



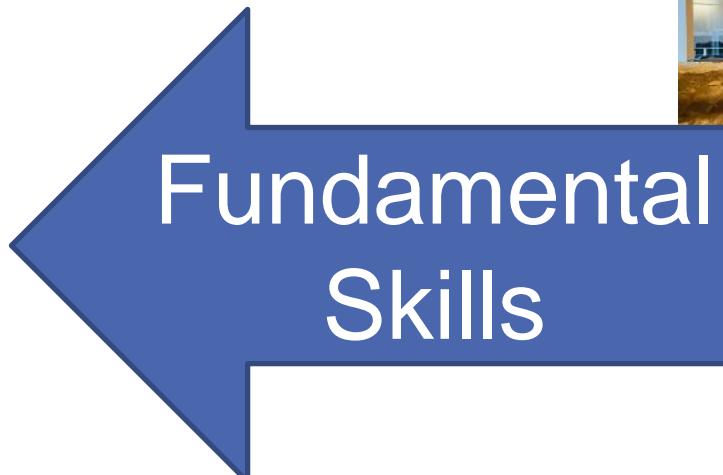
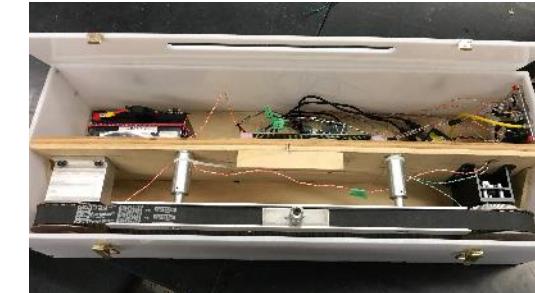
2018 Annual INCOSE
Great Lakes Regional Conference
SYSTEMS AT THE CROSSROADS
17 - 20 October 2018 | Indianapolis, Indiana

Systems Engineering and Community Engagement:

EPICS and INCOSE

Background

- Andrew's Background
 - EPICS student
 - BME graduate
 - BS and MS
 - Biomet Engineer
- Returned to EPICS in ...



Connecting together = IMPACT



Motivation: Education & Society

- Education
 - Prepare future leaders in the global economy with quality **experiences**
 - Sustain projects in an affordable and sustainable manner
 - Connect societal needs with engineering
- Society
 - Opportunities for impact with REAL projects that can be used by real people
 - Long-term partnerships to address needs of the underserved



EPICS®

Purdue University

- Headquarters
- Academic Program
- Multidisciplinary, Engineering-Centered Design Course
- Community-based
- Local and Global
- 1200+ students
- 45+ majors
- 150+ projects

