Today's Road Map

- Seven essentials of the BILT model

- Recruiting employers

- Preparing for the KSA meeting

- Conducting the KSA Meeting

- Behind the Google Sheet

- Employability Skills

- After the KSA Meeting

- Key Performance Indicators

- Student Learning Outcomes

- Cross Reference

Seven BILT Essentials

Two GOALS of a BILT

BUILD RELATIONSHIPS

ALIGN CURRICULUM

THE BILT MODEL ESSENTIALS

1. **CONVENE** quarterly
2. **SCHEDULE** time BILT to talk industry trends
3. **INVITE** faculty to attend
4. **PRIORITIZE** a detailed list of KSAs once a year
5. **MAP** prioritized KSA list to curriculum
6. **GIVE** regular feedback to the BILT
7. **ASSEMBLE** "single-discipline" BILTs

THE ⟨BILT MODEL ESSENTIALS
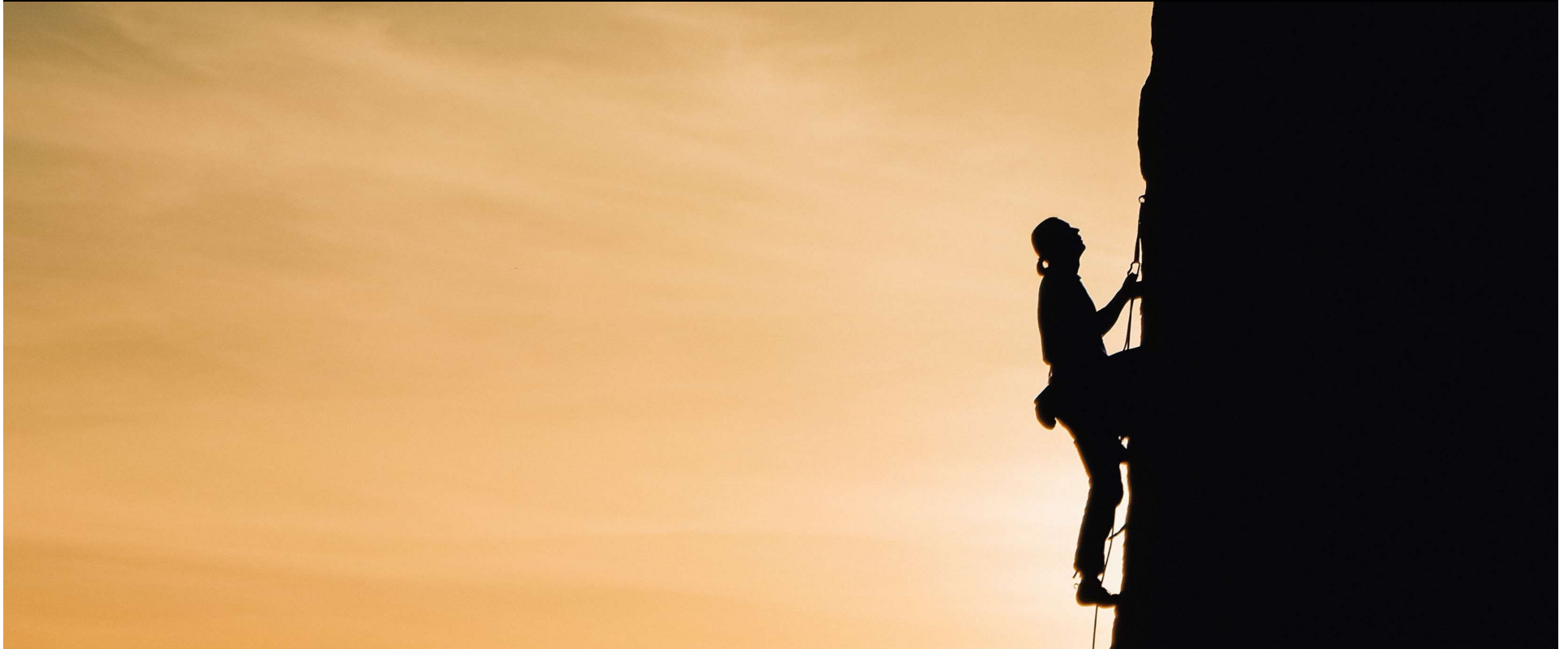
CONVENE QUARTERLY

Avoid "out of sight, out of mind."

Meetings don't always have to be in-person.

Three shorter meetings for trends, one longer meeting for KSAs.

IMPLEMENTATION CHALLENGES

CHALLENGE: Reluctance to schedule frequent meetings.

Meetings don't have to be an elaborate in-person event – virtual meetings work.

Takes time to build relationships. Strive for quarterly.

THE ◉BILT MODEL ESSENTIALS

DISCUSS TRENDS

Shorter (not focusing on KSAs) meetings allow time for BILT members to share perspectives on industry trends.

Help keep educators better understand what's coming.

Nothing proprietary.

Top 10 skills of 2025

World Economic Forum

- Analytical thinking and innovation
- Active learning and learning strategies
- Complex problem-solving
- Critical thinking and analysis
- Creativity, originality and initiative
- Leadership and social influence
- Technology use, monitoring and control
- Technology design and programming
- Resilience, stress tolerance and flexibility
- Reasoning, problem-solving and ideation

Type of skill
- Problem-solving
- Self-management
- Working with people
- Technology use and development

Source: Future of Jobs Report 2020, World Economic Forum.

FIVE I.T. TRENDS - Winter 2022

NATIONAL CONVERGENCE TECHNOLOGY CENTER

The list below summarizes IT trends discussed by the National CTC's BILT (Business and Industry Leadership Team) at the November 2022 meeting. The purpose of these "trend talks" is to keep faculty – and their students – informed on the ever-evolving IT landscape.

1 **Employability skills remain in demand.** Employers aren't interested solely in new hires' technical "hard" skills. Students also need to be nurturing their interpersonal skills, especially when it comes to working within their team and across other teams to find solutions to complex problems. Collaborating, building relationships, and problem solving are all essential skills. As much as students may dislike it, the best way to teach these concepts is through hands-on classroom group work where different personalities and perspectives must come together in pursuit of a single goal.
Learn more: https://www.weforum.org/agenda/2020/10/top-10-work-skills-of-tomorrow-how-long-it-takes-to-learn-them/

2 **Data is increasingly moving to the edge.** More and more, there's no time for information to go all the way back to the traditional data center. Decisions and actions have to be made closer to the "edge" in a more distributed fashion. One employer noted that their customers often mistakenly think their cloud is secure based on the cloud provider's security system, but that's only securing the platform. It's up to the customer to take additional steps to secure the workloads and data that's inside the cloud at the edge.
Learn more: https://www.redhat.com/en/blog/5-security-considerations-edge-implementations

3 **Certifications can get students past the HR gatekeeper.** It's important that students not just take certification classes, but take and pass the cert exam. At larger companies, HR will treat certifications as a filter. That is, if a job posting gets 200 applicants but the managers only want to interview 10 people, HR needs a way to winnow that pool of applicants down. Often, certifications provide the filter. Those with the cert make it to the interview, those without the cert don't.
Learn more: https://www.indeed.com/career-advice/career-development/top-it-certifications

4 **Security clearances require a clean drug test.** One employer from a large defense contractor stressed how many fantastic, well-paying IT jobs require a security clearance. But if you can't pass a drug test cannot get the clearance. That includes marijuana use, which is not permitted. It's surprising how many otherwise qualified job applicants fail the drug test and don't get the job as a result.
Learn more: https://www.dcsa.mil/Portals/91/Documents/pv/mbi/DCSA_SF-86%20Guide_070621.pdf

5 **AI is becoming "generative."** – Rather than task AI with "doing things," now AI will start to create value and develop new insights. That is, AI algorithms increasingly will create new content. Aside from online tools that produce art created by AI programs (https://hotpot.ai/art-generator), generative AI is happening now with pharmaceutical companies formulating new medicines and large defense contractors testing systems and predicting failures based on data rather than actual system performance. This will become more and more common across all industries.
Learn more: https://www.altexsoft.com/blog/generative-ai/

THE ⬤BILT MODEL ESSENTIALS

INVITE FACULTY

Instructors should be in the room to hear first-hand from BILT members.

