

EPICS®



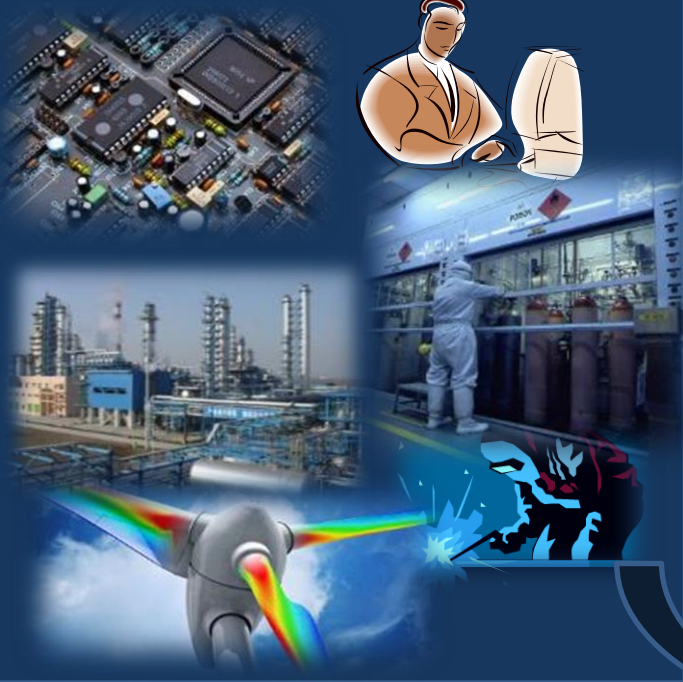
William (Bill) Oakes, Director
Purdue University

<https://engineering.purdue.edu/EPICSU>

<http://www.purdue.edu/epics>

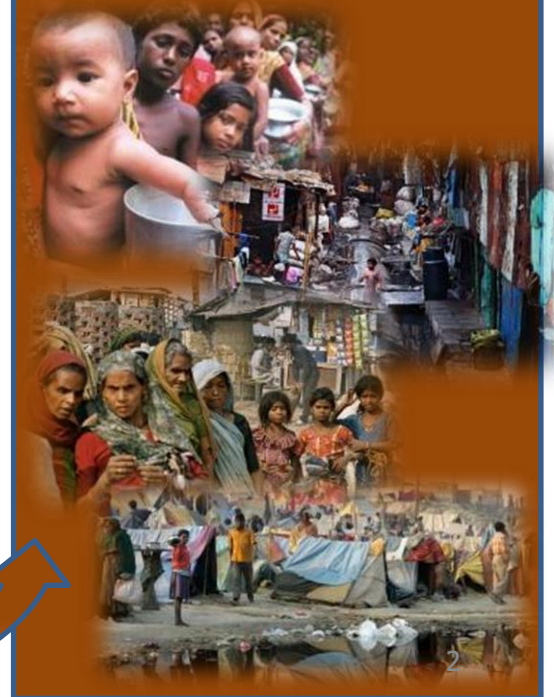
Opportunities

Higher Education
Learning
Diversity
Increasing Participation



- Needs of the underserved offer opportunities
- Solutions improve lives of fellow citizens

