Welcome to MATEC NetWorks Webinar

Sustaining Community College Technical Programs

NetWorks is an ATE Resource Center supporting faculty in Semiconductor, Automated Manufacturing, and Electronics education

Classroom Ready Resources in the Digital Library

TechSpectives Blog

Webinars

All this and more at www.matecnetworks.org

NETWORKS

MARICOPA COMMUNITY COLLEGES

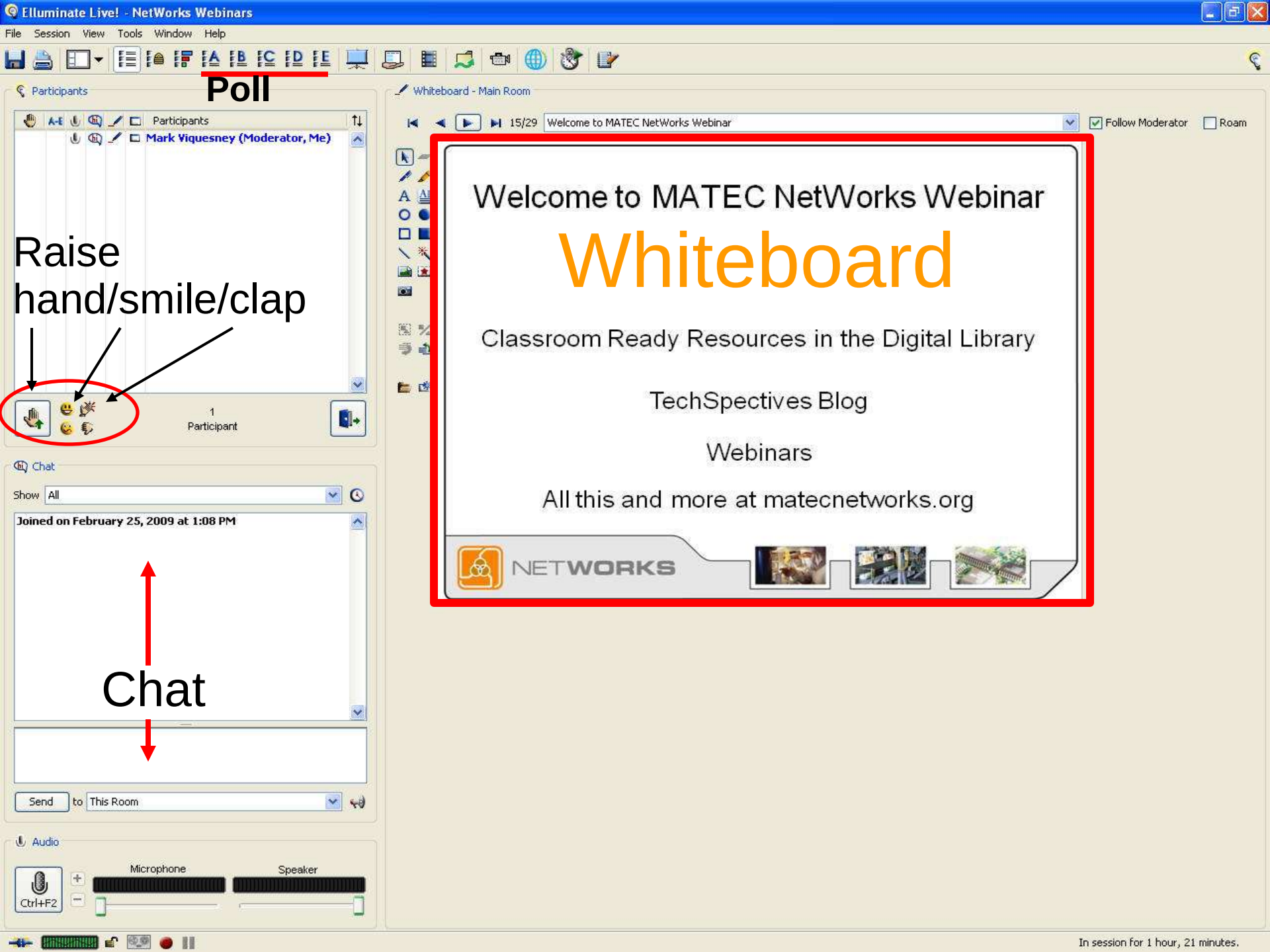
NetWorks is a part of MATEC, a member of the Center for Workforce Development in the Division of Academic and Student Affairs