Faculty available to ask and answer questions.

THE ⬤BILT MODEL ESSENTIALS

CONDUCT ANNUAL VOTE

Once a year, BILT members prioritize a detailed list of entry-level KSAs (knowledge, skills, and abilities) for 12-36 months into the future.

The vote and discussion is a structured, repeatable process.

You need more than 2 or 3 employers.

THE BILT MODEL ESSENTIALS

CONDUCT ANNUAL VOTE

You're either...
- Developing a new KSA list
- Updating your KSA list from last year's vote and discussion

	Infrastructure KSAs - updated Summer 2022	# votes (4 = most important)				green cells ≥ 2.60
		4	3	2	1	Avg
	Tasks SPECIFIC THINGS an entry level person would BE EXPECTED TO PERFORM on the job WITH LITTLE SUPERVISION.					
T-1	Configure network, routers, and switches (e.g., higher-level protocols, tunneling).	2	3	1	3	2.44
T-2	Diagnose network connectivity problem.	4	3	1	1	3.11
T-3	Install and maintain network infrastructure device operating system software (e.g., IOS, firmware) which would include patch network vulnerabilities to safeguard information.	3	5	0	1	3.11
T-4	Install or replace network, routers, and switches.	3	4	2	0	3.11
T-5	Integrate new systems into existing network architecture.	4	4	2	0	3.20
T-6	Monitor network capacity and performance.	0	7	1	1	2.67
T-7	Test and maintain network infrastructure including software and hardware devices.	0	6	2	1	2.56
T-8	Conduct functional and connectivity testing to ensure continuing operability.	2	8	0	0	3.20
T-9	Implement group policies and access control lists to ensure compatibility with organizational standards, business rules, and needs.	1	7	2	0	2.90
T-10	Support group policies and access control lists to ensure compatibility with organizational standards, business rules, and needs.	1	7	2	0	2.90
T-11	Follow SOP and validate/update documentation of compliance.	8	2	0	0	3.80
T-12	Validate/update baseline system security according to organizational policies.	3	6	1	0	3.20
T-13	Manage accounts, network rights, and access to systems and equipment.	4	4	2	0	3.20
T-14	Provide ongoing optimization and problem-solving support.	4	4	1	0	3.33
T-15	Install, update, and troubleshoot systems/servers.	5	4	1	0	3.40
T-16	Check system hardware availability, functionality, integrity, and efficiency.	6	3	1	0	3.50
T-17	Conduct periodic system maintenance including cleaning (both physically and electronically), disk checks, routine reboots, data dumps, and testing.	4	4	2	0	3.20
T-18	Implement local network usage policies and procedures.	4	5	1	0	3.30
T-19	Manage system/server resources including performance, capacity, availability, serviceability, and recoverability.	3	5	2	0	3.10
T-20	Monitor and maintain system/server configuration.	6	3	1	0	3.50

THE BILT MODEL ESSENTIALS

MAP THE KSAs

Faculty meets to map the prioritized KSA to identify gaps in program curriculum.

Curriculum adjustments are guided by gaps.

K or S	Explanation/Clarification	Avg.	293	295	181	344	345	241	242	127	143	144	223	304	346	243	347	316	E's
K-1	Knowledge of how to identify the machining motion of a 3 axis CNC mill and a 2 axis CNC Turning Center	3.875	E	E		E	E		E					E	E	T	T		
K-2	Knowledge of how to identify the 4 quadrants of rectangular coordinate programming.	3.125				E	E		E						E	T	T		
K-3	Knowledge of how to identify CNC Milling machine and CNC Turning Center components.	3.375	E	E										E					
K-4	Knowledge of how to recognize incremental and absolute positioning.	3.250				E	E		E						E	T	T		
K-5	Knowledge of how to identify the proper coolant, oil, and air supply levels for CNC mills and turning centers.	3.000	E	E										E					

THE (BILT MODEL ESSENTIALS

GIVE FEEDBACK

Ensures BILT members feel heard and valued.

Share how you implemented their suggestions.

If you can't do what they ask, tell them – the BILT can sometimes offer solutions.

THE ◖BILT MODEL ESSENTIALS

DIVIDE YOUR BILT

Leverage the know-how of your subject matter experts in their specific discipline.

THE BILT MODEL ESSENTIALS

DIVIDE YOUR BILT

Convene a "super-BILT" for broad "umbrella" program discussions and trends.

Build niche "sub-BILTs" to look at specific KSAs for a discipline area.

BILT MEETINGS EXAMPLE

SPRING
Super-BILT
trends meeting

NETWORKING BILT
PROGRAMMING BILT
SECURITY BILT
TOGETHER

SUMMER
Super-BILT
trends meeting

NETWORKING BILT
PROGRAMMING BILT
SECURITY BILT
TOGETHER

FALL
Three sub-BILT
KSA meetings

NETWORKING BILT

PROGRAMMING BILT

SECURITY BILT

THE ⊙BILT MODEL ESSENTIALS

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Recruiting Employers

Recruitment Overview

- Focus on single discipline

  Not an entire division
  (Ex: Welding works; overall Manufacturing does not)

- Compile your BILT target list

- Reach out via email AND phone – it's high-touch

Composition of BILT

- Companies are representative of those who hire your graduates
- High-level technical executives
- First-line hiring managers
- Technicians
- HR execs, usually not the sole reps for a company
- Faculty are ex-officio; they *listen* and ask questions

Diversity Among BILT Members

- Highly desirable for the companies to hire Associate level students and be local/regional

- Consider diversity measures such as gender, ethnicity, etc.

- Various types and sizes of companies

- Types of jobs within those companies, both now and in the future

- Desirable to have BILT members able to predict future needs

BILT Member Profile

- Qualified as subject matter experts for your program

- Dedicated to co-leading

- Have a WIIFM that is addressed

TIP: Recruit enough to have a minimum of 8-10 members attend your meetings

Mandatory for the KSA meetings

How to gauge that expertise?

- Ask

- Check out LinkedIn profiles

- Get referrals from those you know (your employer team member on this project, for example)

- And, don't forget - existing Advisory Council Members should not be fired!

Subject Matter Expertise

Potential BILT Member Availability and Time Commitment

- Are they available to participate for the quarterly meetings?

- How much do they need YOU and your work to accomplish their goals?

TIP: BILT members may need to miss one or more meetings in a year. Most important meetings are the KSA analysis meeting and the Feedback meeting

Sample Employer Recruitment Letter

At XYZ College, we're aware of the welding skills gap in our community and want your input on how we can increase your pool of qualified applicants. Our welding program is adopting the Business & Industry Leadership Team (BILT) model that puts employers in a co-leadership role. Our goal is to align curriculum with your talent needs so our graduates meet your requirements.

To accomplish this, we need a welding expert from your company to help identify the knowledge, skills, and abilities (KSAs) you want in workers 12-36 months from now. The time commitment will be about 8 hours annually. We'll have four meetings: a KSA analysis and 3 trends discussions.

Who from your company can join us?
(Provide date / time for Orientation or KSA meeting to close the pitch.)