22
Years



NAE Gordon
Prize

University

EPICS University Consortium

- 53 Universities
- U.S., Canada
- Colombia,
- Brazil,



EPICS K-12

EPICS K12



IEEE-EPICS
Advancing Technology
for Humanity
+ projects

Signature Program
• Latin America
• Europe





Multi-Disciplinary, Community-Based Design



650+ students per semester

45+ majors

1st Year – 4th Year Students

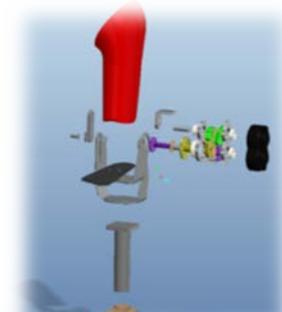
~150 Active Community Projects



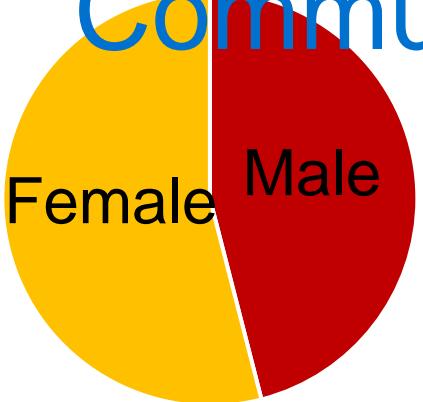
400+ deployed

100+ alumni

~2 years

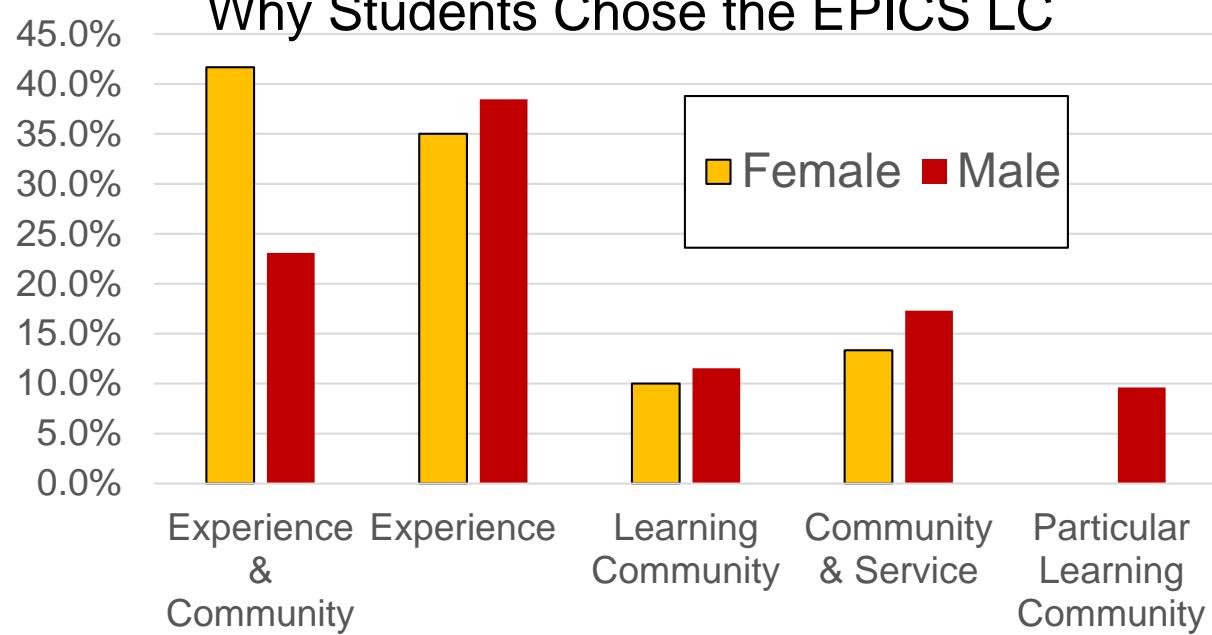


EPICS 1st Year Learning Community



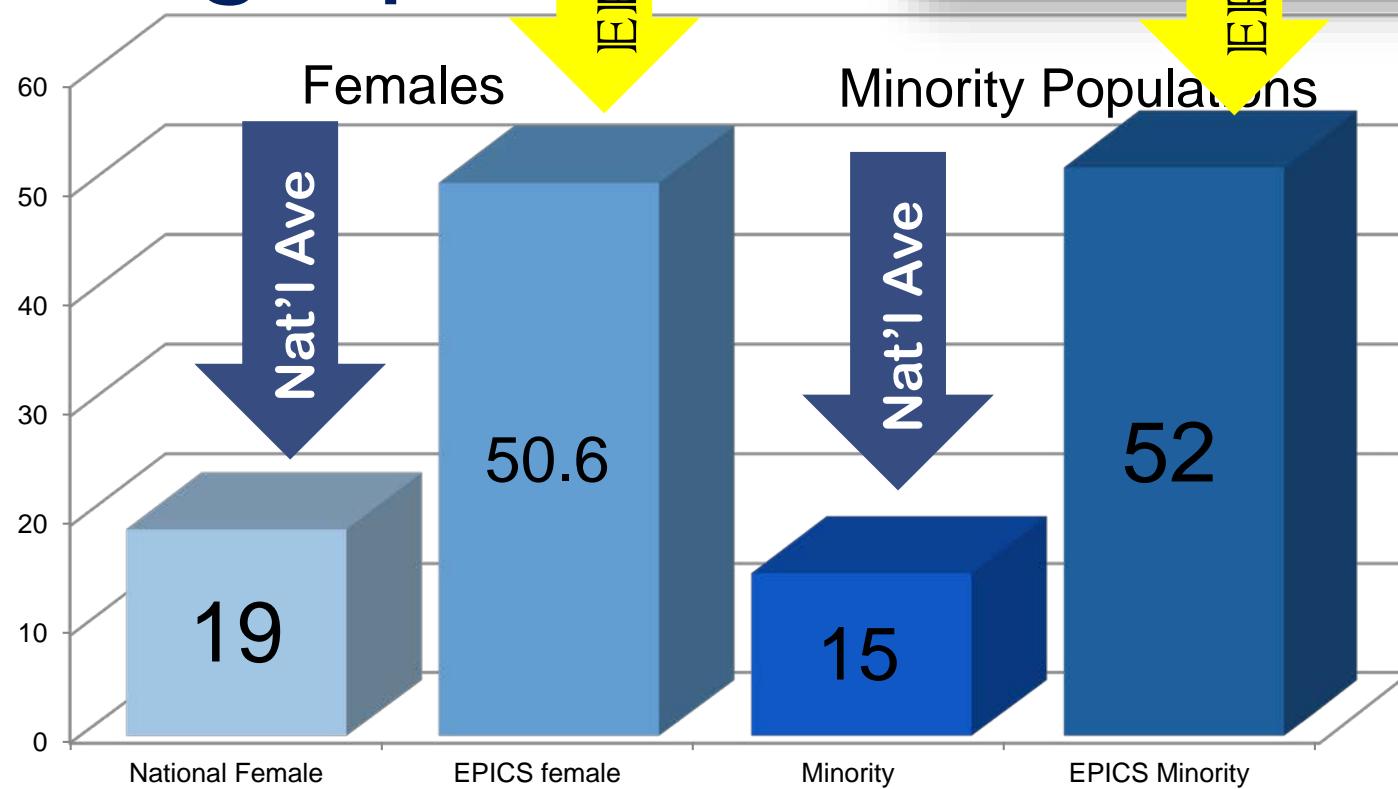
2014: 54% Female

2015: 46% Female



High School EPICS®

Demographics



EPICS Projects



Access & Abilities



Education & Outreach



Human Services



Environment

Projects: Access & Abilities

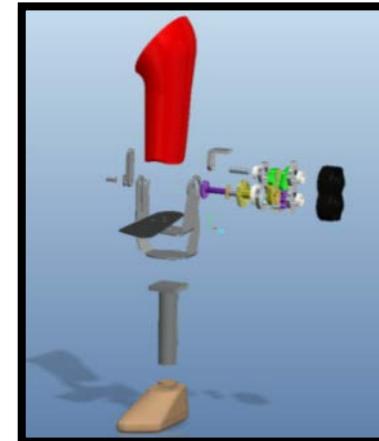
- Communication devices
 - Tablets, mobile devices
- Braille eReader
 - Multi-line



- Camp for Children w Disabilities



□ Custom Prosthetics



Projects: Education

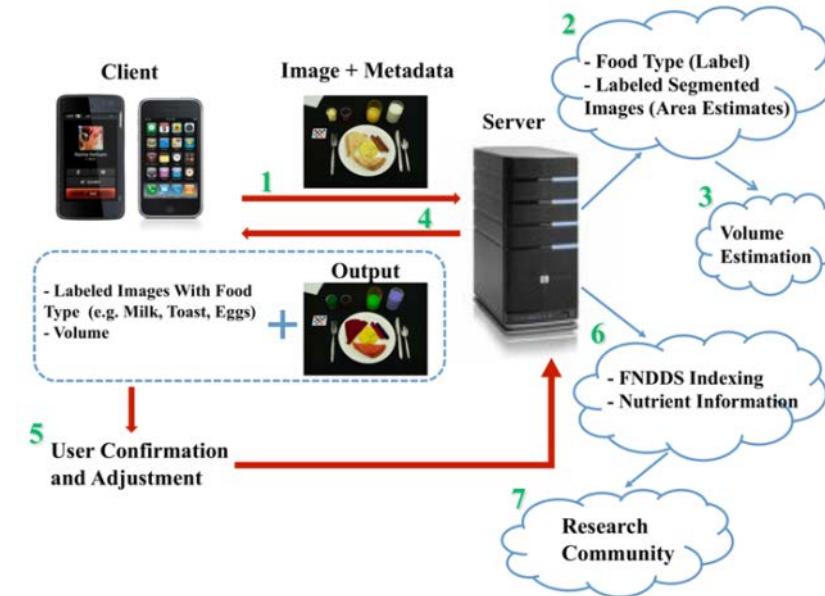
- Educational Designs
 - Schools
 - Museums
 - Libraries
 - Community Centers
 - Zoos



- Video  system for rural school

Projects: Human Services

- TADA Project -
Android App to track
food intake
- Software solutions for
non-profits or NGO
 - Scheduling and data
management
 - Volunteer Management systems