National Science Foundation

Funded, in part, by a grant from the National Science Foundation.
DUE-0501626

NETWORKS




Elluminate Live! - NetWorks Webinars
File Session View Tools Window Help
Poll
Participants
Participants
Mark Viquesney (Moderator, Me)
Raise hand/smile/clap
1 Participant
Chat
Show All
Joined on February 25, 2009 at 1:08 PM
Chat
Send to This Room
Audio
Microphone
Speaker
Ctrl+F2
Whiteboard - Main Room
15/29
Welcome to MATEC NetWorks Webinar
Follow Moderator
Roam
Welcome to MATEC NetWorks Webinar
Whiteboard
Classroom Ready Resources in the Digital Library
TechSpectives Blog
Webinars
All this and more at matecnetworks.org
NETWORKS
In session for 1 hour, 21 minutes.

Poll

Click A-E to take the Poll

How many students are enrolled in your class/classes this semester?

A = 25 students or less

B = 26 – 50 students

C = 51 – 75 students

D = 76+ students

E = I am not teaching this semester

Panelists

Moderator

Michael Lesiecki

Director

Maricopa Advanced Technology Education Center (MATEC)

Host

Tom McGlew

Jorge Rodriguez

Associate Professor of Engineering

Western Michigan University

Stanley Chase

Senior Management Consultant

AMTEC

Senior VP, Emeritus

Lansing Community College

Deb Newberry

Director of Nanoscience Technology Program

Dakota County Technical College

Objectives for Today's Discussion

1. Explore the importance and value of technology education programs to our institutions
2. Discover the challenges and solutions
3. Identify promising practices and success models



1. Why are Technology Programs Important?

Community colleges are considered as an important force for economic development in a region through preparation of the workforce.



2. What are the Challenges and Solutions?

- Working with industry
- Getting and keeping students
- Getting and keeping administration on your side
- Involving faculty from other divisions and
- Knowing and getting the necessary facilities



3. Promising Practices and Success Models

- AMTEC model
- Western Michigan University



Jorge Rodriguez

Associate Professor of Engineering

Western Michigan University

Sustaining Programs at WMU

WMU – Western Michigan University

CEAS - College of Engineering & Applied Sciences:
12 BS degrees, 3 of them in Engineering Technology, in Dept. of Industrial and Manufacturing Engineering (IME)

Engineering Design Technology (EDT)
Manufacturing Engineering Technology (MFT)
Engineering Management Technology (UMT)

- Enrollment: ET: 320, CEAS 2,160
- Emphasis: Hands-on
- Students: HS – CC - Engineering

Challenges - Solutions

- Attract/keep students
- Work with Industry
- Curricula
- Facilities
- etc ….

Presenting work we have done with curricula

1. Electric Circuits and Electronics (ET)
2. Manufacturing Engineering Tech

I. Circuits/Electronics/Machines

Required for the ET programs (EDT and MFT)

Two courses:

- ECE1000: Fund. of Circuits & Electronics, 3 cr (2+3)
- ECE1010: Fund. of Electronics & Machines, 3 cr (2+3)

Issues:

- Students - inadequate offering, repetition, unfit faculty,
- Faculty – lack prerequisites & skills



I. C/E/M - Topics (2)

ECE1000

- Units, components
- Voltage, Current, Resistance
- Ohms Law
- Energy and Power
- Series circuits
- Parallel circuits
- Series-Parallel
- Circuit theorems
- Sine waves, phasors
- RC, RL/AC, DC

ECE1010

- Review ECE1000
- AC Networks & Power
- Transformers
- Three-phase & motors
- Rectifiers & Filters
- Voltage regulators
- Transistor circuits
- Operational amplifier
- Combinational logic
- Industrial Motor control

NETWORKS



I. C/E/M - Decision (3)

Department decided to look at the courses

Survey

- Students & Alumni
- Employers & IAB
- Faculty

Objectives

- hands-on
- job ready

Conclusion: Needs to be “redefined” so it is significant & useful

I. C/E/M – Implementation (4)

New course: “Applied Electricity/Electronics”

Emphasis: practical hands-on & industrial setting (troubleshooting)

Objectives

- Develop techniques to troubleshoot power systems
- Safely use tools (hardware and software)
- Identify and select components (motors/actuators, etc.)
- Define proper requirements for application (power, wiring, control)



I. C/E/M – Summary Topics (5)

Lecture

- **Power** circuits, industrial power applications
- **Conventional** current
- **Troubleshooting** procedures S/P
- **Troubleshooting** of Closed/Open, Lab-View
- Conductors and insulators, **control logic**
- Residential and Commercial **wiring**
- **Magnetic** field, Transformer principles
- **AC** Motors and generators,
- **DC** motors, Brush type, Brushless, step
- **Feedback** devices, encoders, resolvers
- **Electromechanical** systems, actuators
- **Automation** controllers, PLC's



