The Latest Business-Led Curriculum for IT and Communications with Cyber Infusion

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Educators believe their graduates are prepared for work
Businesses do not agree
Depending on the study, percentages vary
Percentages on each “side” are not always the same, but the trends match
96 percent of college and university chief academic officers said they are extremely or somewhat confident in their institution’s ability to prepare students for success in the workforce.

11 percent of business leaders strongly agree today’s college graduates have the skills and competencies that their business needs.

John M. Eger, “Business and Education Executives Just Don’t See Eye to Eye,” Huffington Post, 04/12/2014
72 percent of educators believe their graduates are ready for work in an entry-level job.

42 percent of business leaders agree.

Major Goal for All Technical Programs

STUDENTS completing certificates and degrees are well-qualified for ready employment

BUSINESSES are highly engaged
Business & Industry Leadership Team

Developed/refined by National Convergence Technology Center
National Science Foundation (NSF) Advanced
Technological Education (ATE) Center led by Collin College

- BILT Leadership is foundation of ALL the Center’s work
- Process used for 25 years, but refined and scaled since 2004 through the work of the CTC (regional, now national)
- Used to address the downturn in IT in the early 2000’s – primarily networking/cyber focused
- Shared with consortium of 64+ college and university partners
- Designed with lock-step cooperation with regional (and now national) businesses to ensure employment for graduates
- Also used for $20 million TAACCCT national grant with 7 colleges in 6 states
Using the BILT Process Ensures...

College curricula align with what businesses want to hire 12-36 months into the future
BILT Tackles the Issues Head-on

Business and Industry Leadership Team (BILT) model born from idea that:

- Businesses that co-lead the work hire students because they have a greater say in defining Knowledge, Skills, and Abilities (KSAs) they want in graduates/applicants

- Engaged businesses can provide:
  - detailed course and curriculum feedback
  - expertise in direction and evolution of labs
  - inside look at sector trends
  - job forecasting
  - work-based learning opportunities
Business leaders:
- Identify KSAs needed in curriculum, which colleges map to curriculum (and provide feedback to businesses on what they can and cannot do)
- Participate in quarterly forums to share trends with other business leaders in a neutral, non-proprietary environment
- Develop relationships with colleges preparing their future employees
- Generate positive press for commitment to enhancing local workforce
Essentials of a BILT

- Business Advisory Council “on steroids”
- BILT co-leads the work
- Works for any Career/Tech Education discipline or grant
- Curriculum aligns with THEIR needs
- They clamor to hire graduates and help
- Meets quarterly (1x F2F/3x virtually)
- Structured process for recruiting and engaging BILT members based on USAF process
What and When

- Meets **quarterly**, not 1-2 times per year (less than qtrly is “out of sight, out of mind”)
- Right people on the BILT
  - High-level **technical** executives
  - First-line hiring managers
  - Technicians
  - HR representatives, as long as they are not the sole reps for a company
- Regional BILT advising multiple colleges
Job Skills Validation Process

Curriculum aligned based on solid business-driven process originated in the U. S. Air Force

- **Annual** process
- Modified DACUM to identify KSAs needed in graduates (4-6 hr. meeting)
- Faculty determine how to address KSAs through curriculum by cross-referencing desired KSAs to existing courses and developing new modules or courses to fill gaps
- National work feeds local BILTs
Job Skills Validation Process
### National Business and Industry Leadership Team (BILT) Knowledge Domains - updated August 2017

* Skills for an entry-level IT worker looking for a job 2-3 years from Fall 2017.
* Be sure ITIL (change management and root/cause analysis) elements are covered as needed in every course. ISO 900009001 Quality Management criteria.
* Consider on-site tours.

