>
<th>UH Campus</th>
<th>ICT Related Departments</th>
<th>Degrees Offered</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manoa</td>
<td>Electrical Engineering</td>
<td>B.S., 3 majors: Computers (architecture, algorithms, networking, hardware and software), Electro-Physics (solid-state devices and sensors, analog and digital circuit design, and microwaves and photonics) and Systems (telecommunications, automatic controls, and signal processing) M.S. and Ph.D.</td>
<td>List</td>
</tr>
<tr>
<td></td>
<td>Information and Computer Sciences</td>
<td>B.S., B.A., minor M.S., MLISc, Ph.D.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Library and Information Science Program</td>
<td>MLISc / Educational Technology MEd</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Information Technology Management</td>
<td>BBA in MIS, Ph.D. in GIS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Educational Technology</td>
<td>M.S., Ph.D.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Communications and Information Sciences</td>
<td>Ph.D.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interdisciplinary Program</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Launched in 2010.

40K views by thousands of different visitors.

Videos include interviews with business, industry and education relevant to improving ICT education.

There are also many technical presentations available, mostly from our Winter conferences.
mpictcenter.blogspot.com/

- Launched August 2010 as a community building opportunity for ICT educators in the MPICT region
- >1,000 postings
- >65,000 views, and momentum is building.
- ICT educators engage in this environment to share what they discover in their readings and experiences that might be valuable to their peers.
- ICT is a hard field to keep up with. We have an incredible network of subject matter experts among CC educators in ICT related programs. This is an environment for us to network and share, so we are all better off.
www.facebook.com/MPICT

- Going for about 3 years.
- Several hundred active monthly viewers
- 10s of 1000s of Facebook newsfeed stories views
- Facebook engagement includes ICT related faculty and other ATE community members, but it also includes students and members of the community.
MPICT Newsletters

- QUARTERLY
- 8 PAGES
- IN COLOR
- EMAIL DISTRIBUTION
- ON WEBSITE
- SEARCHABLE ARTICLES
• >2,000 ICT Educator Contacts
What and How Should We Teach K-12 Students About ICT So They Benefit From and Contribute to the Information, Knowledge and Innovation Economies of the 21st Century?
ICT
Information & Communication Technologies

• **Phase One** report (September, 2009) overview
• **Phase Two** report (September, 2010) surveyed more than 600 employers
• **Phase Three**, multiple studies:
  • *ICT: Advancing Digital Literacy in the Greater Sacramento Region* - March, 2011
  • *Emerging Trends in Mobile Media* - May, 2011
  • *Silicon Valley in Transition: Economic and Workforce Implications in the Age of iPads, Android Apps, and the Social Web* - July, 2011
  • *ICT: Educational Program Input* - September, 2011
  • *Mobile Media Occupations in California* - March, 2012

http://www.coeccc.net/ict
Exhibit 8 - Extrapolated 2011 Occupational Employment and Projected 12-month Growth

<table>
<thead>
<tr>
<th>Occupations</th>
<th>2011 employment estimates</th>
<th>2012 employment estimates</th>
<th>Estimated 12-month growth</th>
<th>Estimated 12-month % Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software engineers</td>
<td>24,599</td>
<td>29,100</td>
<td>4,501</td>
<td>18.3%</td>
</tr>
<tr>
<td>Computer support specialists</td>
<td>21,588</td>
<td>24,567</td>
<td>2,979</td>
<td>13.8%</td>
</tr>
<tr>
<td>Project managers</td>
<td>7,521</td>
<td>8,454</td>
<td>933</td>
<td>12.4%</td>
</tr>
<tr>
<td>Web developers</td>
<td>4,996</td>
<td>5,768</td>
<td>770</td>
<td>15.4%</td>
</tr>
<tr>
<td>Graphic designers and/or multimedia artists</td>
<td>6,497</td>
<td>7,004</td>
<td>507</td>
<td>7.8%</td>
</tr>
<tr>
<td>Programmers and/or applications developers</td>
<td>9,801</td>
<td>12,731</td>
<td>2,930</td>
<td>29.9%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>75,004</strong></td>
<td><strong>87,624</strong></td>
<td><strong>12,620</strong></td>
<td><strong>16.8%</strong></td>
</tr>
</tbody>
</table>

Exhibit 18 - Degree programs, certificates, and courses in Mobile Media

<table>
<thead>
<tr>
<th>Region</th>
<th>College</th>
<th>Certificates</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inland Empire</td>
<td>Carro Cajo College</td>
<td>Mobile Media Certificate</td>
<td>Iphone Programming w/Objective C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Iphone Programming w/Web Lab</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mobile Game Programming</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mobile Device Programming</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mobile Device Game Development</td>
</tr>
<tr>
<td></td>
<td>Golden West College</td>
<td>Mobile Media Certificate</td>
<td>Android Development</td>
</tr>
<tr>
<td></td>
<td>Mt. San Antonio College</td>
<td></td>
<td>Technology of Smartphones &amp; Mobile Devices</td>
</tr>
<tr>
<td></td>
<td>NOCCCD Digital Media Center</td>
<td></td>
<td>Creating Applications for Mobile Devices</td>
</tr>
<tr>
<td></td>
<td>Santa Monica College</td>
<td></td>
<td>Programming for the iPhone</td>
</tr>
<tr>
<td>Los Angeles/Orange County</td>
<td>City College of San Francisco</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Central Coast Region</td>
<td>Santa Barbara City College</td>
<td>Mobile Media Skills Certificate</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mobile application developer</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mobile device administrator</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mobile media core</td>
<td></td>
</tr>
</tbody>
</table>
Spring & Fall 2012 Pilots
Summer 2012
Faculty Development Week

“Train the trainer” tracks to prepare faculty to teach new or improve existing courses or programs

Pedagogical tracks to impart teaching and learning skills

Winter 2013 ICT Educator Conference

- CCSF Chinatown Campus
- Industry contributions to ICT education
- ICT education high quality practices
- ICT education/workforce diversification
- Resources for California ICT educators
- 230 Registrations

“Doing What Matters for ICT Education”
WIB Collaborations

CWA California Workforce Association

Ripples: Broadening Our Impact & Influence
CWA's Annual Spring Conference
April 4-6, 2012 | San Diego, Ca

Meeting of the Minds 2012: Collective Impact
We Agree ICT Education is Important!