I. C/E/M – Comments (6)

Approved by Dept, IAB, College

Course offered by IME Dept - First offering in 2011-12

Challenge getting instructor for course

(adjunct, new course, variety of topics)

Work by ET faculty in IME Dept

(particularly Sitkins, Vander Polder, and Engelmann)

Survey (Poll)

How many of you have done a complete revision of curricula for 1 or more of your programs in the past

A = 1-2 years

B = 3-4 years

C = 5-6 years

D = 7-8 years

E = more than 8 years?

II. Manufacturing Engineering Tech

Program in College for decades

Steady decline in enrollment

(lowest: 42 students in 2005 – a 4-yr program)

Drop of more than 50% in 2000's

Challenge – Urgent need for changes!

(here to stay or too expensive?)

Solution – Revamp program

NETWORKS

II. Manufacturing Engineering Tech (2)

Approach: Do a complete revision, from Goals to curriculum

Get everything and everybody in the process

Sources:

- SME's competencies
- Other MFT programs
- Industry/Faculty/Employers/Alumni/Students

NETWORKS

II. MFT – Steps (3)

Generated list of competencies, skills, topics

Grouped according to expected level of proficiency

Mapped against existing courses

Defined courses to

- eliminate
- modify
- create

II. MFT – Mapping Process (4)

Existing Course →

Competency ↓

Modules Certified Manufacturing Engineer (CMfgE) Body Of Knowledge	Semester VII - Fall (17 Credits)	Engineering Teams: Theory & Practice (Area V)	Manufacturing Systems Integration	Metrology	Multidisciplinary Senior Proposal (Prof. 2)		
4.2. Equipment/Tool Design and Development							
4.2.1. Cutting Tool Design							
4.2.2. Workholding Tool Design				1			
4.2.3. Die/Mold Design		0	0	0	0	0	0
Module 5. AUTOMATED SYSTEMS and CONTROL (5.2%)							
5.1. Automated Systems and Control							
5.1.1. Automated Systems (Hard/Flexible)			1				
5.1.2. CNC/PLC/Computer Control			1				
5.1.3. CIM Systems		0	0	0	0	0	0
6.1. Quality and Customer Service							
6.1.5. Problem Analysis & Solving (Fishbone/Pareto/FMEA/etc)							
6.1.6. Factor Analysis (DOE/Correlation/etc)		0	0	0	0	0	0
6.1.7. Capability Analysis (Process/Equipment/etc)							
Module 7. MANUFACTURING MANAGEMENT (13.3%)							
7.1. Manufacturing Management							
7.1.6. Labor Relations		1					
7.1.7. Education/Training		0	0	0	0	0	0
7.1.11. Accounting/Finance/Economics		0	0	0	0	0	0
Module 8. PERSONAL EFFECTIVENESS (6.2%)							
8.1. Personal Effectiveness							
8.1.1. Interpersonal Skills (listening, courtesy, etc.)							
8.1.2. Negotiating & Conflict Management (persuasion, conflict resolution)		1					
8.1.3. Presentation Skills & Oral Communication (formal & informal)		1			1		



II. MFT – Add/Modifications (5)

New:

- Manufacturing for Sustainability (2cr, year4)
  - Seminars and reports

Modify:

- Metrology from y4 to y3
  - Apply it in advanced courses
- Fabrication and Assembly from y3 to y4
  - Make it final step
- Engineering Teams from y4 to y3
  - Apply techniques in project-based courses
- Lab in Fluids and Thermo/Heat Transfer
  - Improve learning



II. MFT – Changes (6)

Replace

Programming language (3cr C++) for Comp Tools (1cr)

Material Properties (3cr) from Material Sciences Dept to
Material Sciences (3cr) from Mechanical Engineering Dept

Statistics (3cr) from Statistics Dept to
Statistics from IME Dept
(3cr with lab – CCLI)

II. MFT – Results (7)

Full support from stakeholders
(IAB, Alumni, students, college)

Able to better sell program to students, CC, & parents
(updated, revised, new)

Enrollment is increasing
(42 to 69 - 2005 to 2010)



Future Activities

Go through cycle of offering and revise accordingly

- Very time-consuming effort
- Need everyone involved

Look at “Basic Sciences” courses for improvement and consolidation

- Customize based on program needs
- Room to include other topics

www.wmich.edu/engineer

www.wmich.edu/ime

NETWORKS

Type them in your chat window

Stanley Chase

Senior Management Consultant
AMTEC

Senior VP, Emeritus
Lansing Community College

NETWORKS

AMTEC

Ignite. Educate. Accelerate.