Needs of the
Underserved
Partnerships
Support





Multi-Disciplinary, Community-Based Design



400+ students per semester

~500 students, spring 2015

70 majors

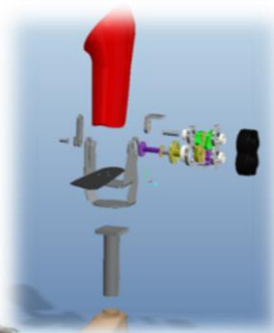
1st Year – 4th Year Students

90+ Active Community Projects





300+ deployed

3000+ alumni

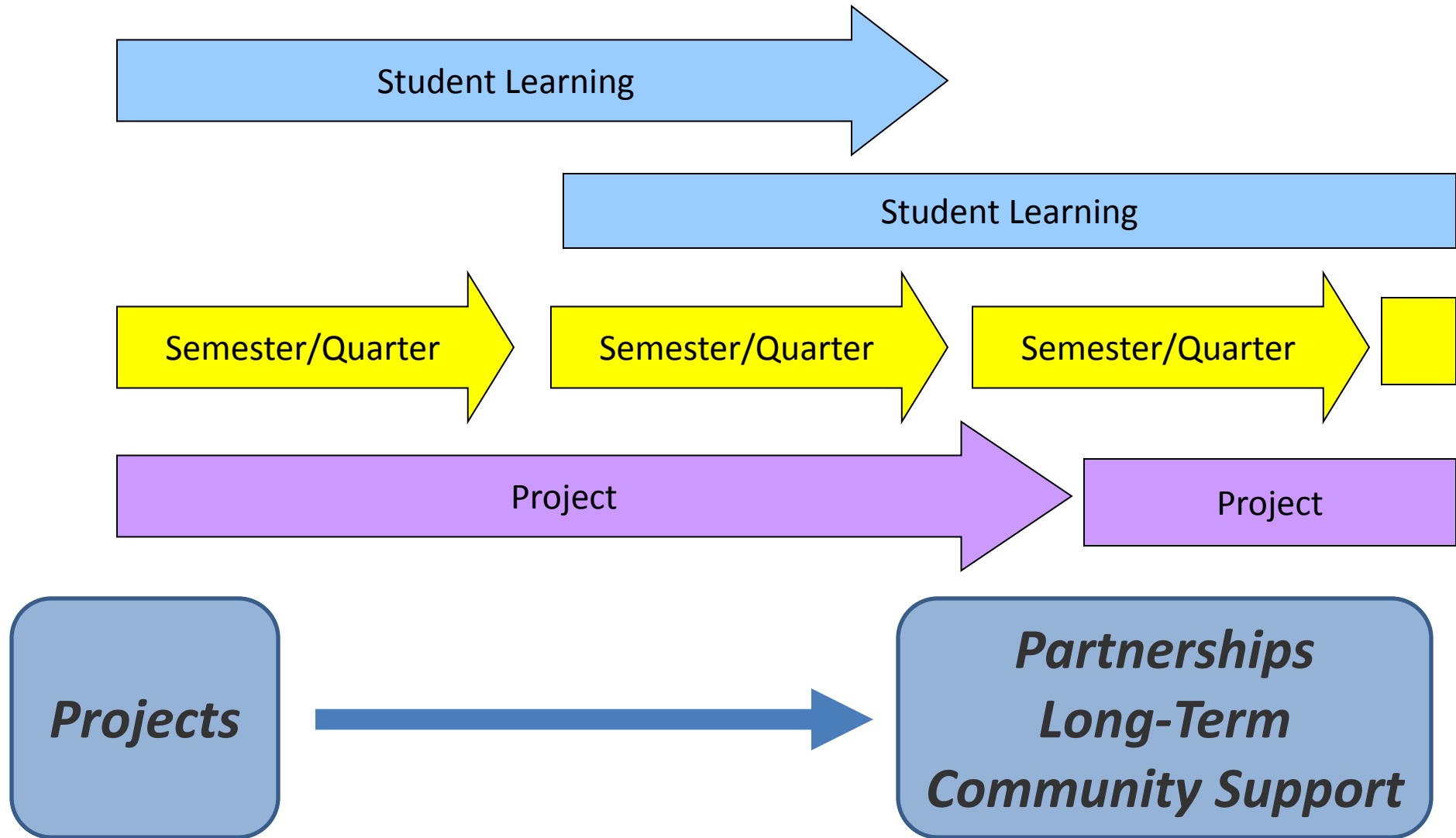
19 years



EPICS Program

Purdue University	University	EPICS Pre-University
<ul style="list-style-type: none"> Headquarters Academic Program Multidisciplinary, Engineering-Centered Design Course Community-based Local and Global 	<p>EPICS University Consortium</p> <ul style="list-style-type: none"> 24 Universities U.S., Canada Colombia, Ireland, Korea, India   <p>NAE Gordon Prize</p>	<p>EPICS High</p> <ul style="list-style-type: none"> 50+ High Schools 12 U.S. States  <p>IEEE-EPICS</p> <ul style="list-style-type: none"> 50+ projects Latin America Europe Africa Asia  <p>Signature Program</p>

