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Career Clusters: Forecasting HS-PS Jobs

Using Labor Market Data
Agenda

The Report – Pradeep Kotamraju

Impact and Policy Implications – Kim Green

Crosswalking – Bruce Steuernagel

POS, LMI and the Future of CTE: A few thoughts – Jim Stone
Pradeep Kotamraju, Ph.D.
Deputy Director
NRCCTE

USING LABOR MARKET INFORMATION WITHIN A PROGRAM OF STUDY CONTEXT: THE CAREER CLUSTERS REPORT
A First Look

Key highlights:
• While jobs for workers with high school diplomas are in decline, they still exist.
• Jobs for middle skill workers (jobs for workers with some college, a certificate, or an Associate's degree) will make up 29% of the workforce by 2018.
• **Manufacturing** will continue to **decline** in total employment, but retiring Baby Boomers will create 2 million job openings. Recent improvements in this sector indicate its continued importance to the American Economy is still strong.

• The **gender gap in wages** varies greatly from **cluster to cluster**. For example, the gap in Architecture and Construction is $2,000; in Health Science, it is $69,000. There is little evidence that the gender wage gap **closes** at higher levels of education. If anything, the reverse is true: the gender wage gap seems to **increase** with educational attainment.
How the Report Was Put Together

• The data used for the *Clusters* report is the same as the one in the 2010 *Help Wanted* Report

• Reorganize data into the 16 career clusters for which a crosswalk was needed.

• Crosswalks connect education programs to occupational information

• Used the crosswalk developed by OVAE (Table 7) available at [www.careertech.org](http://www.careertech.org)
An Implication: Employment opportunities exist at various levels of education but need to balance student interests, employer needs, and supply constraints (OECD report *Learning for Jobs*). Programs of Study/Career Pathways might be one way to do this.
Other Key Findings:

• Postsecondary education matters and more of it raises the labor market payoff – but there are jobs available for those with a high school degree or less but they are declining.

• Jobs for workers with only a high school diploma or less than high school still exist but are quickly declining, (37% of all job openings by 2018).

• Workers with postsecondary middle skills - some college/no degree or an Associate’s degree are a large cluster with varied wage payoffs, (29% of all job openings by 2018).

• Bachelor’s degree or better guarantees access to all career clusters but occupation also matters, (34% of all job openings by 2018).
Other Key Findings:

• Postsecondary education matters and more of it raises the labor market payoff – but there are jobs available for those with a high school degree or less but they are declining

• Although old-line manufacturing continues to decline in employment totals, there will be job openings from baby-boom retirements.

The fastest growing clusters have the highest concentration of postsecondary workers.

Women have greater opportunities in middle-skill jobs, but still earn less than men with high school or less.

Inclusion of certifications-preparation should be part of career-ready education.
Occupation Matters

• 43% of young workers with Licenses and Certificates earn more than those with an Associate’s degree.

• 27% of young workers with Licenses and Certificates earn more than those with a Bachelor’s degree.

• 31% of young workers with Associate’s degrees earn more than those with a Bachelor’s degree.
There will be jobs available for workers with high school or less, but options for these workers will be limited. The best opportunities to earn a living wage with middle skills are in career clusters where men dominate.

### NEW AND REPLACEMENT JOB VACANCIES 2008-2018 (THOUSANDS)

<table>
<thead>
<tr>
<th>CAREER CLUSTER</th>
<th>Less than high school</th>
<th>High school diploma</th>
<th>High school diploma or less (%)</th>
<th>Males per cluster (%)</th>
<th>Rate of growth (% change in employment)</th>
<th>Fastest rate of growth (rank)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>420</td>
<td>1,250</td>
<td>9</td>
<td>71</td>
<td>-1</td>
<td>16</td>
</tr>
<tr>
<td>Architecture and Construction</td>
<td>760</td>
<td>1,200</td>
<td>11</td>
<td>98</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>Transportation, Distribution, and Logistics</td>
<td>560</td>
<td>1,800</td>
<td>13</td>
<td>85</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>Hospitality and Tourism</td>
<td>1,670</td>
<td>3,190</td>
<td>27</td>
<td>50</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>All other clusters</td>
<td>1,230</td>
<td>5,670</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### NEW AND REPLACEMENT JOB VACANCIES 2008-2018 (THOUSANDS)