Sustaining Community College Technical Programs

Annette Parker – Executive Director & PI
Kentucky Community & Technical College System
Stanley Chase, PhD. – Sr. Mgt. Consultant

AMTEC is supported by a National Science Foundation Grant

AMTEC
Ignite. Educate. Accelerate.

AMTEC is supported by a National Science Foundation Grant

autoworkforce.org

AMTEC Leadership

PI & CEO

Annette Parker

AMETC Strategy Board

Caren Caton	Toyota Motor Manufacturing & Eng.
Willy Kaulfersch	Ford Motor Co.
Steve Long	United Auto Workers
Joanne Pritchard	General Motors

AMTEC Staff

TBD	Project Director
Walt Barlow	Director, Curriculum Development
Kitty Manley	Director, Assessment & Evaluation
Carol Crawford	Special Projects Coordinator
Kelly McKown	Administrative Assistant
Melody Traugott	Business Office Assistant

AMTEC
Ignite. Educate. Accelerate.

AMTEC is supported by a National Science Foundation Grant

autoworkforce.org

Co Principal Investigators and Goal Team Leaders

Gary Saganski	Henry Ford Community College
Federico Zaragoza	Alamo Community College
Mike Hudson	Pellissippi State Community College
Joe Petrosky	Macomb Community College

Senior Team Partners

Mark Manuel	Bluegrass Community & Technical College
Beverly Hilderbrand	CARCAM
John Gajewski	Cuyahoga Community College
Jeff Arnold	Danville Community & Technical College
Mary Ann Hyland-Murr	Jefferson Community & Technical College
Bo Garcia	Lansing Community College
Mike Forrester	Spartanburg Community College

AMTEC

Ignite. Educate. Accelerate.

AMTEC is supported by a National Science Foundation Grant

autoworkforce.org

AMTEC Vision and Mission

Vision

A recognized collaboration of colleges and companies working to strengthen the competency and global competitiveness of the automotive workforce.

Mission

Create and sustain an innovative, responsive, and standards-based workforce education development system that meets industry skill requirements.

AMTEC
Ignite. Educate. Accelerate.

AMTEC is supported by a National Science Foundation Grant

autoworkforce.org

National Center Goals

Goal 1 - Create business/industry partnerships in delivering core technical education that meets the high priority needs of automotive manufacturers and suppliers.

Goal 2 - Increase secondary to postsecondary transition and from postsecondary to employment to meet industry needs.

Goal 3 - Implement a collaborative support system to sustain and replicate the AMTEC model.

Goal 4 - Create and sustain the support process for the automotive core integrated systems technology education through assessment and continuous improvement.

AMTEC

Ignite. Educate. Accelerate.

AMTEC is supported by a National Science Foundation Grant

autoworkforce.org

AMTEC Overview of Prior Work

AMTEC
Ignite. Educate. Accelerate.

AMTEC is supported by a National Science Foundation Grant

autoworkforce.org

"Making a Difference"

