Effective Approaches For Aligning Curriculum With Business Demand

March 26, 2015

The Webinar Begins At 3 PM Eastern

Webinar Details

- For this webinar you will be in listen only mode using your computer or phone

- Please ask questions via the chat window

- This webinar is being recorded – you will be sent a recording link

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CCTA | CENTERS COLLABORATIVE FOR TECHNICAL ASSISTANCE
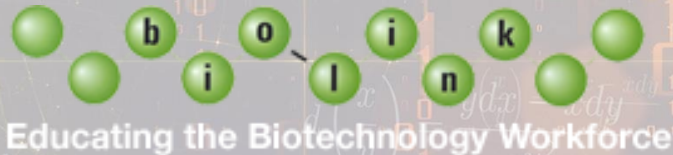
With Additional Support by the ATE Collaborative Impact Project

The CCTA IS Led By

- **National Center for Convergence Technology (CTC)** based at Collin College in Frisco, TX (lead)

- **South Carolina ATE National Resource Center (SCATE)** based at Florence Darlington Technical College in Florence, SC

- **Florida ATE Center (FLATE)** based at Hillsborough Community College in Tampa, FL

- **Bio-Link Next Generation National ATE Center for Biotechnology and Life Sciences (Bio-Link)** based at City College of San Francisco in San Francisco, CA

- **Networks Resource Center** based at the Maricopa Community College District in Phoenix, AZ

ATE CENTERS

Original Purpose

- Respond to a request from the Department of Labor (DOL) to the NSF to have ATE Centers provide technical assistance services to DOL TAACCCT grantees
  - Success coaching
  - In-person convenings
  - Knowledge management /best practices
  - Peer-to-peer learning

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Also Appropriate For

- National Science Foundation Projects and Centers
- Workforce-oriented programs of all kinds

Deliverables

- Topical Webinars and Teleconferences On
  - Existing and new solutions
  - Live/recorded with attendee Q&A
  - Archived on www.atecenters.org/ccta

More Deliverables

- Other online media including videos and transcripts

- Invitations to regional discipline-specific conferences

- Annual HI-TEC NSF conference

- Annual TAACCCT-specific convening following HI-TEC

Poll #1: Your Affiliation

A. I am involved with an NSF grant

B. I am involved with a TAACCCT grant
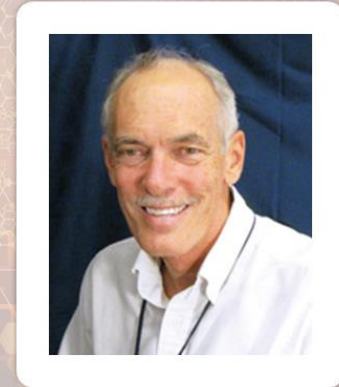
C. Both

D. Neither

Introductions

Marilyn Barger,
PI & Executive Director,
Florida Advanced
Technological Education
Center (FLATE)

Ann Beheler
PI & Executive Director
National Convergence
Technology Center (CTC)

Mike Lesiecki, Director,
Maricopa Advanced
Technolgical Education Center
(MATEC)

Our challenge!

New Factory Tech Will Boost Future Jobs Growth

Agence France-Presse
Mar 9, 2015

The Future of Work conference looked at how technological advancements are changing the shape and even existence of traditional workplaces.

Sean Gallup/Getty Images

LONDON - New technologies are capitalizing on the jobs market and in the workplace, said Arianna Huffington and Google executive chairman Eric Schmidt at a London conference.

The Future of Work conference, staged at Lancaster House, looked at how technological advancements are changing the shape and even existence of traditional workplaces.