Compiling List of Potential BILT Members

- Current Advisory Council members
- Supportive community organizations:
  - Chambers of Commerce
  - Economic Development Corporations
  - Workforce Boards
  - Trade Associations
- Contact your supervisor for guidance on working with others at the college whose focus is employers

The Elevator Pitch

Best pitches are only 4-5 sentences and describe:

- Your program

- Why you need employer SMEs

- What you need them to do and how long it will take

- Potential WIIFM for them (can vary)

- Close by asking for participation

Determine the Ask

Brainstorm possible objections and proactively develop responses

Develop additional questions to address other WIIFMs

- Would your company benefit from a trends discussion with other key employers in our area?

Addressing Concerns

Customize Your Elevator Pitch For Each Constituent

Address value of your work from the listener's point of view

Adjust Elevator Pitches for New Program

- Very similar, but rather than updating / augmenting a Business Advisory Council, you'll be starting from scratch

- Definitely need clear picture of labor market demand *before* recruiting BILT members

Elevator Pitch - Employer

We at (your college name) want to align a program in (program name) with employer demand in our area, and we are adopting the Business & Industry Leadership Team (BILT) Model for our advisory council. The BILT is a proven model that puts area employers in a co-leadership role for our programs.

We invite (business rep name or their company) to become part of our BILT team to guide our curriculum so that the knowledge and skills of our graduates better-align with your needs for job candidates.

Could you join us for a virtual orientation session in February or March (date TBD) to learn more about our BILT and how your participation may be beneficial? We will meet no longer than an hour.

Recruiting Other Key Internal and External Stakeholders

External to the College:

Workforce Boards, Economic Development Corporations, and Trade Associations typically want

- More qualified workers in a job area
- To at least listen in on the KSA and trends meetings

Your Community Benefits

Inside the College:

- Administrators are often motivated by enrollment numbers

- Other faculty want to teach relevant content and want to be involved too once they understand the value of the process

- Staff benefit from seeing how you've positioned your program to be more responsive to the community

Your College Benefits

Recruit and Inform Internal Stakeholders

CUSTOMIZE YOUR PITCH...

- Other Faculty

- Faculty Chair

- Dean and/or Associate Dean

- Vice President of Workforce

- President

- Trustees? (President makes this contact in most cases)

Approach External Stakeholders to Assist with BILT Recruitment

Ask for "warm" email or phone introductions / referrals to potential BILT Members

- Workforce Board

- Chamber of Commerce

- Economic Development Corporations

- Associations in the discipline

TIP: Invite external stakeholders to attend BILT meetings as observers

Elevator Pitch – Vice President

Good to see you Vice President Smith. I'd like you to know about work we're doing to strengthen our Welding program and better align it with employer needs. We are implementing the Business & Industry Leadership Team (BILT) model that puts employers in a co-leadership role to guide our curriculum. This model has shown positive results at colleges across the country.

We are expanding our advisory council to include future-focused welding subject matter experts from local companies. They will participate in a structured KSA analysis process to identify the knowledge, skills, and abilities our graduates should possess 12-36 months from now. Faculty will align and update our curriculum to make sure it addresses these industry priorities. We're excited about deepening employer engagement to strengthen the program so we can **increase enrollments and meet local workforce needs.**

Ask for what you need from Vice President Smith [here].

IMPLEMENTATION CHALLENGES

CHALLENGE: Inability to find committed employers.

Once BILT members understand their voice is heard and realize they are co-leading the program, they will commit.

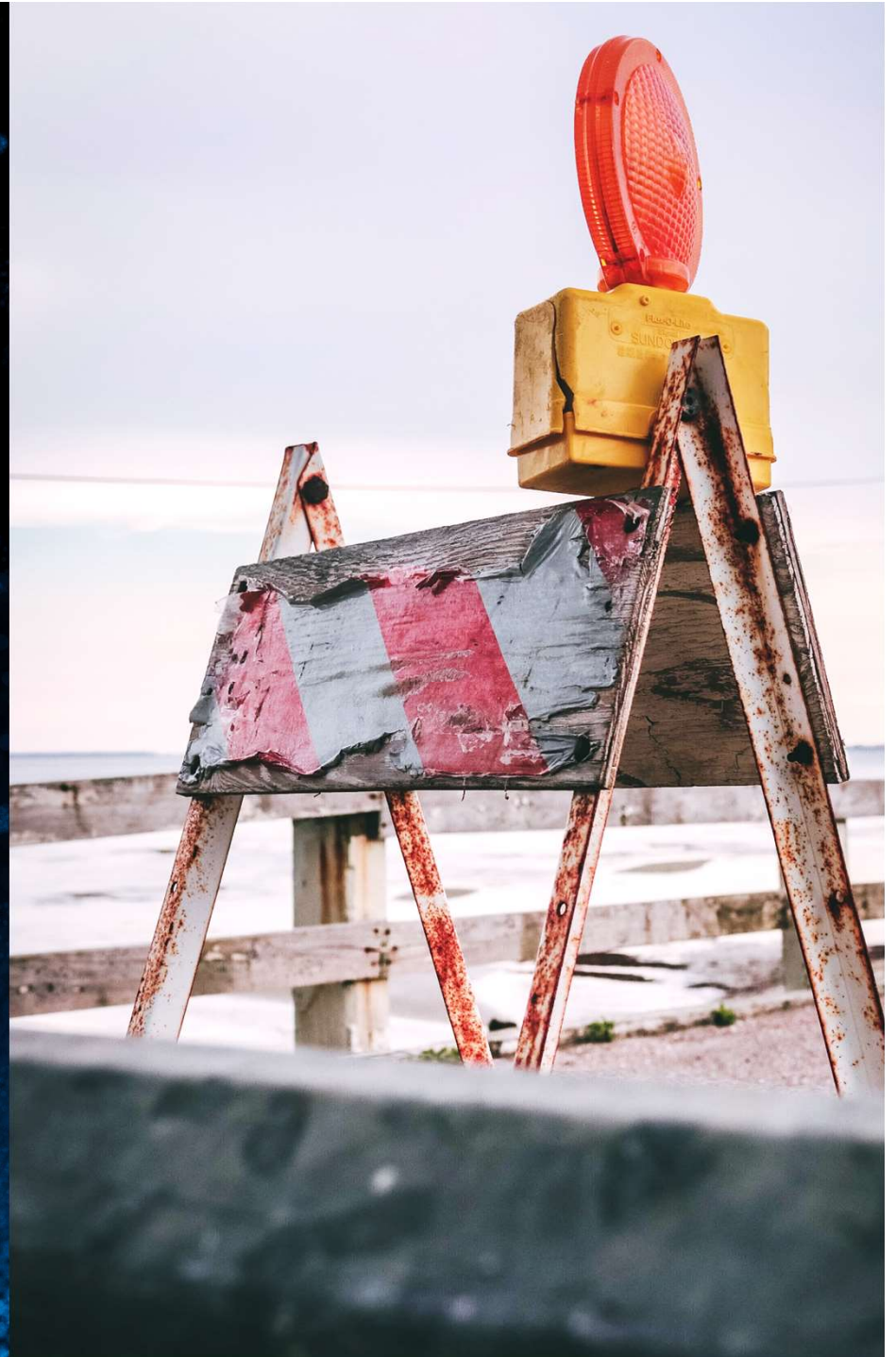Address BILT members' "WIIFM" – what's in it for me?

IMPLEMENTATION CHALLENGES

CHALLENGE: Difficulty getting institutional buy-in.

Start small (don't launch more than one!) to build your case for wider implementation. BILT success inspires copycat adoption.

Recruit a faculty "influencer" that others follow.