Consensus & Continuous Improvement

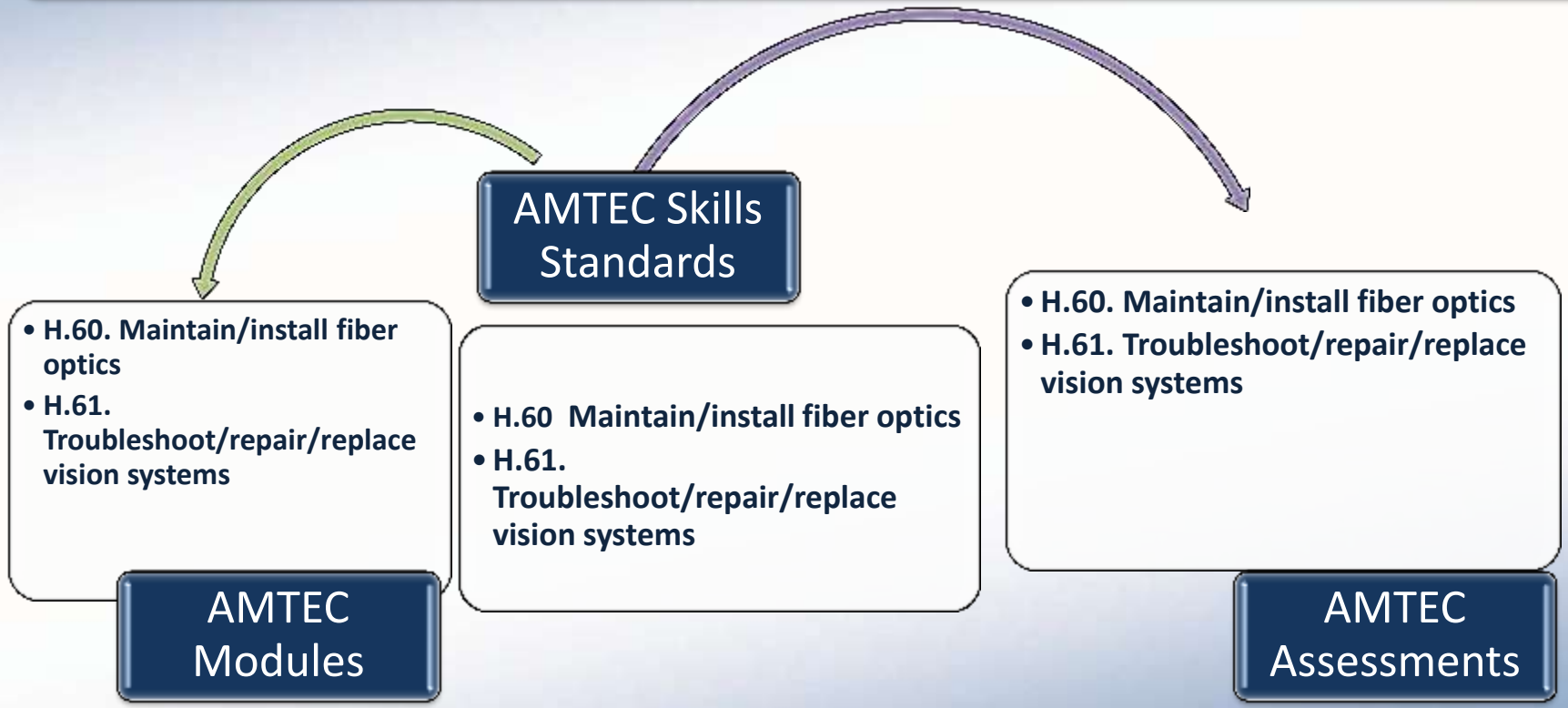
Sector Consensus on Standards → **Industry Endorsed Standards** → **Global Benchmarking & Continuous Improvements**

AMTEC
Ignite. Educate. Accelerate.

AMTEC is supported by a National Science Foundation Grant

autoworkforce.org

A Sector Based Common Modularized Curriculum



AMTEC

Ignite. Educate. Accelerate.