<table>
<thead>
<tr>
<th>CAREER CLUSTER</th>
<th>Some college/no degree</th>
<th>Associate's degree</th>
<th>Some college/no degree/Associate's degree (%)</th>
<th>Males per cluster (%)</th>
<th>Rate of growth (% change in employment)</th>
<th>Fastest rate of growth (rank)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>600</td>
<td>400</td>
<td>8</td>
<td>79</td>
<td>-1</td>
<td>16</td>
</tr>
<tr>
<td>Marketing, Sales, and Service</td>
<td>800</td>
<td>400</td>
<td>9</td>
<td>49</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>Transportation, Distribution, and Logistics</td>
<td>900</td>
<td>400</td>
<td>9</td>
<td>81</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>Health Science</td>
<td>500</td>
<td>800</td>
<td>10</td>
<td>13</td>
<td>21</td>
<td>2</td>
</tr>
<tr>
<td>Business, Management, and Administration</td>
<td>1,100</td>
<td>700</td>
<td>13</td>
<td>31</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Hospitality and Tourism</td>
<td>1,500</td>
<td>800</td>
<td>16</td>
<td>54</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>All others</td>
<td>2,900</td>
<td>2,100</td>
<td>36</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: The Georgetown University Center on Education and the Workforce forecast of educational demand through 2018
How much you make depends on education level.

$35,000 (2010$) is defined as the Minimum Earning Threshold (MET) as an absolute poverty-based definition of the earnings level that equals 150% of the federal poverty level (FPL) for a family of four. It can also be considered the wage level necessary to enter into the middle class.
Some clusters offer better opportunities than others to earn a living wage.

Figure 2. STEM prime-age workers earn above-average wages (2009$)

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Average Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEM</td>
<td>$74,000</td>
</tr>
<tr>
<td>Information Technology</td>
<td></td>
</tr>
<tr>
<td>Law, Public Safety, Corrections, and Security</td>
<td></td>
</tr>
<tr>
<td>Finance</td>
<td></td>
</tr>
<tr>
<td>Business, Management, and Administration</td>
<td></td>
</tr>
<tr>
<td>Health Science</td>
<td>$63,000</td>
</tr>
<tr>
<td>Marketing, Sales, and Service</td>
<td>$51,000</td>
</tr>
<tr>
<td>Government and Public Administration</td>
<td></td>
</tr>
<tr>
<td>Arts, A/V Technology, and Communications</td>
<td></td>
</tr>
<tr>
<td>Education and Training</td>
<td></td>
</tr>
<tr>
<td>Architecture and Construction</td>
<td></td>
</tr>
<tr>
<td>Agriculture, Food, and Natural Resources</td>
<td></td>
</tr>
<tr>
<td>Human Services</td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td></td>
</tr>
<tr>
<td>Transportation, Distribution, and Logistics</td>
<td>$29,000</td>
</tr>
<tr>
<td>Hospitality and Tourism</td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: The American Community Survey (ACS) 2006-2009
Education still determines wages, but occupation also matters.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Less than high school</th>
<th>High school diploma</th>
<th>Some college, no degree</th>
<th>Bachelor’s degree</th>
<th>Master’s degree or better</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitality and Tourism</td>
<td>$26,000</td>
<td>$33,000</td>
<td>$51,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education and Training</td>
<td>$25,000</td>
<td>$30,000</td>
<td>$58,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Services</td>
<td>$30,000</td>
<td>$37,000</td>
<td>$60,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td>$39,000</td>
<td>$48,000</td>
<td>$63,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation, Distribution, and Logistics</td>
<td>$38,000</td>
<td>$45,000</td>
<td>$69,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arts, A/V Technology, and Communications</td>
<td>$36,000</td>
<td>$47,000</td>
<td>$70,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture, Food, and Natural Resources</td>
<td>$39,000</td>
<td>$46,000</td>
<td>$80,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marketing, Sales, and Service</td>
<td>$36,000</td>
<td>$45,000</td>
<td>$92,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Architecture and Construction</td>
<td>$43,000</td>
<td>$52,000</td>
<td>$82,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government and Public Administration</td>
<td>$44,000</td>
<td>$46,000</td>
<td>$88,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Science</td>
<td>$29,000</td>
<td>$46,000</td>
<td>$133,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business, Management, and Administration</td>
<td>$42,000</td>
<td>$48,000</td>
<td>$109,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finance</td>
<td>$35,000</td>
<td>$44,000</td>
<td>$127,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Law, Public Safety, Corrections, and Security</td>
<td>$43,000</td>
<td>$51,000</td>
<td>$139,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEM</td>
<td>$55,000</td>
<td>$60,000</td>
<td>$92,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information Technology</td>
<td>$53,000</td>
<td>$60,000</td>
<td>$89,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: Analysis of ACS data, 2006
Table 25. Participation and concentration of workers with high school diplomas and postsecondary middle skills working in CTE for top six career clusters by award type and career cluster