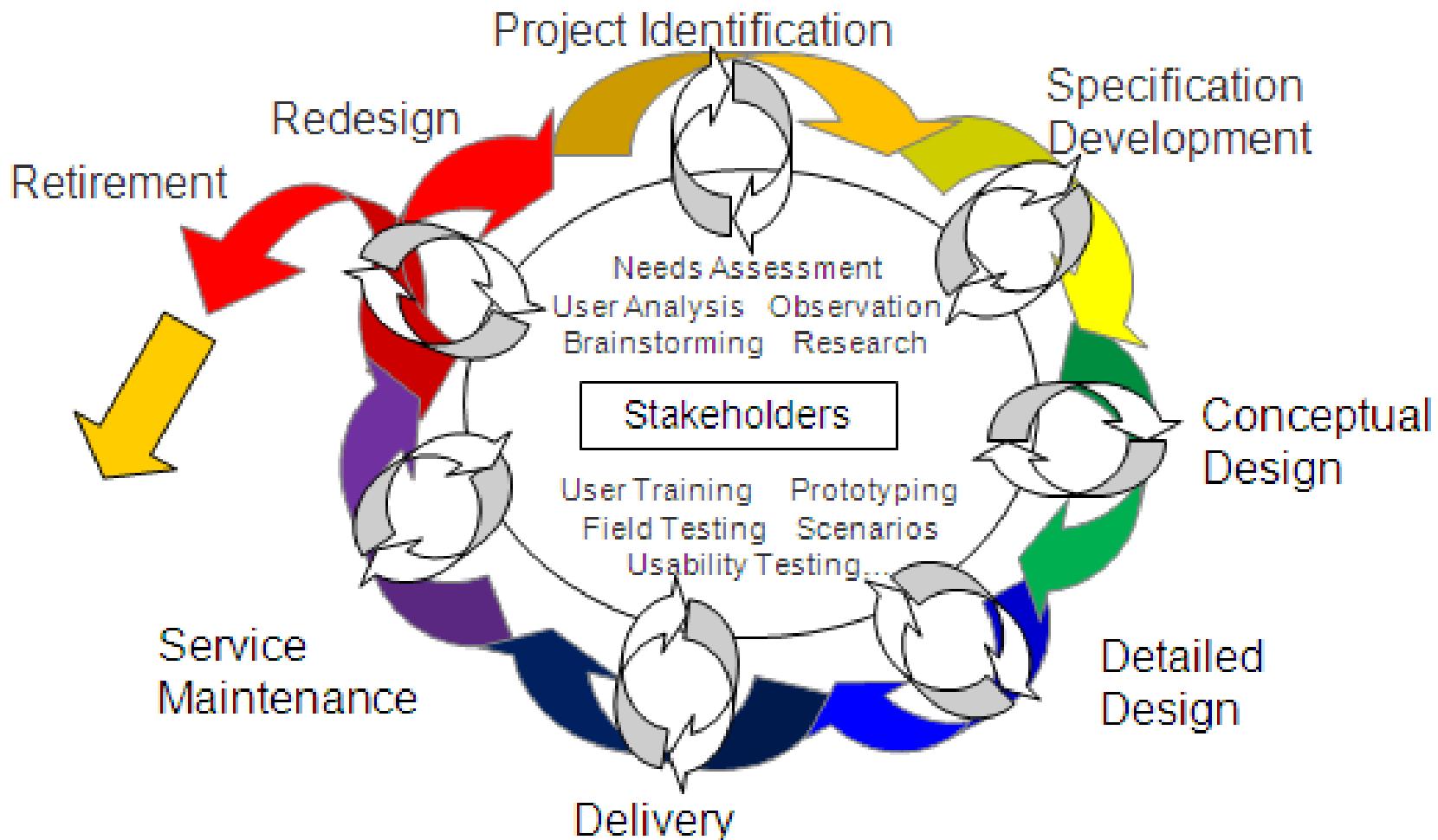
- Disaster resistant
homes
- Feeding urban
children
- Improving grain
storage

Projects: Environment



- Campus sustainability
- Water and Waste Treatment
- Alternative Power Systems
 - Solar power for rural Colombian schools
 - Accessible Solar Cart to transport Children
- Habitat for Humanity
 - Sustainable designs
 - Training of staff
- Sustainable communities
 - Hydroponics

