21st Century Polytechnics

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The world has changed

WHAT THE ECONOMY OF TODAY AND TOMORROW DEMANDS

• Ability to ask good questions,
• Thinking and analytical skills to seek answers
• Information Literacy
• Collaboration & Communication
• Civil duty and sense of community
• Lifelong curiosity and learning
A university is to create and transmit knowledge through research and teaching courses

- After two years in college nearly half of all students showed no improvement in their complex reasoning, critical thinking, and writing skills

- Much of what is taught in college is now available free

- The value of explicit information is rapidly dropping to zero
HIGHER EDUCATION NEEDS TO CHANGE

The Challenges of 21st Century Teaching and Learning

- Many students graduate from even our most elite universities with little or no conceptual understanding of science, math, and technology that they have spent 4-years studying.
- They have learned the facts but not the ideas behind them.
- The traditional model of higher education cannot account for the exponential growth of information.
- For the 21st century, what you know is far less important than what you can do with what you know.
WHY POLYTECHNIC?

WHY THE NAME CHANGE?

The first Polytechnic:

- École Polytechnique: founded 1794 in Paris, France
- A new discipline for the Industrial Age

The 21st Century version of the Polytechnic:

- New discipline for the thinking and creative economy
- The T-shaped Professional

Our new definition of “polytechnic”:

- A college that uses innovative learning methods, real-world experiences, and industry partnerships to produce graduates uniquely qualified for life-long technology-driven careers. Purdue Polytechnic adds the blending of liberal arts to scientific theory and engineering practice

Root meaning:

- from Greek polytekhnos: “Skilled in many arts”
- poly = many
- tekhne = art or technical arts
SIX MAJOR AREAS OF TRANSFORMATION

Support + Progress = Excitement

- Teaching & Learning Innovation
- Curriculum Innovation
- Modernization of Learning Spaces
- Use-Inspired Research
- K-12 STEM Education and URM Opportunity
- Faculty Professional Development

- Tremendous Support
  - Board of Trustees
  - President
  - Provost

- Significant Progress
  - 6 areas of transformation
  - 10 elements of the transformed undergraduate learning experience

- Growing Excitement
  - Fall 2017 will represent 4th consecutive year of growing applications, deposits, and overall enrollment
  - 826 new beginners Fall 17
  - 200+ CODO gain each year
LEARNING EXPERIENCE TRANSFORMATION

10 ELEMENTS OF TRANSFORMING THE UNDERGRADUATE LEARNING EXPERIENCE

- Areas in which we have always excelled, but are expanding
  1. Theory-Based Applied Learning (“learn by doing”)
  2. Team Project-Based Learning

- Areas that are well proven and being adopted in all programs
  3. Required Industry-Driven Two-Semester Capstone Projects
  4. Required Internships or Workforce-Like Experiences
  5. Required Globalization/Cultural Immersions

- Areas in which we aim to set ourselves apart
  6. Modernized “Active Learning” Teaching Methods
  7. Integrated Humanities and Social Science Studies
  8. Integrated Learning-in-Context Curricula
  9. Competency Credentialing
  10. Faculty-to-Student Mentoring

The key is to design and implement all 10 elements in an integrated synchronous fashion and not approach each component in isolation.
# KEY FINDINGS FROM SURVEY OF EMPLOYERS

## KNOWLEDGE OF HUMAN CULTURES + PHYSICAL & NATURAL WORLD

<table>
<thead>
<tr>
<th>College Graduates Need...</th>
<th>According to This % of Employers*</th>
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<tbody>
<tr>
<td>Broad knowledge in the liberal arts &amp; sciences</td>
<td>80%</td>
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<tr>
<td>Awareness of global issues &amp; knowledge about societies &amp; cultures outside USA</td>
<td>78%</td>
</tr>
<tr>
<td>Applied knowledge in real-world settings</td>
<td>78%</td>
</tr>
<tr>
<td>Knowledge about science &amp; technology</td>
<td>56%</td>
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</tbody>
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*Hart Research Associates, “It Takes More Than a Major: Employer Priorities for College Learning and Student Success” (April, 2013)  
[www.aacu.org/leap/public_opinion_research.cfm](http://www.aacu.org/leap/public_opinion_research.cfm)
## Key Findings from Survey of Employers

### Intellectual and Practical Skills

**College Graduates Need...**

<table>
<thead>
<tr>
<th>Skill</th>
<th>% of Employers</th>
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</thead>
<tbody>
<tr>
<td>Critical thinking &amp; analytical reasoning</td>
<td>82%</td>
</tr>
<tr>
<td>Complex problem solving</td>
<td>81%</td>
</tr>
<tr>
<td>Written &amp; oral communication</td>
<td>80%</td>
</tr>
<tr>
<td>Information literacy</td>
<td>72%</td>
</tr>
<tr>
<td>Innovation &amp; creativity</td>
<td>71%</td>
</tr>
<tr>
<td>Teamwork skills in diverse groups</td>
<td>67%</td>
</tr>
<tr>
<td>Quantitative reasoning</td>
<td>55%</td>
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</tbody>
</table>

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www.aacu.org/leap/public_opinion_research.cfm
Educating for the 21st Century

Educate students for:

- Life in a time of profound change
- Life in a digital society
- Life in a diverse and global society
- Life in an evolving information economy
- Civic engagement
The T-Shaped Professional

21st Century competencies

- Deeper learning
- Analytical reasoning
- Effective communication
- Critical thinking
- Managing complexity
- Collaborative work
- Self-directed learning
- Cultural awareness
- Innovation

Depth of knowledge

- Technical content
- Domain theory
- Domain fundamentals
- Problem-solving skills
- Research skills

Methods

- High TRL research
- Student-centered teaching
- Cross-functional learning
- Contextual learning
- Work-based learning
- Internships
- Co-curricular experiences
- Industry driven curriculum