<table>
<thead>
<tr>
<th>Participants</th>
<th>Concentrators</th>
<th>Less than 1 year</th>
<th>At least 1 but less than 2 academic years</th>
<th>Associate’s degree</th>
<th>At least 2 but less than 4 years</th>
<th>Total, all award levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business</td>
<td>Manufacturing, repair, and transportation</td>
<td>Health sciences</td>
<td>Health sciences</td>
<td>Health sciences</td>
<td>Health sciences</td>
<td>Health sciences</td>
</tr>
<tr>
<td>Communications and design</td>
<td>Business</td>
<td>Manufacturing, construction, repair, and transportation</td>
<td>Consumer services</td>
<td>Business management</td>
<td>Manufacturing, construction, repair, and transportation</td>
<td>Manufacturing, construction, repair, and transportation</td>
</tr>
<tr>
<td>Manufacturing, repair, and transportation</td>
<td>Agriculture and natural resources</td>
<td>Consumer services</td>
<td>Manufacturing, construction, repair, and transportation</td>
<td>Engineering, architecture and science technologies</td>
<td>Consumer services</td>
<td>Consumer services</td>
</tr>
<tr>
<td>Consumer and culinary services</td>
<td>Consumer and culinary services</td>
<td>Protective services</td>
<td>Business management</td>
<td>Protective services</td>
<td>Public, legal, and social services</td>
<td>Business management</td>
</tr>
<tr>
<td>Computer and information sciences</td>
<td>Health sciences</td>
<td>Business management</td>
<td>Engineering, architecture and science technologies</td>
<td>Computer and information sciences</td>
<td>Engineering, architecture and science technologies</td>
<td>Protective services</td>
</tr>
<tr>
<td>Engineering technologies</td>
<td>Communications and design</td>
<td>Business support</td>
<td>Consumer services</td>
<td>Computer and information sciences</td>
<td>Engineering, architecture and science technologies</td>
<td>Engineering, architecture and science technologies</td>
</tr>
</tbody>
</table>
Implications

- CTE students are participating in clusters beyond the “old line” clusters such as business and computer and information sciences implying that high school graduates are enrolling and completing courses that teach basic skills required for today’s economy.

- Several career clusters are the same for participants and concentrators indicating that some students are involved in career preparation in a single area intensively at the high school level.

- By being placed as the top post-secondary career cluster, health sciences seems to follow a well-defined pathway with programs at the high school and post-secondary levels.
More Implications

• Studies in manufacturing, construction, repair, and transportation are more prevalent at the associate degree level but at the high school it is possible that students are mixing and matching CTE courses in these areas that cannot be readily seen by aggregative data.

• At the secondary level, students are choosing career clusters in which math and science knowledge requirements for employment are increasing but how much is necessary is still a debatable proposition.

• Studies in manufacturing, construction, repair, and transportation are more prevalent at the associate degree level implying student choices seem to match what is required for the new economy.
Kimberly Green.
Director
National Association of State Directors of Career & Technical Education

IMPACT AND POLICY IMPLICATIONS
CAREER CLUSTERS: USING AND IMPROVING LMI
Career Clusters Report

• The report assembled occupational labor market information (LMI) into the 16 Career Clusters.

• Enables CTE program planners to better understand their area’s labor market.

• Helps to develop POS that are aligned with demand.

• Provides valuable career information to students
What do we mean by LMI?

- Data available on a particular geographic area that includes:
  - industry employment, hours and earnings
  - unemployment estimates
  - industry and occupational employment projections
  - wage information, including level and trend
  - industrial average hours and earnings data
  - job vacancy surveys to estimate number and rate
  - typical education and training level required
  - supply of graduates from related training programs
Sources of LMI

- Most industry and occupational employment and wage data are collected by state economic security agencies in cooperation with BLS.
- Additional labor force characteristic data, such as gender and educational attainment, are collected by Current Population Survey and the Census Bureau’s American Community Survey.
- Post-secondary educational data collected by National Center for Education Statistics through the IPEDS survey.
Examples of questions answered

- Which Career Cluster is projected to have the most job openings? Which is fastest growing?
- What level of education is typically required for jobs in this Career Cluster? To what extent is there up-skilling in the Cluster?
- Which Career Clusters have above-average wages?
- High-demand; High-skill; High-wage
The importance of Cluster definition

- The Career Cluster data in the report is based on the current unique assignment of occupations (SOCs) to the 16 Career Clusters
  - Crosswalk developed by OVAE in 2006–2007. Perkins Table 7

- The Career Clusters are a mixture of industry–based and function–based occupations
  - Industry: Manufacturing, Transportation, Health
  - Function: Marketing, Information Technology
The importance of Cluster definition

- Using a different Cluster definition (group of occupations) could produce some different results
  - STEM and IT are two separate Career Clusters, but other STEM definitions (i.e. NSF) include scientists, math, IT and social science occupations.
  
