Building Innovators Today to Better Serve Tomorrow

2015 ATE Conference
Andre W. Thornton
October 23, 2015
Helping the Future Arrive

...through Advanced Technological Education (ATE) in Science, Technology, Engineering, and Math (STEM)
Today’s Topics

Impact of Innovation on Industry

STEM Workforce skills needed for the future

How ATE can provide a solution

x + y = 22
3x - 20y = 33
Solve for x and y. Solution: ?
### The End Goals

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<th>Academia</th>
<th>Industry</th>
<th>Government</th>
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<td>Provide workforce development and education in response to growing industry needs</td>
<td>Deliver value to customers, employees and shareholders by optimizing value creation through sustained profitable growth.</td>
<td>Maximize GDP and Tax Revenues to re-invest in workforce development, and job creation in evolving high value industries while contributing to solving global challenges.</td>
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### Workforce

Find dream job where a meaningful contribution can be made, value created, and a decent income earned to help support family.
Global Perspectives

“Reaffirming and strengthening America’s role as the world’s engine of scientific discovery and technological innovation is essential to meeting the challenges of this century... That’s why I am committed to making the improvement of STEM education over the next decade a priority.”
— Barack Obama, President of the United States

“There’s no secret to success in the modern world. If countries are going to win in the global race and children compete and get the best jobs, you need mathematicians and scientists – pure and simple.”
— David Cameron, Prime Minister of the United Kingdom

“This is a fine school, it’s a fine school which is doing its best to have a focus on the hard sciences; the science, the technology, the engineering and the math which are going to be such an important part of our future if we are to stay at the cutting edge of progress – if we are to stay at the forefront of the first rank economies.”
— The Honorable Tony Abbot, Former Prime Minister of Australia

Today in 60 Seconds...

2 M+ Google Searches
1,500 Blog Posts
60 WW2 Domains Registered
510,000 Facebook Comments
600 New Tweets
200M+ Emails Processed
20 New Identity Theft Victims

The World Runs on STEM
Every Company Is A Tech Company

Cosmetics Company L’Oréal is an app producer with 1.4 million downloads.

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Solution: ?
Jobs of the Future

Emerging STEM Domains
- Cyber & Analytics
- Advanced Manufacturing
- Nanotechnology
- Robotics
- Energy

Community College Grad
Age - 20
Enter Workforce 2015

10th Grade
Age - 15
Enter Workforce 2020

5th Grade
Age - 10
Enter Workforce 2025

Kindergarten
Age - 5
Enter Workforce 2030

Digital Data Growth
INNOVATION
Population Growth

STEM Innovator

YEAR
- 2015
- 2020
- 2025
- 2030
How We Will Get There

Innovation happens through the combined technical, business and social skills of people solving problems.

Velocity of Change is Driving the Need to Develop All Three Simultaneously.
The Speed of Innovation

Requirement Initial Operational Capability (IOC) First IBM PC iPhone

19.1 years from contract to IOC

Initial ATF requirement RFP issued Lockheed contracted YF-22 EMD first flight contract F-22 first flight F-22 first delivered Collier IOC trophy First overseas deployment Last F-22 delivered

'82 '84 '86 '88 '90 '92 '94 '96 '98 '00 '02 '04 '06 '08 '10 '12

IBM PC Reagan: Star Wars Gorbachev: perestroika Berlin wall falls USSR dissolved; Desert Storm USB 1.0 Retaliation on Taliban 9/11 Attacks Iraq invasion iPhone Lehman bankrupt bin Laden dead

China granted permanent normal trade relations

DARPA - Distribution Statement “A” (Approved for Public Release, Distribution Unlimited)
A Personal Story

Aircraft Manufacturing

Business Strategy

Organizational Leadership
### LM IS&GS TLP Redesign

**Systems Engineering and Agile Organizational Development Approach**

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<th>Year</th>
<th>Month</th>
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#### TLP Redesign

1. **Sprint 1 - Requirements**
2. **Sprint 2 - ELDP Plan**
3. **Sprint 3 - ATLP Plan**
4. **Sprint 4 - Update ELDP and ATLP Plans**
5. **Sprint 5 - Communications Plan**

**Gathered Stakeholder Requirements:**
- E&T
- LoBs
- S&BD
- HR
- Corp

**Company Strategy**

**Stakeholder Reviews:**

**An Engineering Solution to a Human Capital Opportunity**
TLP Competencies

IS&GS TLP (2-3 Year program)

- Develop Enduring Relationships
- Communicate with Positive Impact
- Create Inclusive Environment
- Lead with Integrity
- Be Accountable

Core Competencies

- Capture Engineering
- Affordability Thinking
- Business Management
- Business Case Development

Domain Expertise

- SW, IT, Cyber
- System Development Lifecycle
- Agile Methodology
- Deliver Value
- Make Effective Decisions
- Foster Innovation
- Lead Change with Agility

Social Acumen

Business Acumen

Develop Innovative Technical Leaders
Competency Rubric Assessment

Average Score (0-5), where the higher the average the higher the level of expertise

Significant Gaps in Business Acumen Identified
Transcending STEM Competencies

Begin Preparing the Future Workforce Earlier in All Three Areas

Core Competencies

IS&GS TLP
- Develop Enduring Relationships
- Communicate with Positive Impact
- Create Inclusive Environment
- Lead with Integrity
- Be Accountable
- Capture Engineering
- Affordability Thinking
- Business Management
- Business Case Development
- SW, IT, Cyber
- System Development Lifecycle
- Agile Methodology
- Deliver Value
- Make Effective Decisions
- Foster Innovation
- Lead Change with Agility

College/University
- Public Speaking
- Integrity
- Conflict Resolution
- Emotional Intelligence
- Design to Cost
- Strategy
- Negotiation
- Return on Investment
- SW, IT, Cyber
- Research
- Innovative Thinking

K-12
- Public Speaking
- Character & Etiquette
- Team Building
- Social Responsibility
- Budgeting
- Planning
- Risk
- Imagination Inspiration
- Problem Solving
- Critical Thinking
- Creative Thinking

Social Acumen
- Comm’s HR Ethics

Business Acumen
- F&BO S&BD

Domain Expertise
- E&T

Engage Employee Volunteers

Begin Preparing the Future Workforce Earlier in All Three Areas
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STEM Education Alignment

Purdue University

“With the new technology, the disruption isn’t the technology itself... it’s the implication it has for the organization’s business model and the way the company creates and captures value. If students leave here and don’t understand that, we haven’t done a good job.” -- Mathew Lynall– Director of Experiential Learning and Management Consulting Programs, Purdue University

Temple University

“Temple University’s Fox School of Business offers the bachelor of business administration in management information systems... was reclassified as STEM under federal standards in 2013... One hundred percent of the graduates have been placed, and a Fortune 10 firm has made a multiyear commitment to provide funding for and recruitment of the program.”

Educators are Adjusting

ATE is a Solution

Number of ATE Collaborating Organizations (N=198)

- Business/industry: 4,150
- Other education institutions: 3,680
- Within host institution: 850
- Other ATE projects/centers: 660
- Public agencies: 640
- Other: 260

Leverage ATE to Define and Deliver what Industry Needs
Our Responsibility

STEM Innovator

Superior technology, products, services; affordable value

Core Competencies

- Social Acumen
- Business Acumen
- Domain Expertise

Help the Future Arrive
Through Advanced Technological Education (ATE) in Science, Technology, Engineering, and Math (STEM)... Anything Is Possible

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