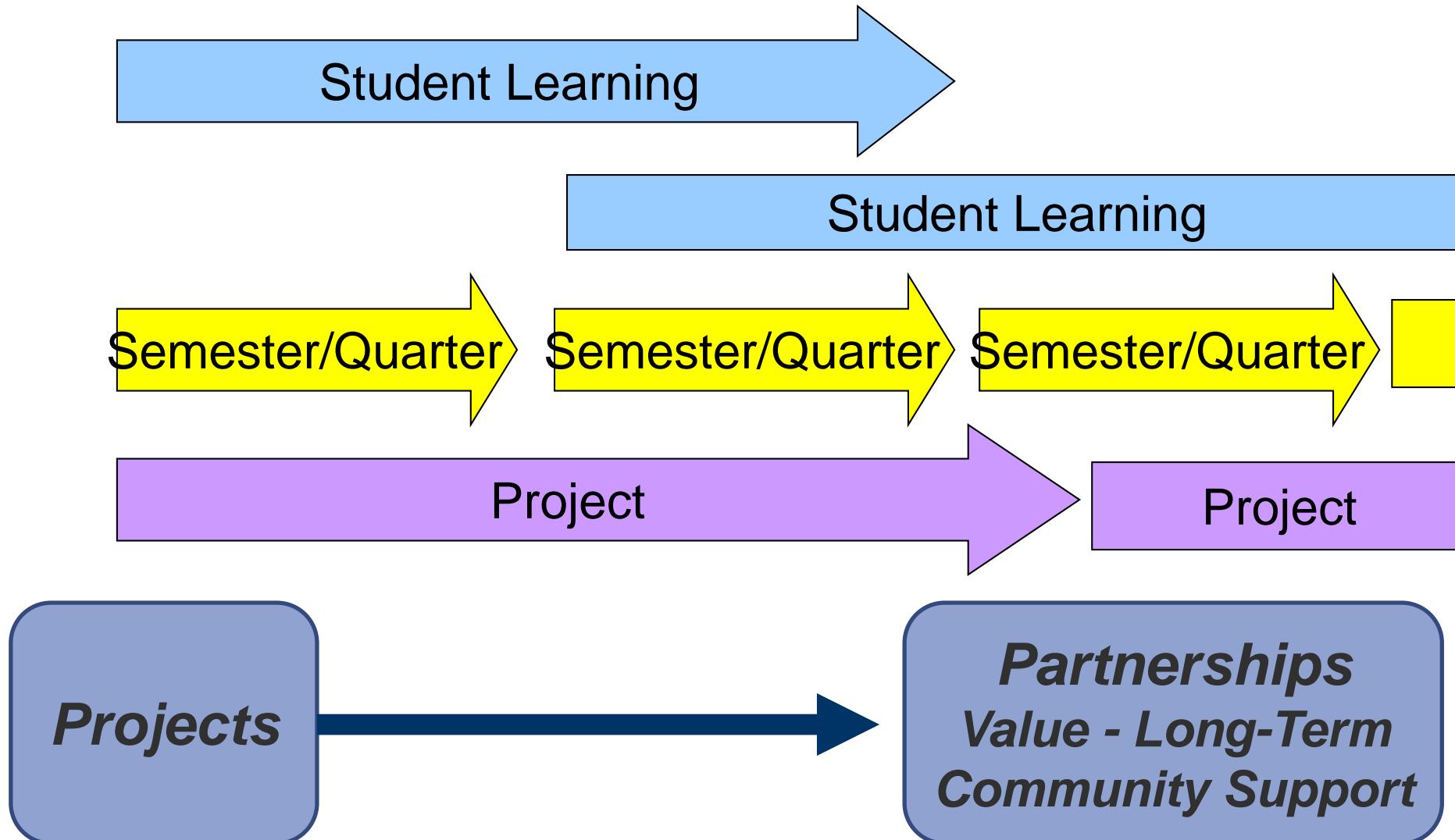
Human-Centered Design



- Interactions with Community
- Communications at all stages

Also draw from:
IDEO, Stanford's
d school

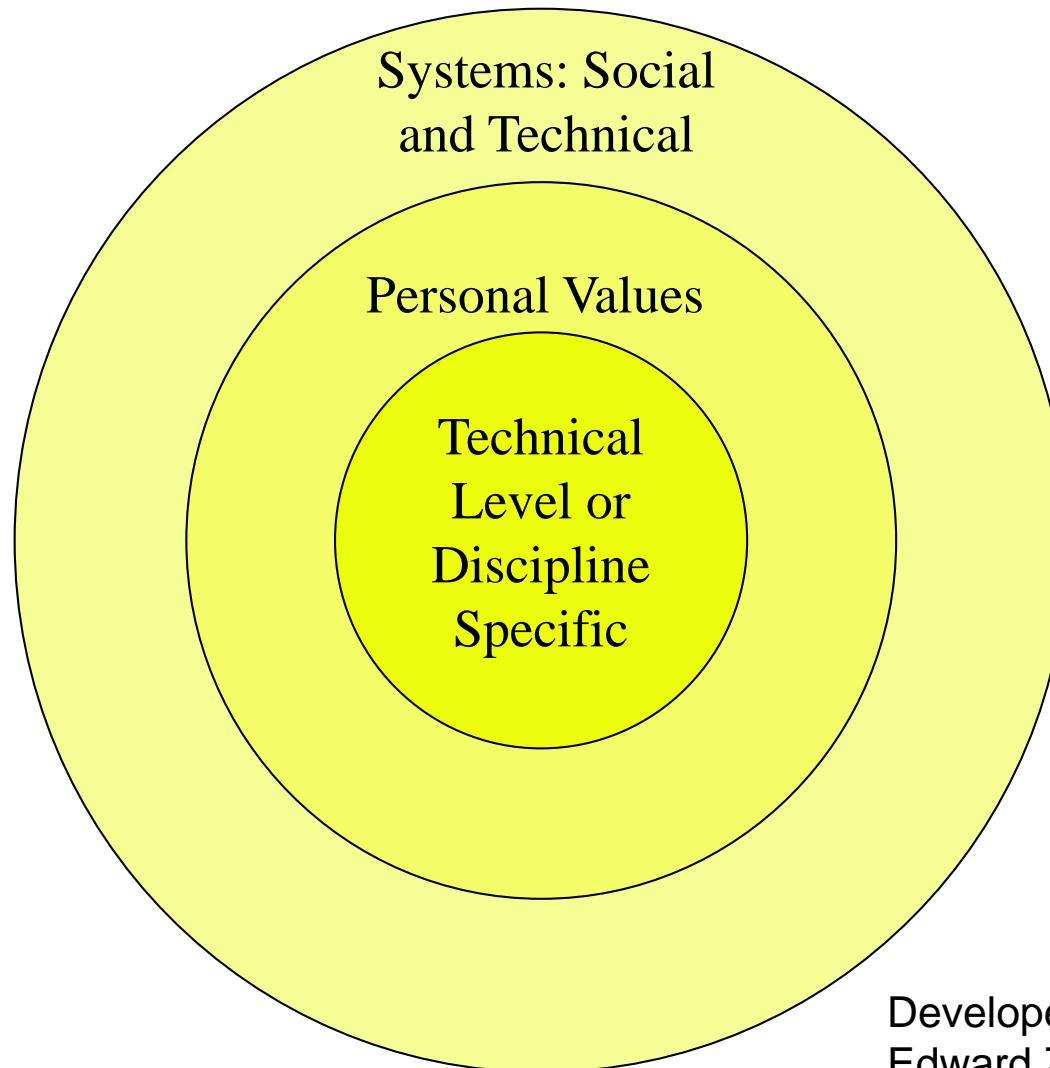
EPICS Decouples Timescales



Reflection

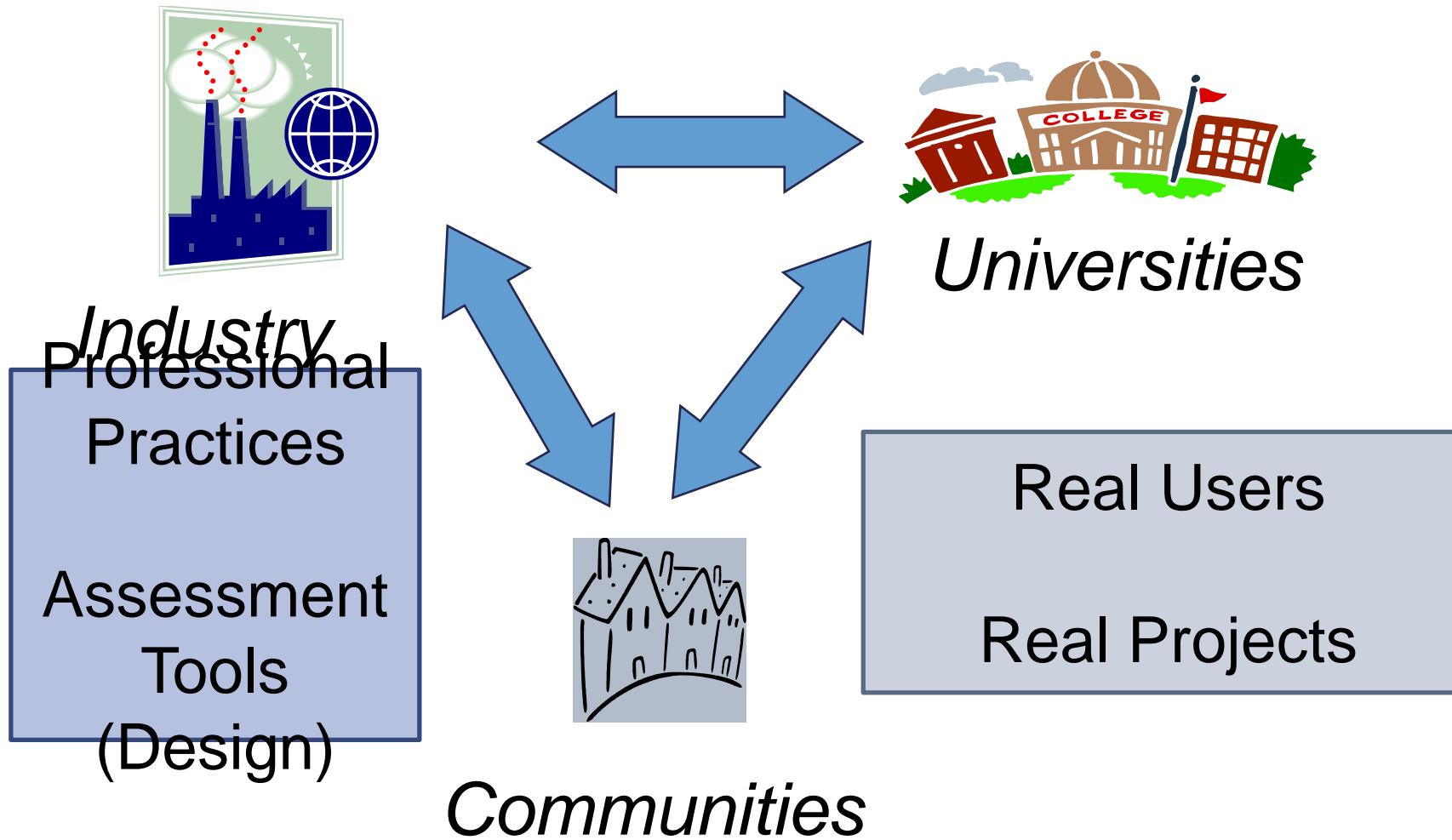
- Connect service to academic learning
 - Metacognitive activity
 - Students compartmentalize experiences and learning
- Address student reaction and/or experience from service
 - Were stereotypes challenged or reinforced?
 - Was there unintended learning?
- Draw out learning
 - Students may miss learning opportunities if not pointed out
 - How is the service connected to Systems?