Break

Activity
Your Elevator Pitch

IT SKILL STANDARDS 2020 AND BEYOND

Background and Context

- Created by NSF ATE Convergence Technology Center

- Uses PCAL7 (Performance Criteria AnaLysis) process developed by US Air Force

- Prioritizes the Knowledge, Skills, and Abilities (KSAs) businesses will need in entry-level workers 12-36 months into the future

- Consensus is not the goal

- Results of prioritization help faculty align curriculum to workforce needs

Start with a pro forma list, not a blank wall

Pro forma list

What is a pro forma list?

A starting point that provides metrics for discussion – a best estimate of knowledge/skills

Approximately 70-150 of mostly knowledge and skills

Pro forma list

Creating the pro forma list

- Compile pro forma KSAs and Tasks for employer evaluation using a variety of existing skill standards (e.g. NICE and NIST, associations associated with the industry, Career Onestop, and various state standards) – no reinvention of the wheel

- Remove any duplicated items from the list

Enter identified KSAs into template spreadsheet and check for duplications

Create an online Google Form that is linked to a Google Sheet

Pro forma list

Using the pro forma list

- BILT members vote electronically on each item regarding importance for curriculum

- Prioritized results are automatically tabulated and displayed for purposes of discussion

- Employers may add, subtract, or modify items on the list

- Synchronous discussion is **extremely important** and is based on prioritized knowledge and skills as well as distribution of votes

	Technical Project/Program Management	# votes (4 = most important)					
	ic	4	3	2	1	Avg	Comments
4	Develop project plans, including defining scope and time requirements.	22	6	2	0	3.67	
5	Identify information technology project resource requirements.	19	9	2	0	3.57	
6	Develop guidelines for system implementation.	6	10	11	3	2.63	
7	Follow methods to monitor and measure risk, compliance, and assurance efforts.	13	10	6	1	3.17	
8	Perform needs analysis to determine opportunities for new and improved business process solutions and participate in determining opportunities for new and improved business process solutions.	13	12	3	2	3.20	
9	Contribute contingency plans regarding project risks.	13	12	5	0	3.27	
10	Identify interdependencies.	20	6	4	0	3.53	
11	Identify and track critical milestones.	24	6	0	0	3.80	
12	Report project status.	28	1	1	0	3.90	
13	Participate in project phase review.	26	3	0	1	3.80	
14	Coordinate and manage the overall expectations provided to a customer/project stakeholder end-to-end as it relates to the project.	13	4	9	4	2.87	
	Gather feedback on customer satisfaction and internal service performance to foster	19	7	4	0		

Lunch
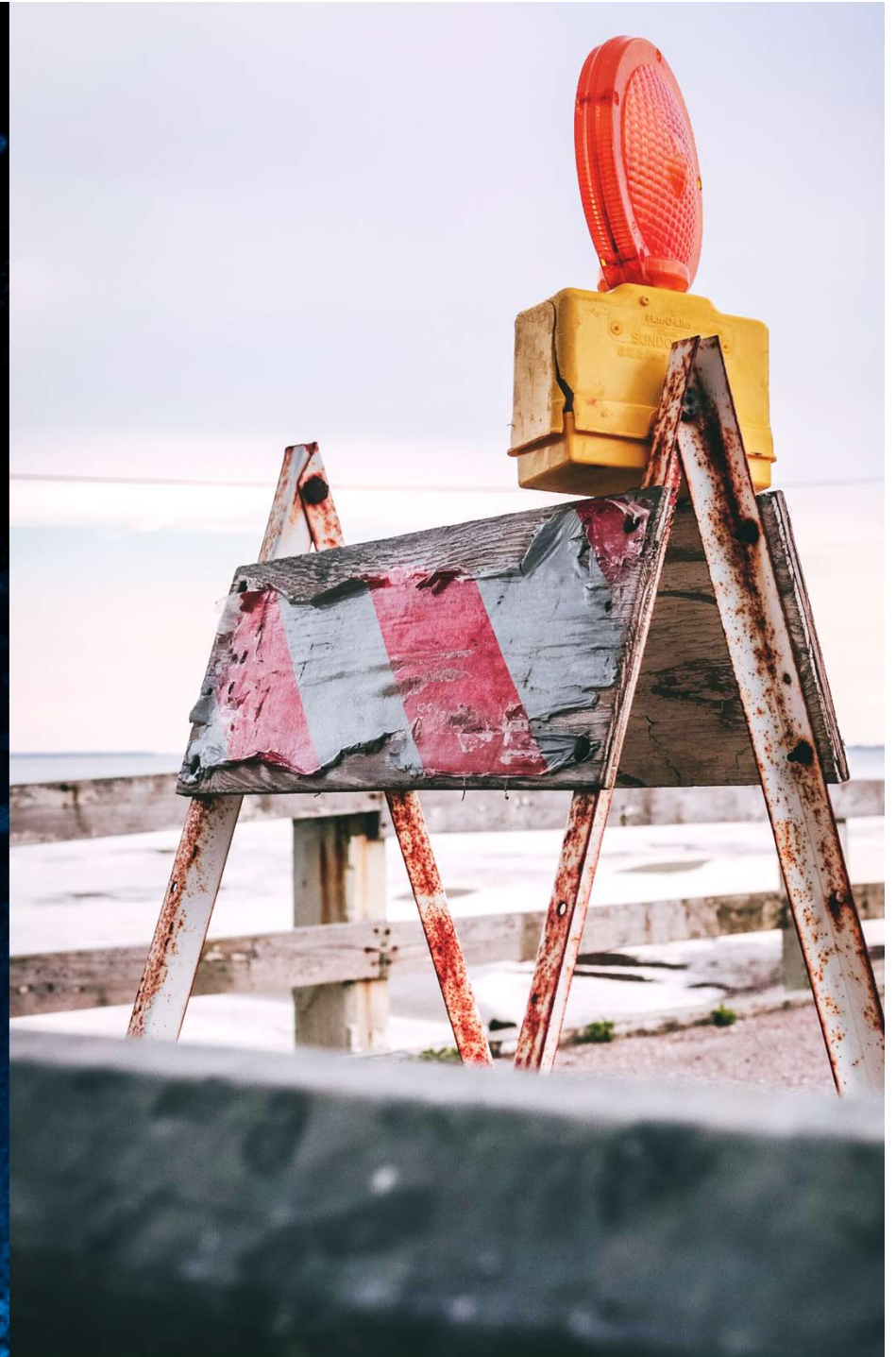
Activity
The Pro Forma List

Scheduling

1. Ensure a non-biased facilitator can be there for KSA meeting

2. Invite employers once the date is set

3. Remember – this meeting is *longer*: approx. 2-2.5 hours

TIP: 50% of your "yes" RSVPs will not show up.

- Verify audio visual capability
  - Screen(s)
  - Sound system, including microphones
  - Conference phone
  - Wireless Internet access
- Room set with employers in U-shape
- Catering or at least coffee and water
- Convenient location for those who will be face-to-face
- Ensure attendees have devices compatible for electronic voting

On-Site and Hybrid Meeting Logistics

KSA Meeting Agenda and Flow

Welcome from the program lead's supervisor or above as well as the lead

Self-introductions of all in the room and on the web meeting

Brief explanation of the BILT approach and how to vote

The **voting link for KSA +Ts** and expected time allowed

Discussion (the bulk of the meeting)

Q&A

Discuss Next Steps on Faculty Cross Reference

Schedule next meeting to provide feedback to BILT

Invitations

Send a calendar invitation with meeting details via email

Include

- "WIIFM" (value proposition)
- Whether or not there will be food
- Whether the meeting will be face-to-face or virtual or both (suggest both)
- Whether or not they need to bring a laptop or tablet for voting if on site

TIP: Your first email contact should NOT be a calendar appointment request. After they say "yes," then send a calendar invitation.

Phone those who have not responded about **1 week** *after* invitation sent to talk with them and ask them to attend.

