How To Mine Job Listings To Parse Employer’s Need

August 17, 2017
Webinar will begin at 3pm ET
Webinar Details

• For this webinar you will be in listen only mode using your computer or phone
• Please ask questions via the question window
• This webinar is being recorded – you will be sent a recording link

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The CCTA is led by

- National Center for Convergence Technology (CTC) at Collin College in Frisco, TX (lead)
- South Carolina ATE National Resource Center (SCATE) at Florence Darlington Technical College in Florence, SC
- Florida ATE Center (FLATE) at Hillsborough Community College in Tampa, FL
- Bio-Link Next Generation National ATE Center for Biotechnology and Life Sciences (Bio-Link) at City College of San Francisco in San Francisco, CA
- Networks Resource Center at the Maricopa Community College District in Phoenix, AZ
CCTA Purpose

• Technical assistance services to DOL TAACCCT and NSF grantees and workforce-oriented programs of all kinds

• Deliverables
  – Topical webinars on existing and new solutions
    • Live/recorded with attendee Q&A
  – Identify and document best practices
  – Host convenings
Poll #1: Your Affiliation

A. I am involved with an NSF grant
B. I am involved with a TAACCCT grant
C. Both
D. Neither
Poll: How many people are listening with you?

A. None
B. 1
C. 2
D. 3 or more
Meet the Presenter

• I have had the privilege to be a PI and Reviewer NSF, ED, and NIH grants since 1989
• I have a Workforce Development background from my time at a large Community College District
• I am focused today on evaluation and assessment

Michael Lesiecki
Principal
Luka Partners
How To Mine Job Listings To Parse Employer’s Need

The story of my attempts to understand
Acknowledgements:

- John Catapano, Maricopa Community Colleges
- John Carrese, California Centers of Excellence
- Dan Restuccia, Burning Glass Technologies
- Mark Lashinske, Modern Industries
- Leah Palmer, Mesa Community College
Points of View

• PIs, grant developers, workforce development personnel, faculty

NIH Image Gallery, NCI
Today

• Paint the picture of the need and rationale
• How does curriculum keep pace now?
• Methodology: Looking to the Demand side
• What is knowable?
• What are the limitations?
• How this can fundamentally change your relationship with industry?
• Rationale?
Jobs Support Our Gainful Employment Data

U.S. Department of Education

Gainful Employment

NOVEMBER 17, 2016

Education Department Releases New Graduate Earnings Data for Career College Programs

Editor's Note 11/23/16: The specific highlight comparing the median earnings of for-profit certificate program graduates to the yearly income of a full-time worker earning the federal minimum wage was updated to more directly reflect the shares of graduates in the for-profit and public sectors.
Gainful Employment

Mesa Community College
Undergraduate certificate in CNC
Machining I
Program Length: 48 weeks

Students graduating on time
N/A* of Title IV students complete the program within 48 weeks

*Fewer than 10 students enrolled in this program. This number has been withheld to preserve the confidentiality of the students.

Program Costs*
$3,268 for in-state tuition and fees
$12,426 for out-of-state tuition and fees
$1,014 for books and supplies
$7,632 for off-campus room and board
Other Costs
Visit website for more program cost information
Connecting Industry With Our Talent Pipeline

We often struggle with this
Employer Recruitment Efforts

Figure 12:
Identify which of the following are your company’s top sources of employee recruitment for skilled production workers, including the effectiveness of each.

Source: The Manufacturing Institute
### Employer Preferred Strategies

**Figure 16:** How important are the following techniques to mitigate the effects of existing skills shortages for a skilled production workforce?