Reflection Model

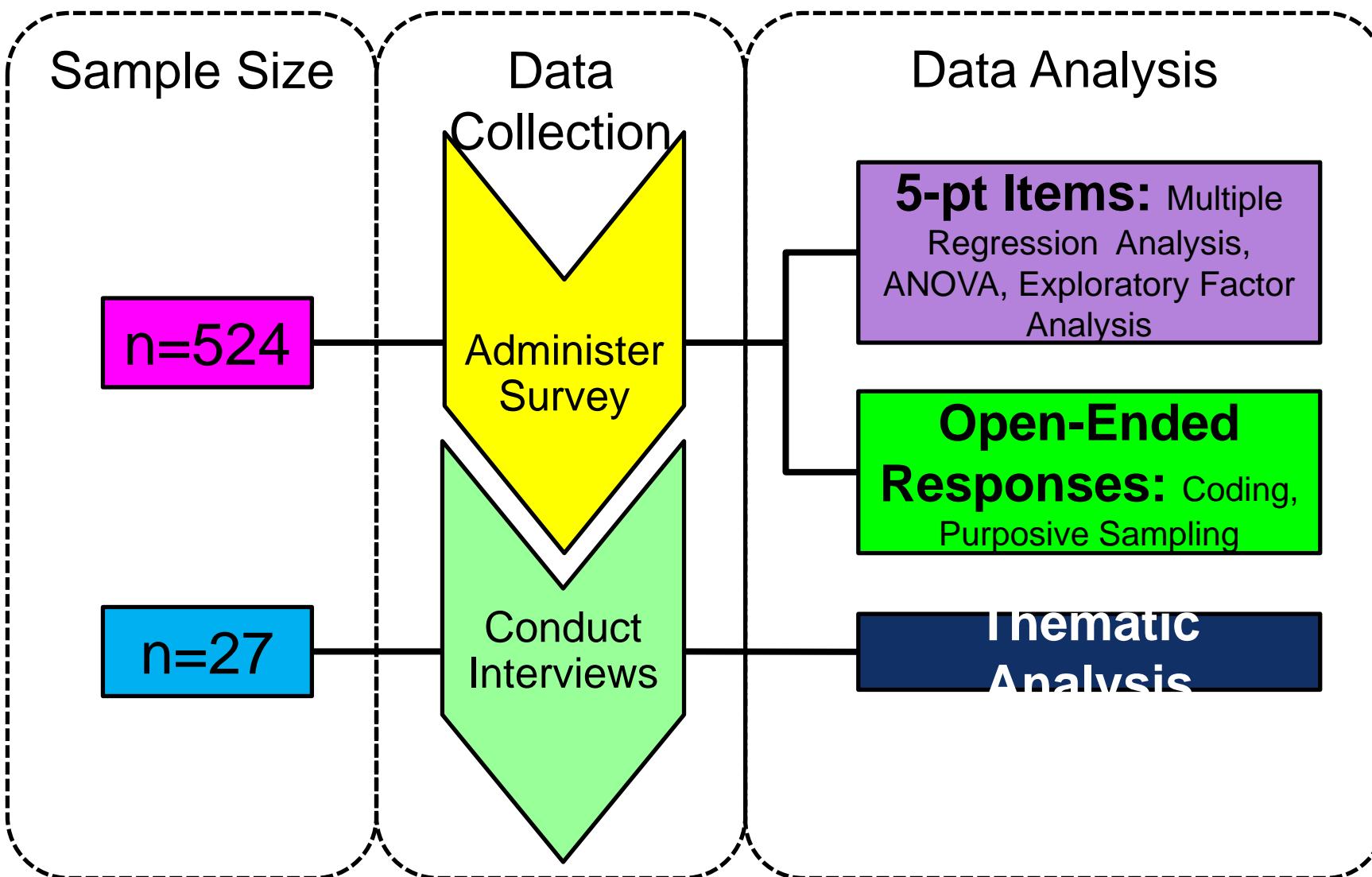


Developed by
Edward Zlotkowski

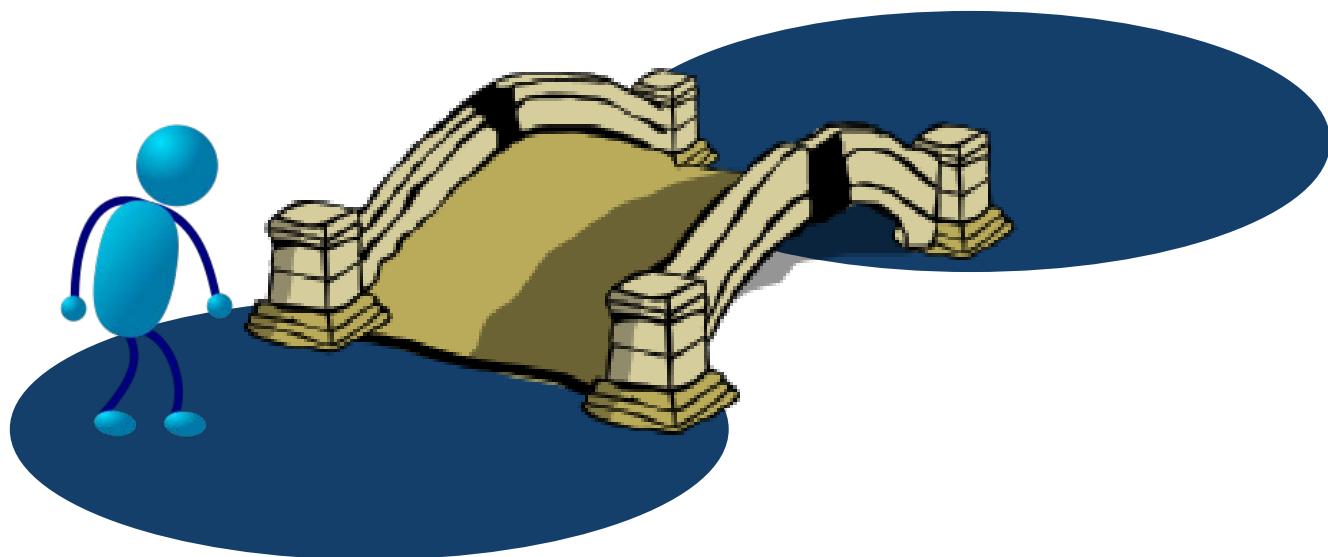
Partnerships and Opportunities



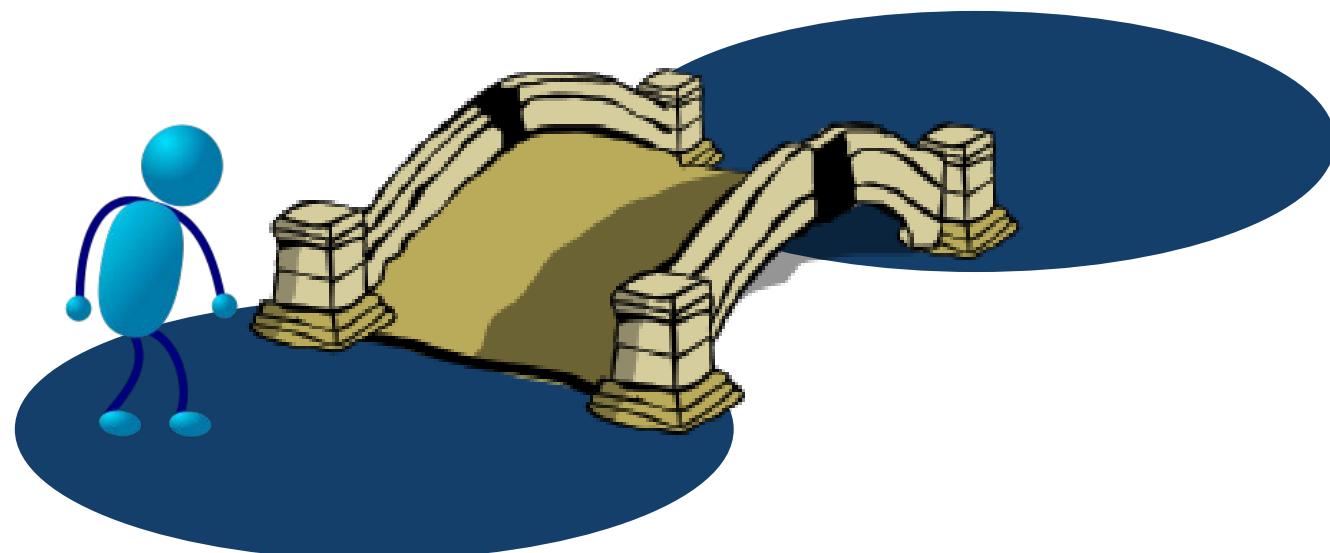
Impact on Alumni in Industry



Connection

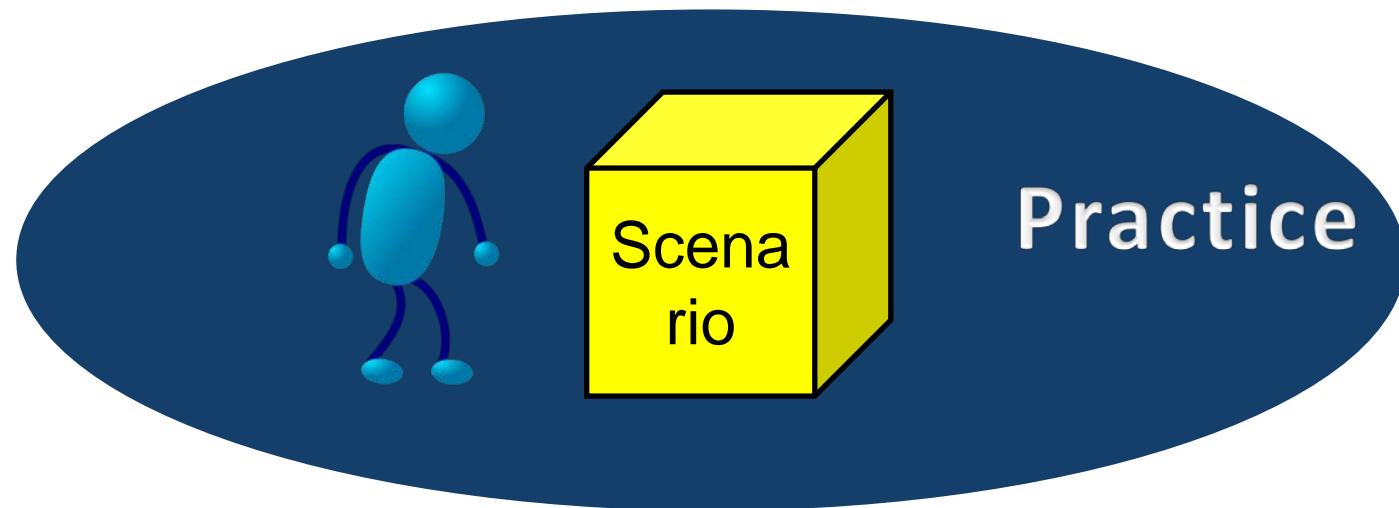