1 week in advance of KSA meeting and again 1 day in advance, email a reminder to all (except those who have declined) with

- Agenda
- Meeting connection info (if supporting hybrid)
- Map and parking instructions

Timeline for Invitation Follow-Up

At Least 1 Week in Advance:

Convert Pro Forma List to Voting Form

1. Ensure you are satisfied with the KSAs pro forma KSAs prior to changing it into the linked Google Form/Sheet (changes often require starting over)

2. Convert spreadsheet to KSA voting form/sheet for upcoming KSA mtg using the video and instructions or seeking help from ITSS member

3. Have staff members vote to test the form (their votes can be removed)

Industry Subject Matter Experts
- Participate in ratings and discussion

Faculty Subject Matter Experts
- Attend as active listeners

Facilitator
- Process expert responsible for efficiency & effectiveness of meeting

Minute-taker
- Records discussion & prepares meeting minutes (Zoom recording)

Spreadsheet Editor
- Captures BILT comments on the spreadsheet in real-time

Meeting Roles

ESSENTIAL BILT BUSINESS ROLES

- Co-lead college programs through quarterly meetings
- Annually prioritize Knowledge, Skills and Abilities (KSAs) they want graduates to have 12-36 months into the future using structured, repeatable voting process
- Predict labor market demand
- Identify industry trends that could impact the program

ESSENTIAL BILT FACULTY ROLES

- Cross reference KSAs to existing curriculum
- Update curriculum to address KSAs prioritized by businesses
- Provide businesses with feedback regarding implementation

BUSINESS WIIFM

- Entry-level employees with "hit-the ground-running" skills (Saves $$)
- Ability to tangibly give back to the community
- Ability to tap eager talent in transitioning to the workforce
- Time value realized and appreciated

FACULTY WIIFM

- Delivering relevant, industry sought-after skills
- Students more prepared to enter the workforce
- Early business engagement exposes students to business perspective (mentoring, internships, business-graded capstone courses)

KSA Rankings (1-4)

4 The KSA must be included in the curriculum

3 The KSA really should be included in the curriculum

2 It would be nice for the KSA to be included in the curriculum

1 The KSA can be left out of the curriculum entirely

This 1-4 ranking criteria considers the following together:
- Importance
- Level of proficiency
- Time spent doing the skill
- Difficulty – how difficult is the skill to learn?

IMPLEMENTATION CHALLENGES

CHALLENGE: Reluctance to conduct the annual KSA vote.

Free-flowing discussions will not provide actionable metrics for faculty to reference when updating curriculum.

Free online tools now make voting simple and efficient.

KSA Voting

bit.ly/ITSSVotingDemo

Two Key Meeting Elements

VOTING

Create prioritized rankings

DISCUSSION

Talk about the vote results
Clarifying questions asked
Line items edited

Both are equally important

Google Sheet Resources

How-To Worksheet

https://drive.google.com/file/d/15AVFnwfZadIjjZux0aRHgSHjHow-TUeZ/view?usp=sharing

How-To Video Tutorial

https://youtu.be/rVr65ycNlc8

Employability Skills

Employability Skills

The transferable skills needed by a student to help them obtain and maintain employment

Orientation to Abilities and Employability Skills

Employability / workplace knowledge and skills, also known as soft skills, are necessary for every job in the U.S.

They form the foundation for workforce competencies.
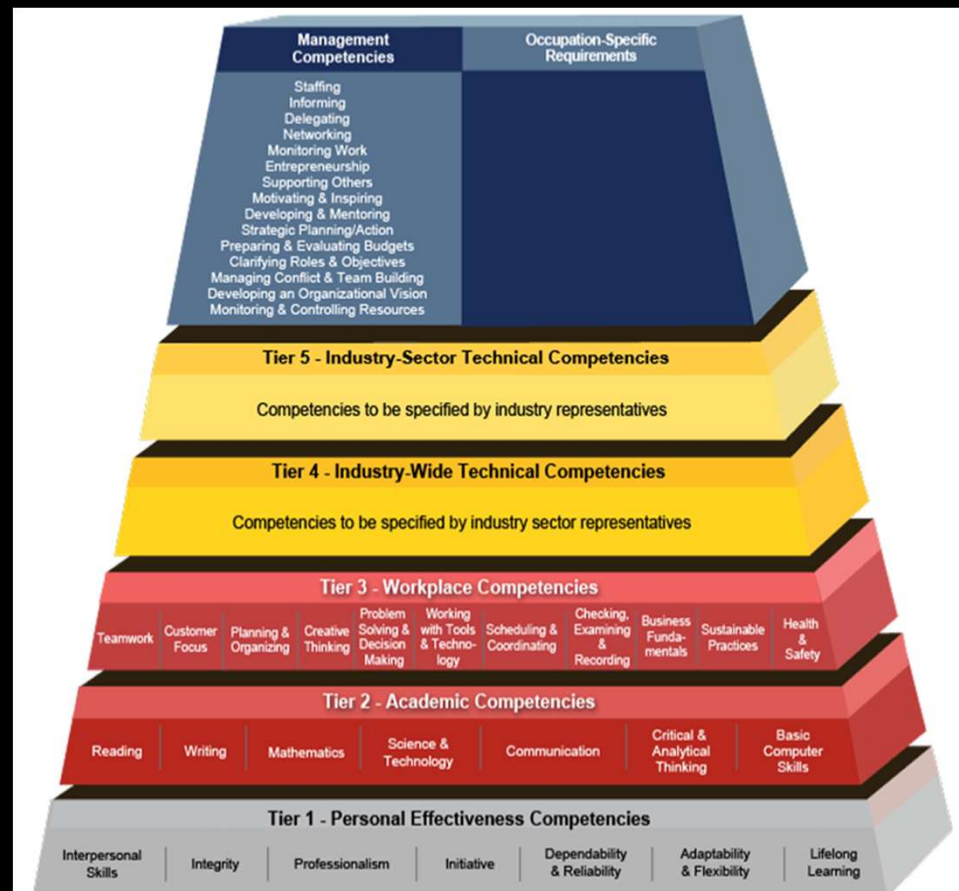
Three Categories

- Personal Effectiveness Competencies
- Academic Competencies
- Workplace Competencies

Two Pathways

- Employability Skills
- Abilities

Abilities and Employability Skills

ITSS Employability Skills

ITSS selected the employability knowledge and skills that most apply to the area of IT

Workplace Competencies	Academic Competencies	Personal Effectiveness Competencies
Cultural Competence	Written Communication	Initiative
Teamwork	Oral Communication	Self & Career Development
Organization & Planning	Problem Solving & Critical Thinking	Adaptability & Flexibility
Accuracy		
Workplace Professionalism & Work Ethics		

Ratings

- Employability skills are important for all jobs, and the question becomes, what level of competency is needed for the work specified by the KSAs and KPIs?

- Each level is described by a statement of what the employability skill would look like if performed at a level 1, level 2 or level 3.

- Ratings were submitted by employer SMEs to determine the level of competence needed.

Survey Example

Written Communication
Comprehend and execute written instructions; Effectively communicate concepts in writing.

|		
☐	**Level 1**	Employee understands written instructions and executes tasks with guidance and feedback from supervisor. Employee clearly communicates concepts in writing.
☐	**Level 2**	Employee comprehends and executes written instructions with minimal guidance. Employee composes well-organized written documents.
☐	**Level 3**	Employee exhibits a mastery of communication internally and externally, demonstrating the ability to succinctly communicate complex concepts in clearly written form that meets the needs of the reader. Employee proactively seeks understanding and to be understood.