<table>
<thead>
<tr>
<th>KSA</th>
<th>Knowledge, Skill, Ability</th>
<th>Topic</th>
<th># votes (4 = most important)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>K1</td>
<td>Linux / Unix OS</td>
<td>Current within 3 years, as of now the operating system of the IoT</td>
<td>13</td>
</tr>
<tr>
<td>K2</td>
<td>Windows Server OS</td>
<td>Current within 3 years, need this background for AWS and Azure</td>
<td>2</td>
</tr>
<tr>
<td>K3</td>
<td>Operating System</td>
<td>Includes topics such as account mgmt, installing apps, command line, directory, file structures, os scripting, config modification, backup/restore, os admin, scheduler, stopping/starting services, change control, documentation, awareness of HP, and SLA/OLA, log files and patches, ACL.</td>
<td>15</td>
</tr>
<tr>
<td>K4</td>
<td>OSI Model</td>
<td>Provides basic framework for how it all works, including how cloud computing has impacted the conceptualization of the seven layers. Plus and awareness of IP multimedia services.</td>
<td>15</td>
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<td></td>
<td>Understand that OSI is the framework for all problem solving and troubleshooting</td>
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<tr>
<td>K5</td>
<td>Enterprise Mobility and Collaboration</td>
<td>Collaboration Technologies - Making enterprise mobility work: A basic understanding of the building blocks for how enterprise mobility operates. Also an awareness of the security requirements.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>PSTN messaging</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VoIP video conferencing</td>
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<tr>
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<td></td>
<td>Bluetooth presence</td>
<td></td>
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<td>Messaging use VoIP</td>
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Three Virtual Meetings Annually

- Trends identified to get head-start on curricular changes
- Informal forecast of future employee need
- Program review for multiple colleges (certificates/degrees)
- Review/approval of major grant activities/progress
- Other topics as appropriate
From a BILT Member’s Perspective

Mercedes Adams
NetApp University
Strategic Programs and Alliances
How a BILT is Different

**ADVISORY:**
- Industry Advised
- Suggested KSA
- Business suggests enhancements to curriculum
- Business is not vested in long-term success of programs
- Ignored advice erodes business commitment

**BUSINESS-LED:**
- Industry Led
- “Required” KSA
- Curriculum recognized by BILT
- Business has “skin-in-the-game”
- Business has the opportunity to reduce OJT (On-the-Job-Training)
- Business has ability to “give back” to community in a multi-generational life-changing way
Results of an Active BILT

- Curriculum aligned to produce workforce-ready grads
- Involvement in recruitment events
- Professional development for faculty
- Internships for students; externships for faculty
- Business mentoring for both students and faculty
Results of an Active BILT

- Guest speakers
- Co-authoring whitepapers
- Evaluation of capstone presentations
- Participation in panels at conferences
- Hiring of graduates
A Sample of The Latest Information Technology/Communications Curriculum with Cyber Infusion
Prioritizes and updates a list of KSAs they want graduates to have 12-36 months in the future

Information goes out to the colleges for review by their BILT teams and for faculty to map prioritized KSAs against current curriculum

Colleges identify gaps and create new curriculum patterns, and the patterns are not all the same (CTC coordinates curriculum development for new courses)
Sample from Collin College

- For entry-level IT jobs that are not solely Cybersecurity-focused

- One college’s version among many
Computer Networking Tracks

- AAS – Computer Networking
  - Infrastructure Track
  - Integrated Networking Technologies Track
  - Systems Track

- Occupational Skills Award – Entry-Level Network Support (*shared by all tracks*)
Infrastructure Track

- Prepares graduates to design and install secure network systems with a focus on managing network devices

- Helps to prepare students for the CCNA and CCNP professional certification exams
Infrastructure Track Certificates

- Certificate 1 – Infrastructure Technician (CCNA)
- Certificate 1 – Infrastructure Wireless Technician
- Certificate 2 – Infrastructure Administrator
Systems Track

- Prepares graduates to design and secure network systems with a focus on managing servers

- Helps prepare students for MCSA and CCENT professional certifications
Systems Track Certificates

- Certificate 1 – Integrated Networking Cloud Technician
- Certificate 1 – Integrated Networking Virtualization and Storage Technician
- Certificate 2 - Integrated Networking Administrator
- Certificate 3 – Systems Administrator
- Certificate 3 – Networking Systems Professional (CCNP)
Integrated Networking Technologies Track

- Prepares graduates to design and secure network systems with a focus on cloud, storage, and virtualization networking technologies

- Helps prepare students for CCENT, EMC, vSphere professional certification exams, among others
Details for All Collin Tracks

Questions?
Resources

- BILT Resources from the Convergence Technology Center: http://connectedtech.org
- Webinars on employer engagement/related topics - Centers Collaborative for Technical Assistance: http://www.atecenters.org/ccta
- Mark Dempsey, mdempsey@collin.edu
- Ann Beheler, abeheler@collin.edu
- Mercedes Adams, mercedes.adams@netapp.com