<table>
<thead>
<tr>
<th>Technique</th>
<th>Extremely Effective or Very Effective</th>
<th>Moderately Effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involvement with local schools and community colleges</td>
<td>81%</td>
<td>13%</td>
</tr>
<tr>
<td>Internal employee training and development programs</td>
<td>32%</td>
<td>32%</td>
</tr>
<tr>
<td>External training and certification programs</td>
<td>30%</td>
<td>28%</td>
</tr>
<tr>
<td>Use of overtime</td>
<td>20%</td>
<td>29%</td>
</tr>
<tr>
<td>Creation of new veteran hiring programs</td>
<td>21%</td>
<td>27%</td>
</tr>
<tr>
<td>Use of contingent labor (staffing agencies, etc.)</td>
<td>22%</td>
<td>26%</td>
</tr>
<tr>
<td>Flexible work arrangements</td>
<td>18%</td>
<td>25%</td>
</tr>
<tr>
<td>Outsourcing of certain functions</td>
<td>11%</td>
<td>22%</td>
</tr>
<tr>
<td>Focused recruiting on specific workforce segments, (i.e., gender and/or diversity initiatives)</td>
<td>10%</td>
<td>12%</td>
</tr>
<tr>
<td>Considering a new geographic location (within the U.S.) due to easier access to talent</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>Considering a new geographic location (cross-border to Mexico and/or Canada) due to easier access to talent</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>Considering a new geographic location (abroad to other parts of the world) due to easier access to talent</td>
<td>4%</td>
<td>5%</td>
</tr>
</tbody>
</table>

*Source: The Manufacturing Institute*
It Sometimes Seems

• Fields change overnight
• Desired skills change every week

How can we keep up?
Historically

We rely on our curriculum process

And our industry connections
A Rhetorical Question

How many of us swear our programs are tightly aligned to industry’s needs?
Second Rhetorical Question

How many of us have written proposal *need* and *rationale* sections, claiming we need to more closely align our programs to industry’s needs?
Third Rhetorical Question

• When our industry advisory board meets, do we sometimes struggle when it comes to talking about needed skills?
Question that came into the window
Looking At The Demand Side

• Data from Burning Glass Technologies (and others) used to look at job postings

• Analysis of:
  – Top employers
  – Top skills and certifications
  – Educational requirements
  – Job titles
We Are Not Talking About Workforce Demand

• Clearly the number of jobs is important, but not today

Seattle Times
How It Works

• You use a data miner like Burning Glass Technologies

• There are others
What is Burning Glass?

An Interactive, report-generating application that gives users real-time access to a comprehensive database of demand (jobs) data

*Intelligence on the nature and context of the employer demand*
Next: Find Your Analyst

They are usually located within Institutional Research Research or Workforce Development
I Sat Down With John
I Sat Down With John

I said: *I want intelligence on the nature and context of the employer demand*
I Sat Down With John

I said: I want intelligence on the nature and context of the employer demand

He said: let’s get started
What Industry?

• He meant what NAICS number

North American Industry Classification System (NAICS), a federal standard to classify industries
What Occupations?

• He wanted to know what was the SOC code

Standard Occupational Classification (SOC) system
  – A federal system that classifies workers into occupational categories
I said: *maybe we should use O*NET, the occupational information code system*

https://www.onetonline.org/find/

O*NET: Occupational Information Network
Details Report for:
51-9141.00 - Semiconductor Processors

Perform any or all of the following functions in the manufacture of electronic semiconductor segments; load individual segment into crystal growing chamber and monitor controls; loc
He said: *let’s just log in*


They say: *we mine and code detailed data from each posting describing the specific skills, education, experience, and work activities required for the job – going well beyond the occupation and industry codes offered in other sources.*
Create a Report

We then ran the Skills report.
For Manufacturing
Questions?
Poll #3

I have used data mining approaches like this

A. Yes, to determine number of jobs forecast

B. No, not yet
Poll #4

I have used data mining approaches like this:

A. Yes, to determine skill need

B. No, not yet
I wasn’t really sure what this was telling me yet
I got on the phone
Dan Restuccia | Chief Analytics Officer
Burning Glass Technologies
Dan said, we try to predict and understand the future from looking at the recent past

- If we can make skill projections by looking at individual skills and skill growth we can gain insight
- Insight into how the job market is evolving
We Care About

Educators care about what are the most common skills

Educators build their programs around those skills
They Care About

Industry cares about what are the most distinctive skills that help them push what they are trying to do

• Certain firms (or hubs), who are the leaders, are identifying the skills that will probably flow down
Consider

Job descriptions at Tesla look like a tech firm

Job descriptions at Ford look like a more conventional manufacturer
That Gave Me An Idea

Lucid Motors, a California startup, will build a $700 million plant in Casa Grande to manufacture luxury electric vehicles.