"While there have been a lot of concerns about machines and technology replacing humans, when it comes to jobs, in fact we are seeing that technology is allowing an enormous amount of new jobs to emerge," Huffington, editor-in-chief of The Huffington

Objective

- Examine two different methods for aligning curriculum with business needs so that program graduates are workforce ready

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Desirable characteristics of effective curriculum review process models

Require Frequency/Regularity of Reviews

Identify & Communicate a Formalized Process

Involve Faculty Leaders & Subject Matter Experts

Involve Industry for Currency & Relevancy

Provide Guidance for Curriculum Updates

Informal Methods of Input for Curriculum

- Anecdotal information
  - Partners/colleagues
  - Various publications
  - Internet
  - Working students /graduates
- College level program reviews

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Formal Curriculum Review Processes

- Job Task Analysis
- DACUM Process
- Modified DACUM Process
- Defined/required process & schedule
- Align to national industry credential standards

Working with Industry for Defining Curriculum

Involve Industry for Currency & Relevancy

- Listen to their needs
- Recruit as many as you need
- Value their time
- Engage them in discussion
- Facilitate consensus as much as possible

Speaker: Ann Beheler, Ph. D. – *Principal Investigator*, NSF ATE National Convergence Technology Center

Executive Director, NISGTC, a National TAACCCT IT consortium (Round 1)

Setting the Context
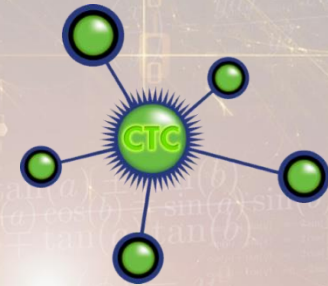
- National Convergence Technology Center
  - Advanced Technological Education (ATE) Center with National Science Foundation (NSF)
  - Based at Collin College, Frisco, TX 2004 forward
  - Primarily in the area of networking infrastructure/mobility/data communications

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Business & Industry Leadership Team (BILT)

- BILT Processes developed under the Regional Center for Convergence Technology
  - Used for National Center with 8 partners, 40 affiliates in the Convergence College Network
  - Used for DOL TAACCCT grant with 7 partners

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Business Role

- BILT Leads; does not just advise
- Approach with businesses applies to creating/maintaining/reinvigorating any technology program

Sometimes Business Teams

- Meet only 1-2 times per year, and that is the only time they are on campus

- Have a mixed level of knowledge

- Give advice that may not be honored

- Find their time split among colleges in a region

- May be asked to "rubber stamp" programs

Our Process = Engagement

- BILT meets quarterly: 1 face to face; 3 via webinar
- Uses solid process, business-led, to determine Knowledge, Skills, and Abilities needed from graduates (faculty determine how to address KSAs in curriculum)
- All meetings cover trends to get ahead of curricular changes
- BILT leads and co-owns curriculum

RESULT is ENGAGEMENT

KSA Analysis Process

- Modified DACUM based on U. S. Air Force Process called PCAL7

- Used Pro Forma List of Skill/Knowledge Areas based on National Skills Standards

- Typically requires 4-6 hours, not 2-3 days

- Updated annually via face to face meeting

KSA Business Team

- Business team formed from technically up to date professionals
  - Technicians
  - First line managers
  - Higher-level managers, still technically up to date
  - HR reps limited

Skills Validation Process

- Use the job skills spreadsheet that you will add to, subtract from, or modify.

- Rank Skills from **1 to 4**, with 1 being the **least** important and **4** the **most** important.

- These are skills for an **entry level employee** coming out of the college's program 12-36 months into the future

Validation Process

- Rating Criteria considers
  - Importance
  - Level of proficiency
  - Time Spent doing the skill
  - Difficulty – how difficult is the skill to learn?

- Discussion of differences important

Validation Process

- Items with avg. of **3.0 or above are included in curriculum**

- Faculty will *"map"* the skills/knowledge areas to existing courses

- Gaps will be identified, and **curriculum strategy** established for filling gaps

- Results and follow up will be reported back to the BILT

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Originally Ranked Individual Skills

CTC Business and Industry Leadership Team for Convergence Technologies and related disciplines