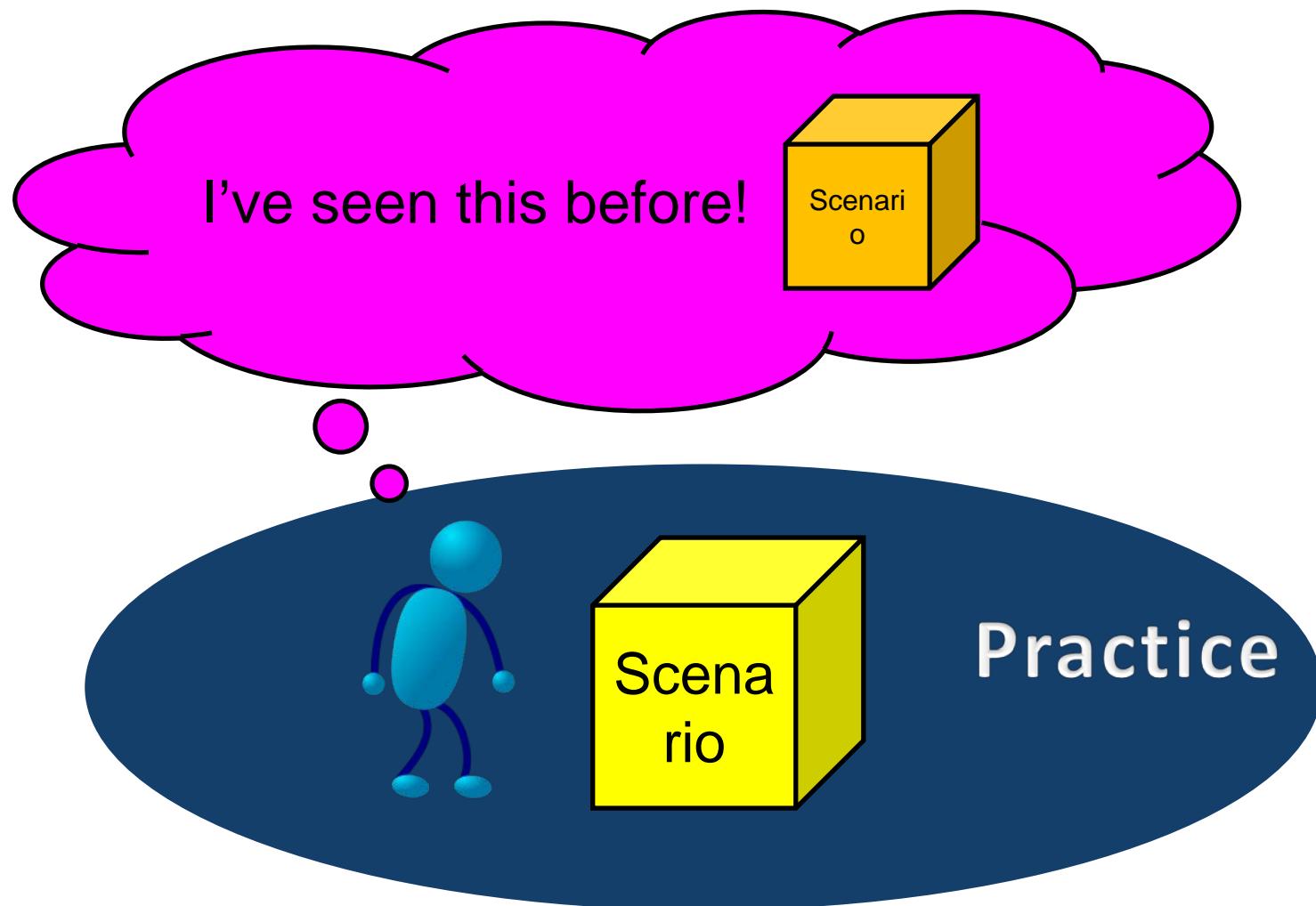
EPICS PURDUE



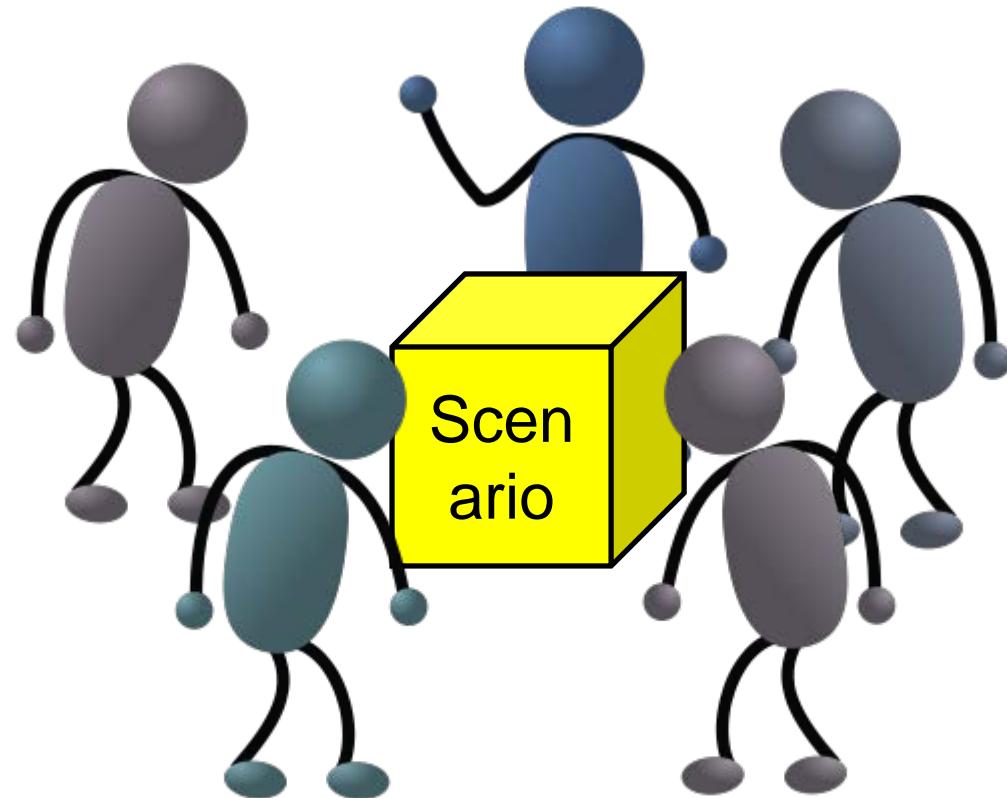
EPICS PURDUE

Experience

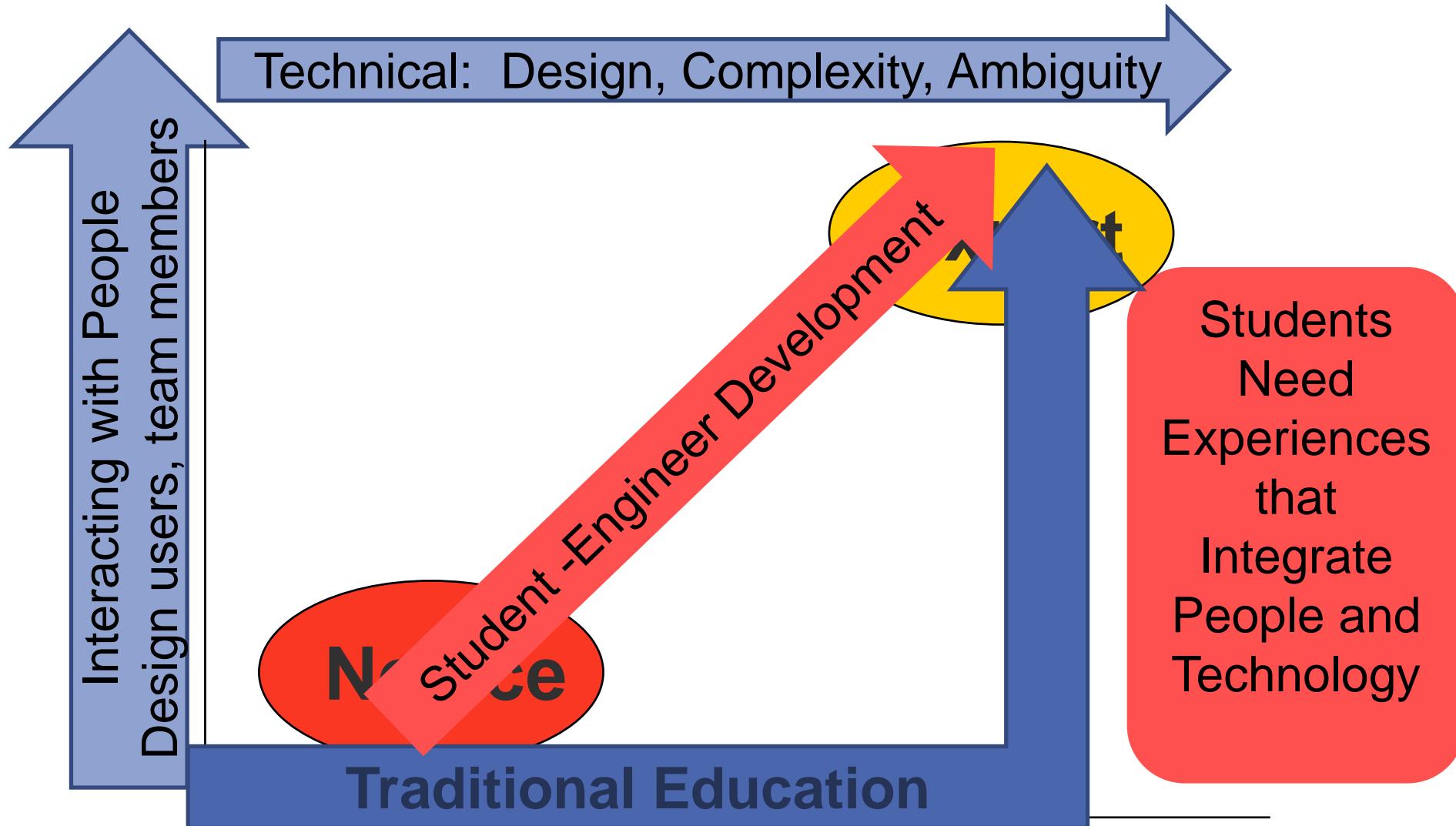




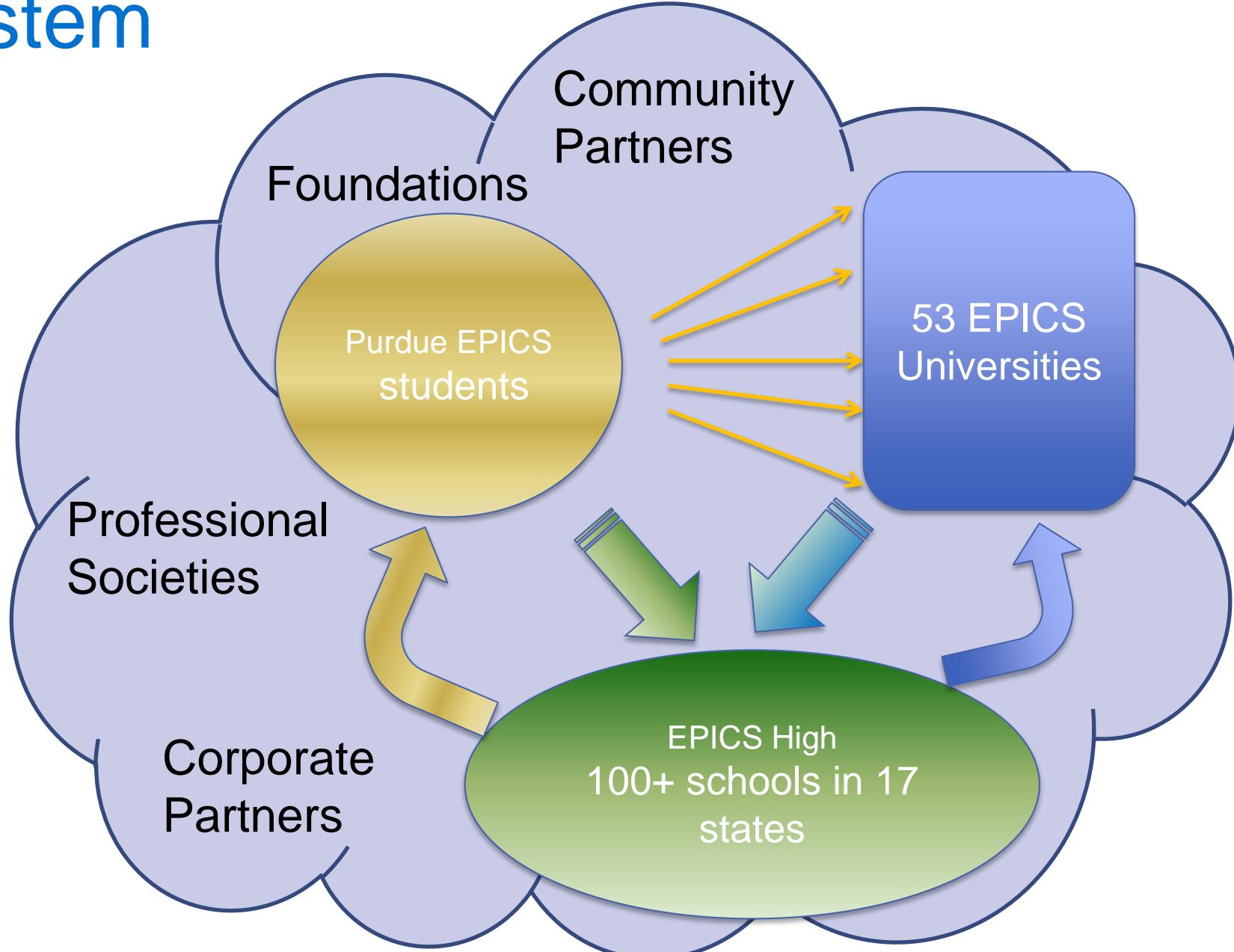
Working with Others



Research Results: People and Technical are Related



EPICS is a Community and System



Collaborative Opportunities

- Purdue University
 - Design Reviews (in-person or remotely)
 - Oct 2-5
 - Dec 4-7
 - PDH's on systems thinking

Other universities

Butler

Notre Dame

Collaborative Opportunities

- Pre-University
- Free EPICS design curriculum
 - Opportunity to draw more students into Engineering
 - Address diversity (e.g. gender balance)
- Systems learning modules

Collaboration Opportunities

- Engage volunteers as mentors for EPICS schools
 - Start new schools
 - Mentor existing schools
- EPICS Curriculum additions
 - Systems approaches to community design

Questions?