AMTEC is supported by a National Science Foundation Grant

autoworkforce.org

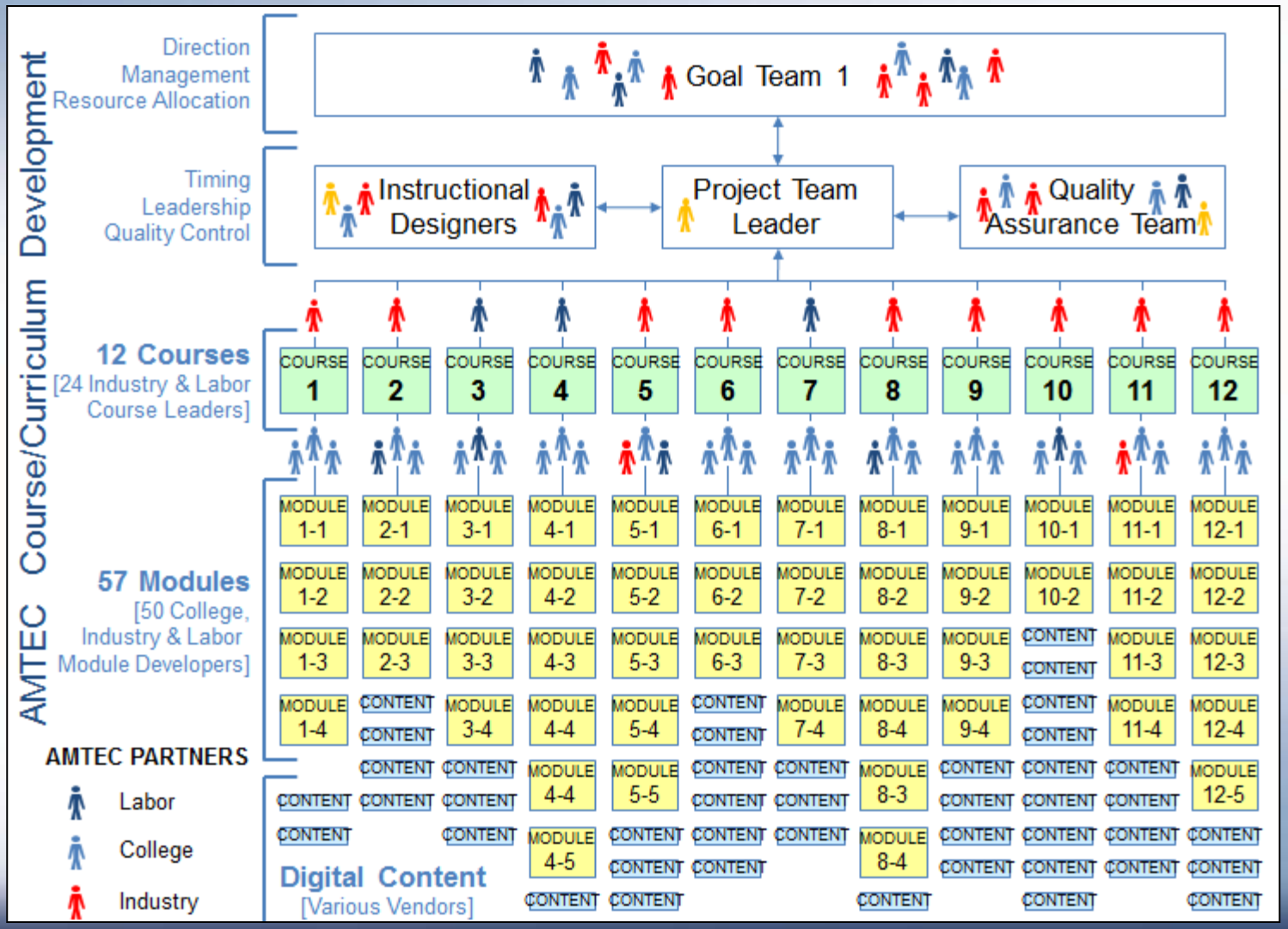
2010/2011 Goal 1 in Review

AMTEC

Ignite. Educate. Accelerate.

AMTEC is supported by a National Science Foundation Grant

autoworkforce.org



Automotive Manufacturing Technical Education Collaborative

AMTEC
Ignite. Educate. Accelerate.

AMTEC is supported by a National Science Foundation Grant

autoworkforce.org

Course/Module Development

- Started in May 2010 (Georgetown, KY)
  - 41 of 62 Module Template & Instruction Guides are Complete
  - Purchase of CampusCE & Moodle Rooms Joule
    - CampusCE Environment Established
    - Moodle Rooms Joule AMTEC
- 3 Follow up Curriculum Development Workshops (Dearborn, Knoxville & Flint)

AMTEC

Ignite. Educate. Accelerate.

AMTEC is supported by a National Science Foundation Grant

autoworkforce.org

2010/2011 Goal 2 in Review

Career Pathway

AMTEC
Ignite. Educate. Accelerate.

AMTEC is supported by a National Science Foundation Grant

autoworkforce.org

AMTEC Career Pathway

AMTEC is developing a career pathway model to be used by AMTEC colleges and their respective high school and four-year postsecondary institution partners, and industry partners to increase accessibility, portability and graduation rates for students in automotive manufacturing and related technical fields.

Deliverables Include:

- 1. 1 Review of the Literature
- 1. 2 Develop Career Pathway Model/Framework
- 1. 3 Generate empirical data and research from AMTEC members
- 1. 4 Conduct "Best Practice" Academies
- 1. 5 Disseminate Reports to AMTEC Executive Committee & NSF

AMTEC
Ignite. Educate. Accelerate.

AMTEC is supported by a National Science Foundation Grant

autoworkforce.org

AMTEC Model Elements

Literature Findings For Effective Career Pathway	Element Present - Example
1. Employer involvement in all phases of the program	Governance Body - Boards/ Committee composed of majority Employers. Curriculum- Competencies, Standards, Labs Recruitment - Plant tours, High school fairs Retention - Mentoring, Internships Funding - Equipment, scholarships, donors Jobs – Internships and Pre or Apprenticeship Opportunities An Employer or Consortia of Employers – Requires Memorandum of Agreement between parties.
2. Institutional and instructional transformation links education and career competencies and training	Connects high school to college career pathway Connects from workforce to college career pathway Allows for non-credit to credit conversion Values and aligns credits for industry certification.
3.Wrap around support services	Provides career guidance, academic counseling, mentor financial assistance, and internships for student success.
4. Partnerships	Employers, Schools, Colleges, Universities, Government, and CBOs.
5. Continuous improvement	Utilizes data to improve performance and student success.
6. Sustainability	Makes good use of data to drive planning and implementation that involves the blending and/or reallocating of funding sources.