"stealing from the playbook"
Reports

• Best ones to run?
  – Software skills
  – Baseline skills
  – Keyword function

• What about “needed certification” reports?
  – There are very few explicit requests
  – Exception: welding
Dan’s Advice

• Worry more about the rank order than the absolute numbers
Industry Advisory Board Meetings

• This changes the equation
• Employers can react to the data
• Job postings are their way of telling you what they want

• At my next meeting of the BILT....
Business and Industry Leadership Team

Our Chair is from Modern Industries
Conversation

Mark, we ran the data

Our analysis of your postings shows...
Skills at Modern Industries

Skills in Greatest Demand
Aug. 01, 2016 - Jul. 31, 2017
There are 6 postings available with the current filters applied.
There are 0 unspecified or unclassified postings.

Showing 8 results

- Lean Manufacturing: 6
- Inspection: 6
- Computer Numerical Control (CNC): 6
- Machining: 4
- Milling Cutters: 3
- Macros: 3
- Computerized Numerical Control Lathes: 3
- CNC Mill: 3

View Job Postings
2nd Highest Skill

Mark, could this possible be right?

Mike, Yes inspection in general is a skill of high demand

My world changed
This as been a very “local” discussion so far.

Let’s travel to California and look at a much bigger picture.
Process (On A Lager Scale)

• Defining the Industry through NAICS codes in five industry subsectors

• Defining Occupations: challenges using SOC codes
  – Group 1: 6 SOC codes
  – Group 2: 14 SOC codes

• Analyzing Demand
Demand Side

1. EMSI for projected job demand
2. Burning Glass data for
   - Top employers
   - Top skills and certifications
   - Educational requirements
   - Job Titles
Process (continued)

• This helped them understand the employers in the sector
• They next turned to their own institutors to determine the “supply”
• Then they dove deeper into the data for skills
## Table 6: Top Required Skills by Employer Job Postings in California (n=2,863)

<table>
<thead>
<tr>
<th>Technical Skills (Specialized)</th>
<th>Fundamental Skills (Baseline)</th>
<th>Number of Job Postings, Jan–Dec 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry*</td>
<td>Quality Assurance and Control**</td>
<td>705</td>
</tr>
<tr>
<td>Inspection</td>
<td>Communication Skills</td>
<td>513</td>
</tr>
<tr>
<td>Good Manufacturing Practices (GMP)</td>
<td>Research</td>
<td>504</td>
</tr>
<tr>
<td>Biology*</td>
<td>Organizational Skills</td>
<td>366</td>
</tr>
<tr>
<td>Experiments</td>
<td>Writing</td>
<td>352</td>
</tr>
<tr>
<td>Laboratory Equipment</td>
<td>Microsoft Excel</td>
<td>346</td>
</tr>
<tr>
<td>Validation</td>
<td>Detail-Oriented</td>
<td>291</td>
</tr>
<tr>
<td>Good Laboratory Practices (GLP)</td>
<td>Computer Skills</td>
<td>262</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>Troubleshooting</td>
<td>244</td>
</tr>
<tr>
<td>Calibration</td>
<td>Problem Solving</td>
<td>225</td>
</tr>
<tr>
<td></td>
<td>Number of Job Postings, Jan–Dec 2013</td>
<td>1,100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,027</td>
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<td></td>
<td></td>
<td>898</td>
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<td></td>
<td>804</td>
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<td></td>
<td>468</td>
</tr>
<tr>
<td></td>
<td></td>
<td>345</td>
</tr>
</tbody>
</table>
One Of Their Findings

The community colleges provide important training for these jobs, but might need to expand their capacity and align programs to meet employer demands.
Summary:

• You can see the rationale for using this data mining approach
• You hopefully can find someone to help you look at the “demand” side
Summary (continued)

• You could really use this as evidence to support proposal development and program alignment
• You can now talk to industry
• You see how this could be applied locally or more grandly
• You are happy you attended today
Questions

Ask Frequently, Ask Often

Follow Up Questions Welcome

mlesiecki@gmail.com
Join Us – All Webinars 3 pm Eastern

Thursday, September 21, 2017

Preparing for the Future - The Ins and Outs of Succession Planning

Succession planning is an organizational strategy in which employees are recruited and developed so that each key role is consistently and continuously filled. A good plan for succession ensures continuity in organizational and positional knowledge. Join us to learn and share good practices and ideas for ensuring continuous knowledge and how succession planning can impact the sustainability of any organization, including educational consortia.

Presenters: Marilyn Barger, Principal Investigator (PI) & Executive Director, Florida Advanced Technological Education Center

Phil Centonze, Director of Client Engagement
FloridaMakes

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