Output Example

Software Development Employability Skills

Workplace Professionalism & Work Ethics	Level 1 - Employee learns expectations of workplace environment (professional behavior and ethics) and adheres to practices with some guidance. Level 2 - Employee exhibits sound professionalism, judgment, and integrity and accepts responsibility for own behavior. Employee exhibits these qualities without guidance but occasionally refers to policies as needed.
Written Communication	Level 1 - Employee understands written instructions and executes tasks with guidance and feedback from supervisor. Employee clearly communicates concepts in writing. Level 2 - Employee comprehends and executes written instructions with minimal guidance. Employee composes well-organized written documents.
Oral Communication	Level 1 - Employee understands oral instructions and executes tasks with guidance and feedback from supervisor. Employee communicates concepts orally while clarifying for meaning. Employee develops listening skills. Level 2 - Employee comprehends and executes oral instructions with minimal guidance and exhibits good listening skills. Employee clarifies for meaning without needing prompting from supervisor.
Teamwork	Level 1 - With guidance and feedback from supervisor, employee obeys team rules and understands team member roles. Employee actively participates in team activities, volunteers for special tasks, and establishes rapport with co-workers. Level 2 - Employee demonstrates commitment, enthusiasm and supports team members. Employee follows up on assigned tasks and leads by example.
Problem Solving & Critical Thinking	Level 1 - Employee identifies the problem and relevant facts and principles with guidance and feedback from supervisor. Employee summarizes existing ideas and demonstrates creative thinking process while problem solving. Level 2 - With minimal supervision, employee analyzes underlying causes, considers risks and implications, and uses logic to draw conclusions. Employee applies rules and principles to processes and recommends solutions.

Abilities

- A second pathway to capture the personal effectiveness, academic and workplace competencies.

- When employer SMEs are working on the technical knowledge and skills, they will often also come up with abilities that are needed.

- Capture those abilities and also make a point of asking about them at the end of the session.

- You can use abilities gathered to provide the foundational competencies for your skill standards.

Break
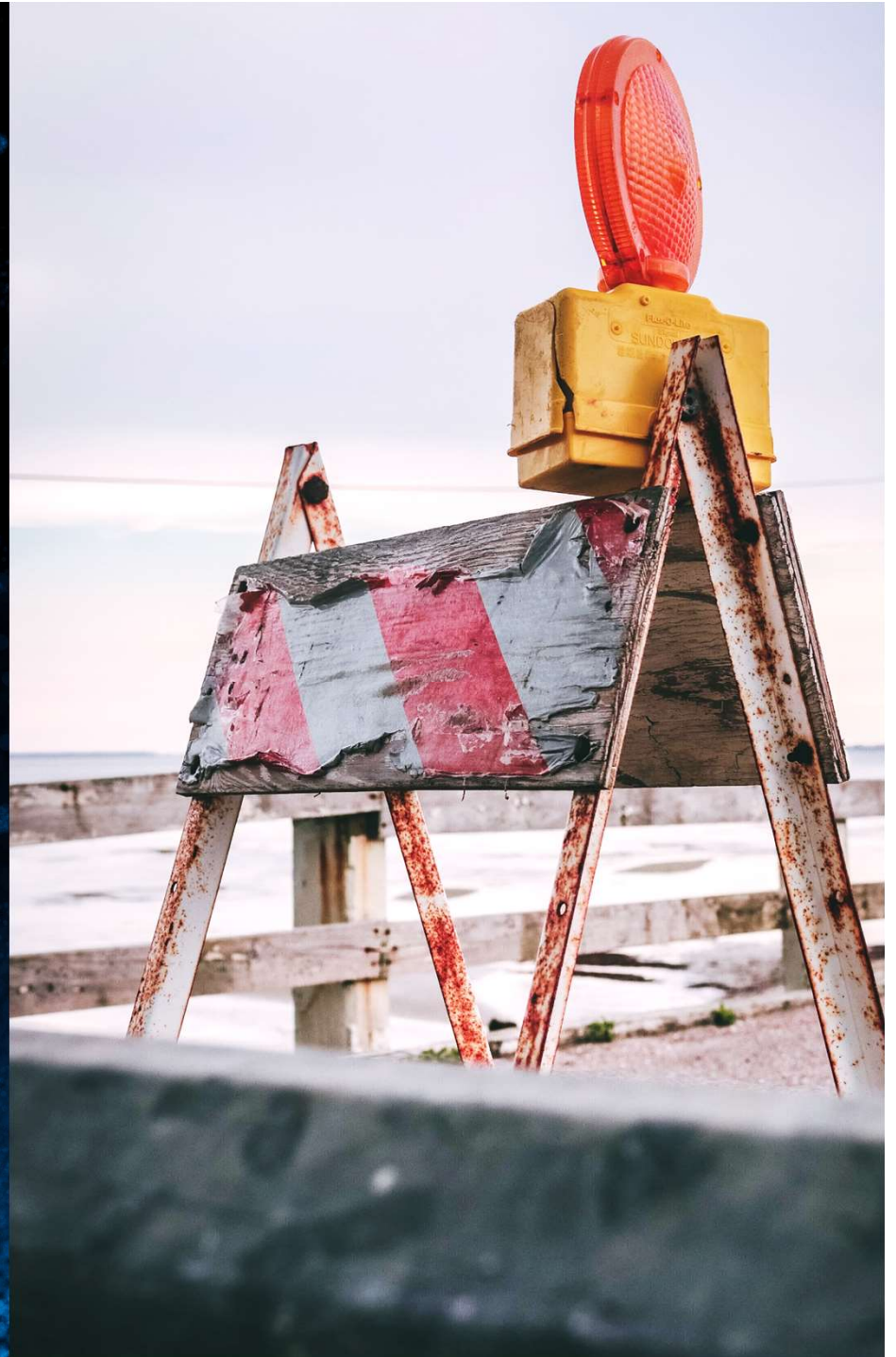
After the KSA Meeting

SME Verification Meeting

- Setup is very similar to that of the KSA vote.
- Invite only those employers who participated in the KSA voting
- Employers revote on parts of the KSA+Ts
  - Add-ons from the synthesis
    - Topics that had more than 2 employers mention it
  - Any item that had major rewrite during any of the meetings
- Employers vote on the Key Performance Indicators that state how good is good enough for the final tasks.

Key Performance Indicators

Key Performance Indicators

- Performance criteria answer the question, "How do we know when a task is performed well? "

- KPIs are associated with specific groupings of tasks.

- They are employers' definition of the key desired outcomes of the task and the qualities of those outcomes.

- The aspects of work that are *critical* to competent performance such as work procedures, safety, organization etc. are usually included.

- Review the tasks and associated knowledge and skills related to the grouping you are working with.

- Identify existing skill standards with KPIs and find tasks that are similar to the ones you are working with.

- In collaboration with one or two SMEs,

  - Adopt or adapt KPIs associated with the tasks that you find

  - List them with the task grouping

- Review for redundancy and completeness.

How to Develop KPIs

- Key performance indicators
  - Should be concrete
  - Should be observable
- Avoid writing key performance indicators that are merely instructions for carrying out a key activity.
- The total set of key performance indicators associated with a given task should be comprehensive.

Characteristics of KPIs

Things to Think About When Creating KPIs

Do the performance indicators accurately depict how you would know if this function and activities were performed well?

Is the language used in the performance indicators appropriate and understandable?

Are there any aspects of fully competent performance that are missing?

Is the language in the performance indicators clear?

Employer Validation

- Have your employers validate the KPIs

- Use the same ranking as the KSA voting (the 4, 3, 2, 1 voting)

- Allow employers the opportunity to modify, delete, or add

Output Example

Technical Project Management Key Performance Indicators

For the entry-level employee, all tasks are typically done under supervision for as much as the first year and then with some independence with verification after the employee has more experience. All tasks are done according to company guidelines.