EPICS Decouples Timescales





Access &
Abilities



Education &
Outreach



Human
Services



Environment

■ Local and Global Partnerships

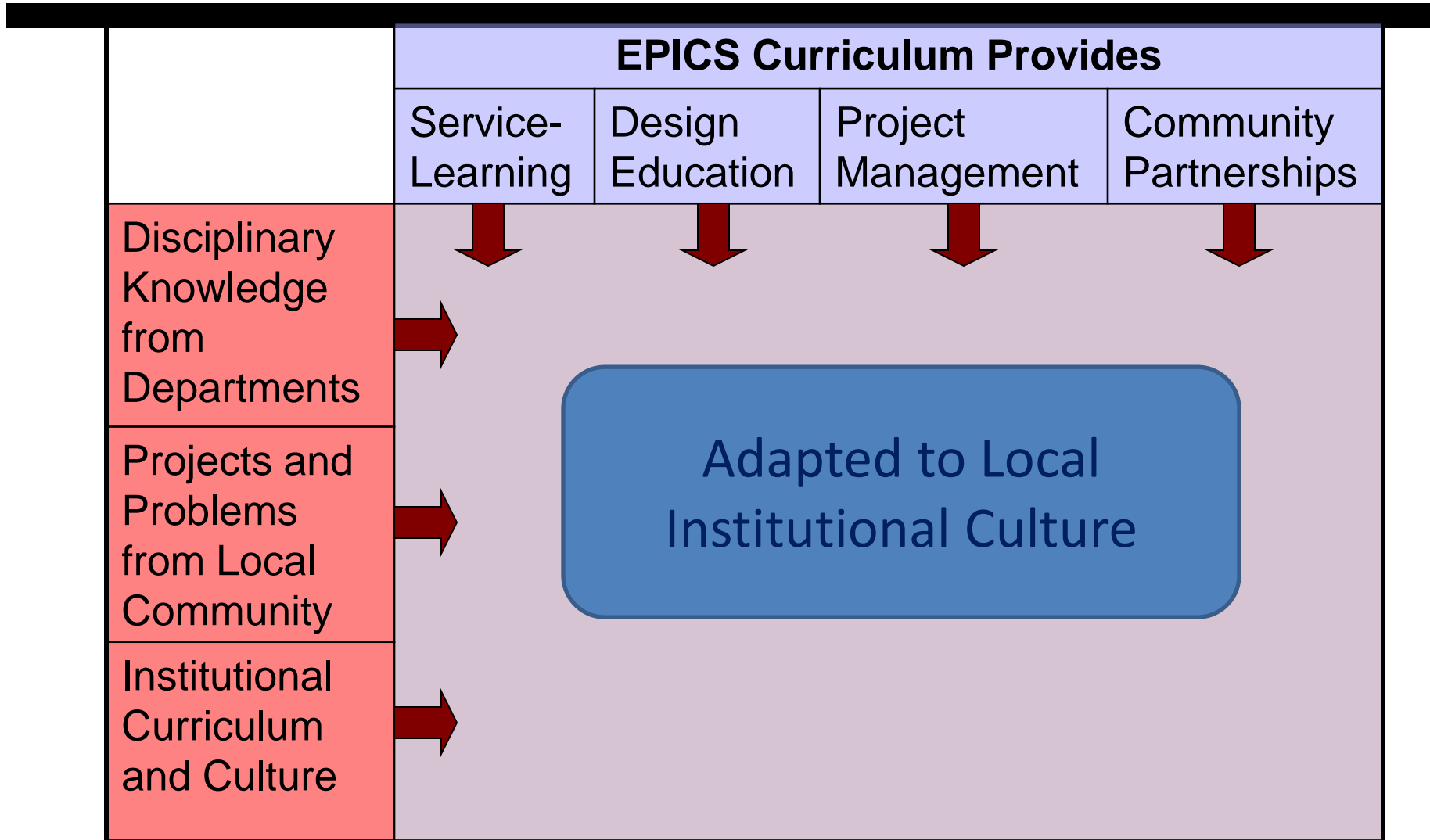
- ❑ Local university and community partners
- ❑ EWB-USA chapter integrated with EPICS