AMTEC
Ignite. Educate. Accelerate.

AMTEC is supported by a National Science Foundation Grant

autoworkforce.org

Review of the Literature

Found at least six elements of strong, sustainable career pathways:

1. Institutional and instructional transformation that develop clear linkages and easy transitions between education and training
2. "Wrap around" support services -- such as counseling, academic preparation, internships, financial aid, etc. -- to help students succeed
3. Partnerships that make good use of data to drive planning and implementation; involves the blending and/or reallocating of funding sources
4. Employer involvement in all phases of the process
5. Continuous improvement systems
6. Commitment to sustainability that involves the blending and/or reallocating of funding sources

AMTEC

Ignite. Educate. Accelerate.

AMTEC is supported by a National Science Foundation Grant

autoworkforce.org

2010/2011 Goal 3 in Review

Academies, Marketing, & Mentoring

AMTEC
Ignite. Educate. Accelerate.

AMTEC is supported by a National Science Foundation Grant

autoworkforce.org

AMTEC Academies

- Team of Industry & Education Partners
  - Plan, Coordinate, and Implement Academies
    - San Antonio – Career Pathway Academy
      - February 9-11, 2011
      - Hosted by Alamo Community College
        - » 87 Participants
    - Lexington – AMTEC/NCATC Joint Summer Workshop
      - June 8-10, 2011
      - 3 Tracks with Industry Partners Hosting Track 3
      - **Unveiling of the AMTEC Curriculum & Pathway Model**

AMTEC

Ignite. Educate. Accelerate.

AMTEC is supported by a National Science Foundation Grant

autoworkforce.org

2010/2011 Goal 4 in Review

Assessment

AMTEC
Ignite. Educate. Accelerate.

AMTEC is supported by a National Science Foundation Grant

autoworkforce.org

AMTEC Assessment Development

- AMTEC Standard Assessment
  - Assessment Reliability and Validity Testing
  - Cut Score Set
    - 1800 Assessments Administered
- Plan to develop 12 Smaller Assessments aligned at the course level
- Plan for ANSI/ISO Certification

AMTEC is supported by a National Science Foundation Grant
autoworkforce.org

AMTEC ANSI Certification Accreditation

- Based on ANSI/ISO/IEC 17024: General Requirements for Bodies Operating Certification of Persons
  - International Standard
  - Nationally Adopted: American National Standard
- Requirements within the Standard
  - Organizational Structure
  - Requirements for the staff and contracted individuals such as examiners for performance examinations
  - Certification Process
    - Psychometrically sound examination
    - Recertification
    - Due process for taking certification away from individual