	Task	Key Performance Indicators
	Project Plan	
T-1	Develop project plans, including defining scope and time requirements.	Criteria for satisfying stakeholder needs are identified.
T-2	Identify information technology project resource requirements.	The size and the specifics of the project are documented accurately and completely.
T-3	Develop guidelines for system implementation.	Appropriate stakeholders and decision-makers are identified in a timely manner.
T-5	Perform needs analysis to determine opportunities for new and improved business process solutions, and participate in determining opportunities for new and improved business process solutions.	Tasks requiring long lead times are identified to avoid project delays. Escalation procedures are clearly identified and agreed upon. Detailed task list is developed (work breakdown structures).
T-7	Identify interdependencies.	Time requirements are realistic and accommodate the time for the management approved process.
T-13	Analyze data to identify trends or relationships among variables.	Estimates of time, materials and capabilities needed are accurately identified.
T-6	Contribute contingency plans regarding project risks.	Activities dependent upon other activities are sequenced appropriately.
T-18	Provide input on project costs, design concepts, or design changes.	Approval points, milestones, and go/no go decision points are defined to allow for project review, evaluation, postponement, and cancellation. Task priorities are assigned.
T-22	Ensure that appropriate Service-Level Agreements (SLAs) and underpinning contracts have been defined that clearly set out for the customer a description of the service and the measures for monitoring the service.	The constraints and potential conflicts are accurately identified.
	Tracking, Reporting and Problem Solving	
T-4	Follow methods to monitor and measure risk, compliance, and assurance efforts.	
T-8	Identify and track critical milestones.	Project outcomes are in scope, on time, on budget, and customer satisfaction is evaluated against project goals.
T-9	Report project status.	Complete project phase results are documented, reviewed and clearly communicated.
T-16	Track duties or work schedules or resources.	
T-17	Prepare analytical reports.	Lessons learned are clearly documented and communicated.
T-19	Provide ongoing improvement and problem-solving support.	
T-20	Collaborate with others to resolve information technology issues.	Performance metrics associated with the process are captured and documented

Student Learning Outcomes

IT SKILL STANDARDS 2020 AND BEYOND

Why Create Student Learning Outcomes?

Accreditations Agencies Requirements

SACSCOC - Example

The institution identifies expected outcomes, assesses the extent to which it achieves these outcomes, and provides evidence of seeking improvement based on analysis of the results in student learning outcomes for each of its educational programs.

Student Learning Outcomes

Why Create Student Learning Outcomes?

Accreditations Agencies Requirements

ABET- Example

Student outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviors that students acquire as they progress through the program.

Student Learning Outcomes

Statements that specify what students will know, be able to do or be able to demonstrate when they have completed or participated in a course

Align with the knowledge and skills in the prioritized KSAs

Student Learning Outcomes

Student Learning Outcome Examples

- Identify and describe common application security vulnerabilities.

- Compare and contrast common open source frameworks and tools used for software development.

- Develop a server page containing integrated object model components.

- Demonstrate effective communication skills (both oral and written) when working with team members and stakeholders.

Bloom's Taxonomy

create — Produce new or original work
Design, assemble, construct, conjecture, develop, formulate, author, investigate

evaluate — Justify a stand or decision
appraise, argue, defend, judge, select, support, value, critique, weigh

analyze — Draw connections among ideas
differentiate, organize, relate, compare, contrast, distinguish, examine, experiment, question, test

apply — Use information in new situations
execute, implement, solve, use, demonstrate, interpret, operate, schedule, sketch

understand — Explain ideas or concepts
classify, describe, discuss, explain, identify, locate, recognize, report, select, translate

remember — Recall facts and basic concepts
define, duplicate, list, memorize, repeat, state

Vanderbilt University Center for Teaching

Bloom's for Computing

Remembering	Understanding	Applying		Analyzing	Evaluating	Creating
Define	Annotate	Apply	Investigate	Analyze	Adapt	Assemble
Duplicate	Classify	Backup	Iterate	Articulate	Administer	Collaborate
Enumerate	Comment	Build	Manipulate	Attribute	Appraise	Compose
Find	Convert	Calculate	Map	Automate	Argue	Construct
Identify	Demonstrate	Carry out	Measure	Categorize	Assess	Create
Label	Describe	Code	Modify	Compare	Choose	Design
List	Differentiate	Compile	Operate	Contextualize	Critique	Develop
Locate	Discuss	Compute	Perform	Contrast	Debate	Devise
Memorize	Exemplify	Configure	Produce	Correlate	Debug	Formulate
Name	Explain	Connect	Provision	Decompose	Decide	Generate
Recall	Infer	Decrypt	Randomize	Deconstruct	Defend	Hypothesize
Recognize	Interpret	Deploy	Recover	Deduce	Estimate	Invent
Reference	Paraphrase	Diagram	Restore	Detect	Evaluate	Make
Retrieve	Report	Document	Schedule	Discriminate	Judge	Plan
Select	Summarize	Edit	Solve	Distinguish	Justify	Program
State	Translate	Encrypt	Store	Examine	Optimize	Script
		Execute	Train	Generalize	Prioritize	Secure
		Graph	Use	Integrate	Prove	Visualize
		Illustrate	Virtualize	Model	Support	
		Implement	Write	Monitor	Test	
		Install		Organize	Validate	
				Outline	Value	
				Predict	Verify	
				Simulate		
				Structure		
				Trace		
				Translate		
				Update		

Created by the ACM Committee for Computing Education in Community Colleges.
Visit **ccecc.acm.org** for additional information and examples.

CCECC

https://ccecc.acm.org/files/publications/Blooms-for-Computing-Verb-Table-for-printing-Letter-size.pdf

Activity
Correcting SLOs

IT **SKILL** STANDARDS **2020** AND BEYOND

Improve These Student Learning Outcomes (SLOs)

For each SLO, identify why it is not a measurable outcome and rewrite to make it a measurable SLO.

1. Understand the ethical and legal aspects of data analytics, including data privacy, security, and compliance with regulations.

2. Develop the capacity to make morally sound decisions and understand the implications of these choices.

3. Appreciate the challenges in identifying and assessing cybersecurity threats.

4. Develop a deep understanding of the integration of mechanical and electronic components to design and operate complex mechatronic systems.

5. Students will develop strong problem-solving skills enabling them to diagnose and rectify issues in mechatronic systems.

6. Gain expertise in various nanofabrication methods.

7. Be skilled in using data analytics tools and programming languages, such as Python and R, to manipulate data and develop analytical models.

8. Explore potential applications of nanotechnology in various fields.

9. Develop a deep understanding of the fundamental principles of nanoscience, including quantum mechanics, nanomaterial properties, and quantum effects at the nanoscale

- Group the Knowledge items by major topics.

- Group Skills by major topics.

- Group Abilities by major topics.

- Review for further breakdown for measurable outcomes.

- Use Bloom's Taxonomy six levels of thinking to evaluate each group.

  - Use Bloom's Taxonomy action verbs to write measurable student learning outcomes.

- Have other faculty review SLOs.