Knowledge Domains	Rank 1	2	3	4	Avg	Comments
Unix / Linux	0	0	1	8	3.89	
Windows	0	0	0	9	4.00	
Mac OS	2	5	2	0	2.00	
Android	0	4	0	0	2.00	Gaining importance
Apple IOS	0	4	0	0	2.00	Gaining importance
Operating System Maintenance						
Configuration modification, backup, restore and location (e.g. registry, INI files)	0	0	4	5	3.56	
Operating system administration (e.g., monitoring, process control, threads, upgrades and patching)	0	0	5	4	3.44	
Scheduler; stopping & starting services	0	3	3	3	3.00	
Directory, file structures and systems	0	0	4	5	3.56	
Account management	0	0	0	9	4.00	
Installing applications	0	0	0	9	4.00	
CLI	0	0	0	9	4.00	
OS compatibility and interoperability	0	0	4	5	3.56	
OS Scripting	0	0	0	9	4.00	

Certification Classes Aligned with Certifications

Certifications	Rank				Avg	Comments
	1	2	3	4		Comments
A+ Certification	4	5	0	0	1.56	Concepts, not the certification
Network + Certification	0	0	6	3	3.33	basic certification entry level
MCSA Server Infrastructure 2012	0	0	4	5	3.56	Depends on whether servers needed
MCSE Server Infrastructure 2012	0	1	4	4	3.33	Depends on whether servers needed
CCNA Certification	0	0	4	5	3.56	basic certification entry level
Wireless Certification CWNA	0	3	3	3	3.00	Gaining importance
VmWare Certification	0	0	3	6	3.67	Highly marketable
EMC Information and Storage Management Certification	0	3	3	3	3.00	General concepts more impt.

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Faculty Map to Classes to Identify Gaps

CTC Business and Industry Leadership Team for Convergence Technologies and related disciplines	Avg	GAP	ITCC1301	ITCC1302	ITCC1320	ITCC1322	ITNW1563	ITNW1568
Knowledge Domains		Comments						
Unix / Linux	3.89							T
Windows	4.00						T	
Operating System Maintenance								
Configuration modification, backup, restore and location (e.g. registry, INI files)	3.56						T	
Operating system administration (e.g., monitoring, process control, threads, upgrades and patching)	3.44						T	
Scheduler; stopping & starting services	3.00						T	
Directory, file structures and systems	3.56						T	
Account management	4.00						T	
Installing applications	4.00						T	
CLI	4.00						T	
OS compatibility and interoperability	3.56						T	
OS Scripting	4.00						T	
	Avg							
Certifications		Comments						
A+ Certification	1.56	Concepts, not the certification	GAP					
Network + Certification	3.33	basic certification entry level	GAP					
MCSA Server Infrastructure 2012	3.56	Depends on whether servers needed						T	
MCSE Server Infrastructure 2012	3.33	Depends on whether servers needed						T	
CCNA Certification	3.56	basic certification entry level		T	T	T	T		
Wireless Certification CWNA	3.00	Gaining importance						E	
VmWare Certification	3.67	Highly marketable	GAP						
EMC Information and Storage Management Certification	3.00	General concepts more impt.							T

Important Features of KSA Analysis

- Face to face with discussion

- Full engaged

- Recognizes that no college can train for specific business needs

- Our approach is national and requires each college or region to adapt to local markets

Everyone Has a Role

- Industry Subject Matter Experts
  - **Participates in rankings and discussion**
- Faculty Subject Matter Experts
  - Attend as *active listener* (may ask clarifying questions)
  - Cross-reference results to courses, identifies gaps, create curriculum (after meeting)
- Facilitator
  - Process expert responsible for **effectiveness of meeting**
- Recorder
  - **Records rankings and discussion; prepares meeting minutes**

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Approach Aligns With Characteristics of Effective Review/Process Models

Require Frequency/Regularity of Reviews

Identify & Communicate a Formalized Process

Involve Faculty Leaders & Subject Matter Experts

Involve Industry for Currency & Relevancy

Provide Guidance for Curriculum Updates

Result: Active Engagement

- Involvement in recruitment events

- Professional development for faculty

- Provide internships for students; externships for faculty

- Provide business mentoring

- Guest speakers

- Co-author whitepapers

- Evaluate capstone presentations

- Participate in panels at conferences

- Hire graduates

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Questions

Please use the chat window

Speaker: Marilyn Barger, Ph. D., P.E. – *Principal Investigator* and *Executive Director*, Florida Advanced Technological Education Center of Excellence (FLATE)