Type them in your chat window

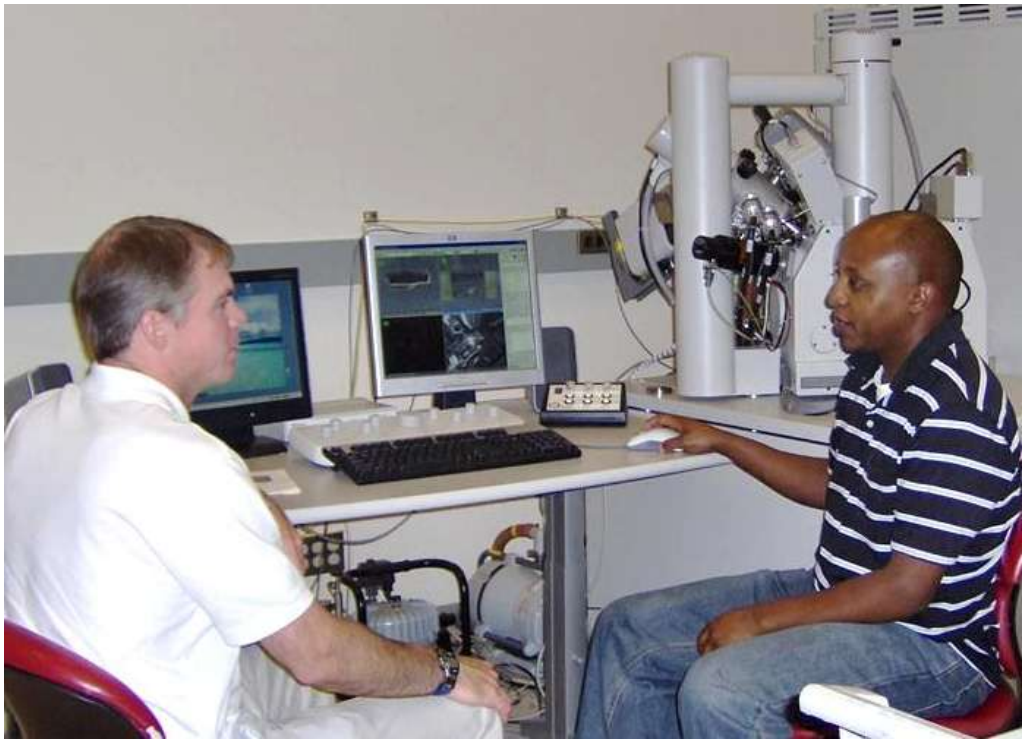
Deb Newberry

Director of Nanoscience Technology Program

Dakota County Technical College

Five Pillars of Sustainability

1. Industry
2. Facilities
3. Faculty
4. Students
5. Administration



1. Industry Issues

- Building relationships
- Hiring 2-year grads
- Industry Advisory Boards

NETWORKS

Industry Solutions

- Create a KSA profile/portfolio
- Take away admin & logistical burden
- Have a clear goal for the board
- Find members through industry groups
- Boards should Advise, Assess and Advocate



2. Facilities Issues

Knowing

- How to start
- Facility goals
- Student KSAs
- Growth plan

Facilities Solutions “Knowing”

- To “know” what to do, create an industry committee (facilities and lab managers) to first audit you and then recommend a plan with some vision. Include safety in the audit as well.

- Develop a needs list industry can respond to.



2. Facilities Issues

Acquiring

- Funding/grants
- Donations and managing them
- Staff and expertise

- Infrastructure and ongoing operational costs

Facilities Solutions “Acquiring”

- Grants/donations
- Issue press releases that acknowledge their donation, (www.rit.edu/news/story.php?id=48062)
- Piggy back
- Bundle-in installation, training and 1 year support
- Utilize programs like ERLE DoE program, (www.osti.gov/erle/)



3. Faculty Issues

- Identification of Champions
- Knowing who we are serving
- Skilled and knowledgeable faculty

Faculty Solutions

- Develop Leadership/Champions
- Program advisors
- Professional development such as externships



4. Student Issues

- Engagement & awareness
- Preparedness & knowledge requirements
- Soft skills

Student Solutions

- Reach students through mobile and social media
- Recruit from within
- Develop foundation and bridge programs such as Bridge to Biotech and I-BEST



5. Administration Issues

- Strategies for demonstrating the need
- Creating faculty buy-in before you go to them
- Gaining resources and funding
- Managing the up-line

Administration Solutions

- Identify and Develop Champions
- Provide data on jobs and student success
- Funding: use a consortia based approach (www.oregonmanufacturing.org/node/195)



Type them in your chat window

Objectives for Today's Discussion

1. Explore the importance and value of technology education programs to our institutions
2. Discover the challenges and solutions
3. Identify promising practices and success models



How Can We Better Serve You?

Whether you are joining us live or watching the recorded version of this webinar, please take 1 minute to provide your feedback and suggestions.

www.questionpro.com/t/ABkVkZIOXP



HI TEC

HIGH IMPACT TECHNOLOGY EXCHANGE CONFERENCE • EDUCATING AMERICA'S TECHNICAL WORKFORCE

Join Us in San Francisco, CA
July 25-28, 2011

www.highimpact-tec.org

NETWORKS



Webinar Recording & Slides

Go to www.matecnetworks.org,

Keyword Search:

“Webinar Sustaining CC Technical Programs”



NetWorks Upcoming Webinars

May 19 (MS)	They Snooze, You Lose: 10 Shots to Caffeinate Presentations
June 16	Grant Opportunities and Success Strategies

www.matecnetworks.org



Thank you for attending

Sustaining Community College Technical Programs

NetWorks is an ATE Resource Center supporting faculty in Semiconductor, Automated Manufacturing, and Electronics education

Classroom Ready Resources in the Digital Library

TechSpectives Blog

Webinars

All this and more at www.matecnetworks.org

NETWORKS