Creating Student Learning Outcomes

Output Example

	Knowledge	Student Learning Outcomes
K-1	Knowledge of risk management processes (e.g., methods for assessing and mitigating risk).	Explain information security fundamentals. Demonstrate an understanding of the importance of ethics and privacy with data. Describe the functions of database recovery, security and administration, and basic data warehousing concepts.
K-16	Knowledge of data classification standards and methodologies based on sensitivity and other risk factors.	
K-17	Knowledge of Personally Identifiable Information (PII) data security standards.	
K-30	Knowledge of how to identify and document potential ethical concerns for application of model outputs.	
K-4	Knowledge of data administration and data standardization policies.	Describe the principles, techniques, and business policies for collecting, organizing, managing, analyzing, and reporting information. Describe the process of data science analytics from data acquisition to recommendations based on data. Describe different methods and tools for data collection and their impact on analysis of data. Identify the concepts of the relational model, normalization, dependencies, integrity, and constraints.
K-11	Knowledge of the with various technologies for organizing and managing information (e.g., databases, bookmarking engines).	
K-18	Knowledge of the principal methods, procedures, and techniques of gathering information and producing, reporting, and sharing information.	
K-5	Knowledge of data mining and data management principles.	
K-19	Knowledge of data mining techniques.	
K-26	Knowledge of Decision Science Game theory.	
K-28	knowledge of optimization	

Process Spreadsheet

Cross Reference

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Overall Guidelines

Faculty Cross-Reference

- Involve all faculty teaching in the program under consideration.

- Determine the KSA "cutoff" value (usually 2.6 to 3).

- For each KSA ranked above the cutoff, consider each course in the program one at a time and mark:

    "E" for exposure coverage

    "T" for thorough coverage

    Blank for no coverage

Feedback Forms

- Cross-reference file showing "E" and "T" indicators for prioritized KSAs

- Highlight rows showing only "E" coverage with yellow.

- Rows with no coverage will be left blank.

- Feedback form for program with multiple certificates and/or degrees

Ks		Avg	Course A	Course B	Course C	Course D	Course E	Course F	Course G	Es
K-41	Knowledge of risks associated with storing various types of data in different physical locations.	2.64	E	E		E		T		
K-42	Knowledge of infrastructure data storage capabilities and storage clusters.	2.91				E			E	
K-43	Knowledge of IoT end devices and connectivity.	2.82	E	E		E		T		
K-44	Knowledge of Software Defined Networking concepts.	3.18			E					
K-45	Knowledge of database theory.	2.18								
K-46	Knowledge of Continuous Quality Improvement Principles (of particular value: Lean and Agile).	2.36				E	E	T		
K-47	Knowledge of how to balance organization goals with system architecture (i.e. know your business).	2.82	E	E				T		
K-48	Knowledge of Python or other scripting languages.	2.82	E	E		T			E	

IMPLEMENTATION CHALLENGES

CHALLENGE: Faculty fear losing control to employers.

BILT meetings focus on the KSAs, not course content.

Educators remain the classroom experts – they decide how and when to teach the BILT's requested KSAs.

Activity
Practicing a Gap Analysis

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PROCESS TIMELINE

The Business and Industry Leadership Team (BILT) model - the BILT model - offers an active, energized approach to employer engagement. The BILT provides a structured, repeatable process that works for any technical program. This timeline will vary – more work will be needed to develop a new program as opposed to reinvigorating an existing program.

Meeting rule of thumb: half of your RSVPs will not show up. If you need ten employers to attend a meeting, get 20 to RSVP "yes."

‡Additional, optional elements can be added on top of the ideal BILT meeting framework to develop true skill standard products – Tasks showing entry-level duties in addition to KSAs (Knowledge, Skills, and Abilities), Key Performance Indicators, and Employability Skills.

30-MINUTE ORIENTATION MEETING	KSA MEETING (+ TASKS & EMPLOYABILITY SKILLS‡)	FOLLOW-UP MEETING (+ KPIs‡)	MODIFY CURRICULUM	TRENDS MEETING
Proceed only if you have 12-15 interested employers.	**Proceed only if you have 12-15 employers committed to attending *and* a robust pro forma list.**	**Ideally held within 2 months of KSA meeting, but you must be prepared to provide detailed feedback.**		
1½ months - 3 months out * Identify committed leadership and personnel (employer SMEs, meeting facilitator, support staff) * Choose meeting day/time * Recruit employer SMEs as needed * Reserve room and AV, including support for virtual participation	**1½ months - 3 months out** * Develop and/or locate pro forma KSAs (competencies from other programs, industry standards, trusted employers) and Tasks‡ * Recruit more employer SMEs as needed * Reserve room and AV, including support for virtual participation	**1½ months - 3 months out** * Choose meeting day/time * Reserve room and AV, including support for virtual participation	**Timing will vary based on complexity of program changes** * Faculty converts KSA results to Student Learning Outcomes (or Competencies) for any new KSAs * Faculty modifies existing curriculum or creates new curriculum to align with KSAs	**1½ months - 3 months out** * Choose meeting day/time * Recruit employer SMEs as needed * Reserve AV and plan to hold virtually
3 weeks - 2 months out * Send out meeting invites (employer SMEs and faculty), track RSVPs	**3 weeks - 2 months out** * Send out meeting invites (employer SMEs and faculty/admin), track RSVPs * Convert (and test) pro forma list into online voting form * Create online Employability Skills‡ voting form	**3 weeks - 2 months out** * Send out meeting invites (employers and faculty), track RSVPs * Create (and test) KPI‡ online voting form – note that only employers who attended the KSA meeting can vote on KPIs		**3 weeks - 2 months out** * Send out meeting invites (employers and faculty), track RSVPs
1 week - 2 weeks out * Send meeting reminders * Finalize meeting content/handouts * Tentatively schedule KSA meeting	**1 week - 2 weeks out** * Send meeting reminders * Finalize meeting content/handouts	**1 week - 2 weeks out** * Send meeting reminders * Finalize meeting content/handouts		**1 week - 2 weeks out** * Send meeting reminders * Ask1-2 BILT members to be ready to discuss an emerging trend * Finalize meeting content/handouts
Meeting day * Send final meeting reminders * Host meeting - explaining the BILT model * Confirm KSA meeting date	**Meeting day** * Send final meting reminders * Host meeting - vote and discuss KSAs (and Tasks‡) differences; vote also on Employability Skills‡ * Conclude meeting with a "what's missing?" discussion **After the meeting** * Analyze KSA results, conduct employer follow-ups for clarification if needed * Faculty "crosswalk" KSA results with curriculum to identify possible gaps * Faculty prepare feedback for employers using templates	**Meeting day** * Send final meeting reminders * Follow-Up Meeting content can include any or all of the following: • Talk trends (what do employers see emerging in the workforce?) • Vote and discuss any added KSAs • Vote and discuss KPIs‡ • Provide feedback and discuss (what have you done/plan to do with KSA recommendations, including crosswalk gaps?)		**Meeting day** * Send final meeting reminders * Host meeting - ask employers what they see emerging in the workforce

Today's Road Map

- Seven essentials of the BILT model

- Recruiting employers

- Preparing for the KSA meeting

- Conducting the KSA Meeting

- Behind the Google Sheet

- Employability Skills

- After the KSA Meeting

- Key Performance Indicators

- Student Learning Outcomes

- Cross Reference

Tomorrow's Road Map

- Examples of other KSAs

- Review game

- Action plan presentations

Action Plans

IT SKILL STANDARDS BEYOND 2020 SUMMIT

ACTION PLAN

Using the table below, please write down three strategies, best practices, and/or tools that you want to implement at your home school.

These three items must have underline measurable outcomes. That is, what data will tell you that the strategies, best practices, and/or tools made a positive impact in the classroom?

	Action item	Who will be involved	How success/impact will be measured
1.	Meet with people at your college to provide BILT overview and process for implementation.	The team that attended the ITSS Summit, the college administration, and other college faculty	The college administration and other faculty buy into the idea of the BILT.
2.	Recruit employers for cyber program - host orientation meeting.	Faculty and administrator responsible for cyber program.	About 20 employers were recruited, and an orientation meeting was held.
3.	Host a BILT KSA meeting for cyber program.	Faculty and administrator responsible for cyber program.	KSA meeting held (at least 10 employers attend) with vote and discussion on pro-forma KSA list.

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