  - Pathway changes would affect the assignment of occupations to clusters. For example, there now is an Accounting Pathway in the Finance Cluster. Accountants are currently in the Business Cluster.
Current Crosswalk Validation Project

- Project initially focused on CIP assignments to cluster because of need to have national standardization for accountability reporting.

- There was concern among the State Directors regarding the assignment of particular CIPs to particular Clusters.
Process

- Compare the Table 7 CIP Cluster assignment to the OSDS Unit of Analysis Cluster assignment

- Recommend adjustments, if necessary, based on decision rules that take into consideration:
  - Employment by industry of occupations related to the program
  - Skills (i.e. agricultural journalist; Ag or Arts/Comm.)
  - Existing pathway definitions; Accounting, Marketing
Status

- Recommendations have been sent to a group of experts for their review and recommendations
  - Response requested by March 15th

- Convert the CIPs to CIP 2010
  - Delete old CIPs and add new ones to revised Table 7 Cluster assignment

- Apply 2010 CIP–SOC Crosswalk to arrive at revised Table 7 Occupation/Cluster assignment
  - Review for consistency and reasonableness
POS, LMI AND THE USE OF LABOR MARKET INFORMATION IN CTE

James R. Stone III
Director
NRCCTE
A Few Thoughts

1. Labor market data provide possible targets for CTE programing but..
   • Education about work and working
   • Education through work to achieving academic ends
   • Education for work to prepare for tomorrow’s workplace

2. CTE offers many means for achieving the multiple targets for today’s students
Pedagogies of Quality CTE

- Classroom instruction
- Project based learning
- Contextualized learning
- Work based learning-WBL
- Labs
- Shops
- Job shadowing
- Internships
- School-based enterprise
- Cooperative education
- Apprenticeships
- CTSOs
- Leadership development
- Professional development
- Service/social engagement
- Competitive events
Two Approaches

- Long-Term Labor Market Projections
- Short-term – e.g., *Burning Glass-Real Time Labor Market Intelligence*

- Sector Strategy Analysis
- Links long term government policy targets to specific industry clusters
Kentucky’s Target Industry Sectors

- Health Care
- Transportation, Distribution & Logistics
- Automobile & Aircraft Mfg
- Business Services/R&D
- Energy Creation/Transmission
Built Upon Career Development

K-5: Career Awareness
Introduction to health careers

6-8: Career Exploration
Discovering interest in health careers - Begin Individualized Graduation Plan

Grade 8: Transition
Choosing a health career focus (can change easily at any time later)

9-12: Career Preparation
Academics and technical courses, intensive guidance, individual graduation plans

Postsecondary: Career Preparation
Achieving credentials: college, certification, apprenticeship, military

Employment: Career Advancement
Continuing Education and Lifelong Learning

A Developmental ILP that Drives Program Choice & Student Course Assignments
Framed Within a Program of Study

- Incorporates *secondary education and postsecondary education* elements;
- Includes coherent and rigorous content aligned with challenging academic standards and relevant career and technical content in a coordinated, *non-duplicative progression of courses* that align secondary to postsecondary education;
- Leads to an *industry-recognized credential* or certificate at the postsecondary level or an associate or baccalaureate degree; and
- May include opportunity for secondary education students to gain postsecondary education credits through *dual or concurrent enrollment* programs or other means.
- *K-12, Community College, Industry Based Models*
Early Lessons From POS Studies

• Partnerships

• Career Guidance/Development

• National Programs of Study Institute
CCR Components

- Academic Skills
- Technical Skills
- Employability Skills

Career Pathway

Career Guidance

State Policy

Industry Cluster Info

WBL

CTSO

CTE Class

Jobs

SkillsUSA

Career UR CAREER
One Final Thought

• High school is the last education opportunity paid for wholly by the public. Its purpose has to be to do the best it can to provide all who leave it the foundation necessary to enter, or further prepare for, adult life. - Barton, 2006
Questions? Comments?
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