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Who we are

- Florida Advanced Technological Education Center of Excellence for Manufacturing (FLATE)
  - A National Science Foundation (NSF) Advanced Technological Education (ATE) Center of Excellence
  - Hosted by Hillsborough Community College, Tampa, Florida and funded since 2004
  - FLATE supports all of advanced manufacturing
  - Florida has a statewide system for curriculum
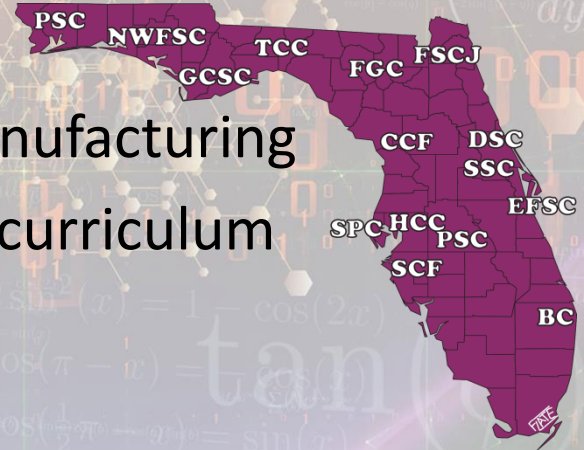
Florida Engineering Technology AS Degree

(60 semester hours)

I. **General Education – 15 - 18 credit hours**

II. **ET Core - 18 credit hours**

III. **10 Specialization Tracts – 24 to 27 credit hours**

Florida's Curriculum Review Process & Players

FDOE ACE Division Manufacturing Cluster

- Manage/oversee the process
- Develop 3-year work plan
- Identify occupations
- Oversee implementation of work plan, timelines, participants

Program Committee

- Develop new program frameworks
- Revise/delete existing frameworks
- Consolidate duplicative frameworks
- Members are educators, industry, regulatory agencies, workforce boards, etc
- Submit consensus document to FLDOE for revised frameworks

NEW / Revised Curriculum Framework

- Defines what an individual needs to know and be able to do
- Includes common core standards (for secondary programs)
- Defines aligned occupational SOC Codes

Florida's Curriculum Review Process & Players

FDOE ACE Division

Manufacturing Cluster

- Manage the process
- Develop 3-year work plan
- Identify occupations
- Oversee implementation of the work plan, timelines, participants
- Prepare final documents for state approval

Florida's Curriculum Review Process & Players

Program Committee

- Develop new frameworks
- Revise/delete existing frameworks
- Consolidate duplications
- Members are educators, industry, regulatory agencies, workforce boards, other stakeholders, etc.
- Submit consensus document to FDOE for revised frameworks

Florida's Curriculum Review Process & Players

New / Revised Curriculum Framework

- Defines what an individual needs to know and be able to do
- Includes common core standards (for secondary programs)
- Defines occupations & SOC Codes

FL Process and Timeline

MARCH	First review announcement	FDOE
APRIL-MAY	College/indutry teams defined & lead assigned	FDOE & college program managers
JUNE-AUG	Frameworks reviewed	College/industry teams
AUG-SEPT	Consensus document!	Lead college/industry team
SEPT-OCT	Draft framework developed	FDOE
OCT	Final review	College/industry teams
NOV-DEC	Final frameworks developed	FDOE
FEB-MAR	State approval	State committee
SUMMER	Implement changes	College/industry teams

Sample Framework Framework Document

2014 – 2015
Florida Department of Education
Student Performance Standards

Program Title: Engineering Technology
CIP Numbers: 1615000001
Program Length: 60 credit hours
SOC Code(s): 17-3023, 17-3026, 17-3027, 17-3029, 51-4012

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:

01.0	Demonstrate knowledge of industrial processes and materials properties--The student will be able to:
01.01	Demonstrate knowledge of current manufacturing processes.
01.02	Demonstrate knowledge of the use of current manufacturing machines, operating systems and mechanisms.
01.03	Estimate manpower needs and skills needed in assembly operations.
01.04	Demonstrate knowledge of the criteria for tool design, maintenance, procurement and handling.
01.05	Demonstrate knowledge of gage design, usage and limitations.
01.06	Analyze and recommend the usage of jigs and fixtures, including effectors and special grippers for automated systems.
01.07	Demonstrate knowledge of processes used to ensure that changes do not negatively impact production or product.
01.08	Demonstrate knowledge of production timing to ensure customer satisfaction and on-time delivery.
01.09	Demonstrate knowledge of time and motion to enhance productivity.
01.10	Make continuous adjustments to equipment and procedures that result in improved productivity.
01.11	Demonstrate knowledge of how raw materials are moved.
01.12	Setup or modify new equipment per engineering specifications and documentations.
01.13	Demonstrate an understanding of the importance and impact of routine maintenance of machines and equipment on operations.
02.0	Generate and interpret computer-aided drawings--The student will be able to:
02.01	Apply current industrial computer aided-drawing practices.
02.02	Construct geometric figures.
02.03	Create and edit text formatted to industry standards.
02.04	Use and control accuracy-enhancement tools for entity-positioning methods.
02.05	Identify, create, store, and use standard part symbols and libraries.

Sample Framework Framework Document

2014 – 2015
Florida Department of Education
Student Performance Standards

Program Title: Engineering Technology
CIP Numbers: 1615000001
Program Length: 60 credit hours
SOC Code(s):   17-3023, 17-3026, 17-3027, 17

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to CATES, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:

01.0   Demonstrate knowledge of industrial processes and materials properties. The student will be able to:
01.01
01.02
01.03
01.04
01.05
01.06   ystems.
01.07   duct.
01.08
01.09
01.10
01.11
01.12
01.13   nent on operations.
02.0
02.01
02.02   Construct geometric figures.
02.03   Create and edit text formatted to industry standards.
02.04   Use and control accuracy-enhancement tools for entity-positioning methods.

✓ Demonstrate knowledge of….
✓ Construct…
✓ Prepare…
✓ Set up equipment…
✓ Analyze…

Sample Framework REVIEW Document

K	U	D	S	B	STANDARDS AND BENCHMARKS	COMMENTS
					12.0 Operate, troubleshoot, and maintain pneumatic, hydraulic and electromechanical components and/or systems – The student will be able to:	
					12.01 Identify, classify and describe the function of pneumatic, hydraulic and electrical machines and components.	
					12.02 Construct flow diagrams and of pneumatic, hydraulic, and electromechanical systems.	

K=Keep as is
U=Update per comment   S=New standard per comment
D=Delete (no longer relevant) B=new benchmark per comment

Sample Framework <u>REVIEW</u> Document

K	U	D	S	B	STANDARDS AND BENCHMARKS	COMMENTS
✓					12.0 <u>Operate, troubleshoot, and maintain pneumatic, hydraulic and electromechanical components and/or systems</u> – The student will be able to:	
	✓				12.01 Identify, classify and describe the function of pneumatic, hydraulic and electrical machines and components.	
	✓				12.02 Construct flow diagrams and of pneumatic, hydraulic, and electromechanical systems.	*This needs clarifying – are they individual or integrated systems?*

K=Keep as is
U=Update per comment　　　S=New standard per comment
D=Delete (no longer relevant)　　B=new benchmark per comment

Sample Framework <u>REVIEW</u> Document (2)

Program Review Committee

The Program Review Committee's responsibilities are to review the Standards and Benchmarks within the Curriculum Framework to determine their relevance in today's workforce. Based on the Committee's recommendations, the Standards or Benchmarks will be kept as they are, revised, deleted or new ones written to reflect today's job market.

The following persons served on the Program Review committee:

Name: Lee Hayes Byron
Occupation: Sustainability Manager
Business/Company: Sarasota County

Name: Dayton Amey
Occupation: Engineering Manager
Business/Company: Food and Beverage/Tropicana

Name: Michael Ennis
Occupation: Manufacturing Engineer
Business/Company: RF Communications/Harris Corp

Name: Tim Twitty
Occupation: Manufacturing Operations
Business/Company: Hydraulic Controls/Sun Hydraulics

Name: Justin Thompson
Occupation: President
Business/Company: defense/security (renewable energy for surveillance in remote locations);
Sentry View Systems, Inc.

Name: Peter Straw
Occupation: Executive Dir

Business/Company: Manuf/SAMA

Name: Idelia Phillips
Occupation: Owner/Consultant
Business/Company: P..Consulting

Name: Dennis Stroer
Occupation: HVAC Calcs
Business/Company: HVAC/Calcs-Plus

Name: Scott Choquette
Occupation: Sr. Engineer
Business/Company: Draper Laboratory

Name: Adrienne Gould-Choquette
Occupation: Program Dir/Faculty
Business/Company: State College of Florida

Summary of A.S. ET Degree 2012-14

Reviews	ET Core	Advanced Manufacturing - Spec.	Advanced Technology - Spec.	Applied Technology Spec. - CCC	Alternative Energy - Spec.	Biomedical Systems - Spec.	Digital Design and Modeling - Spec.	Mechanical Design and Fab. - Spec. / [1] CNC Machinist - CCC	Quality - Spec.	Lean Six Sigma Green Belt - CCC / [2] Six Sigma Black Belt - CCC	Totals
New Benchmarks Added [3]12	7	0	0	6	2	7	1	1	3	6	**45**
Benchmarks Deleted 12	0	0	0	0	2	1	2	7	0	1	**25**
Benchmarks Updated for Clarity 6	17	3	4	1	6	16	29	1	3	4	**90**
Standards Updated for Clarity 1	3	0	0	0	0	2	0	0	0	0	**6**
Standards Deleted 0	0	0	0	0	0	0	0	0	0	0	**0**
#Educators Committee Members 2	2	1	1	1	2	2	2	2	2	2	**19**
#Industry Committee Members 6	5	2	2	9	3	4	3	3	4	5	**46**

Desirable Characteristics of Effective Curriculum Review Process Models

Require Frequency/Regularity of Reviews

Identify & Communicate a Formalized Process

Involve Faculty Leaders & Subject Matter Experts

Involve Industry for Currency & Relevancy

Provide Guidance for Curriculum Updates

Join Us – All Webinars 3 pm Eastern

• **April 16 — Locating Free Curriculum and Professional Development Resources**

This webinar will begin to explore the vast curriculum and professional development resources developed and refined by the NSF ATE Centers over their 20+ year history, where you can find them and how best to use them. Many resources are open source.

• **May 12 — Planning for Sustainability**

Funding agencies have the expectation that vital elements of funded projects will be sustained after awards are expended. How do grant funded college programs plan for sustainability? How will the project's goals, principles, and efforts necessary to achieve desired outcomes be continued? The NSF ATE program has focused on sustainability strategies for over 20 years. Learn from a panel of experts how to think and plan strategically and creatively to ensure your project's most meaningful work is sustained.

• **June 18 — Other Approaches for Ensuring Effective Business Engagement in Programs**

What are some secrets of success for strong industry engagement in your college's workforce programs and projects? What do they need to become active participants and partners – even if they do not need to hire your students today? With decades of experience behind them, the NSF ATE Centers have many strategies for starting and growing strong, sustainable and highly engaged industry partnerships.

Register at www.atecenters.org/ccta

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Register for HI-TEC and TAACCCT Convening

HI-TEC Conference July 29-30 in Portland, Oregon

Register at http://www.highimpact-tec.org/registration.php

TAACCCT-specific session track during the conference.

Free follow-up TAACCCT technical assistance convening for grantees on Friday, July 31.

Q&A and Contacts

- Ann Beheler, abeheler@collin.edu
- Marilyn Barger, mbarger@hccfl.edu
- Mike Lesiecki, mlesiecki@gmail.com