■ Immersive Experiences

- ❑ Camp for Children with Disabilities

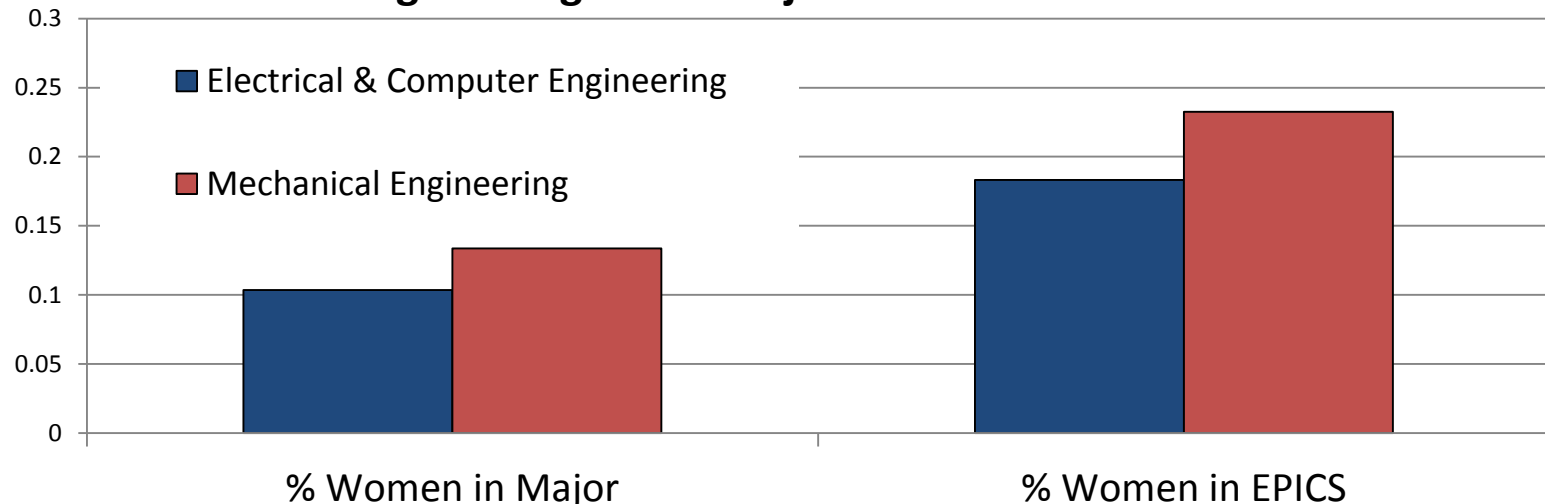
■ Entrepreneurship Integration

EPICS Programs



EPICS and Women

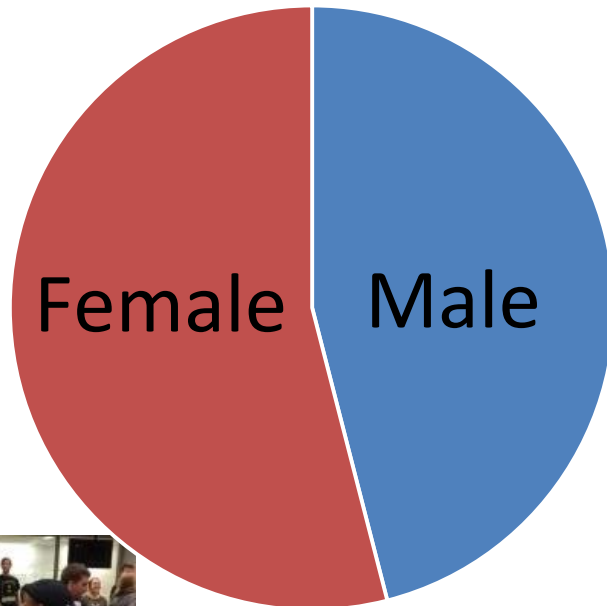
Percent of Women in Electrical/Computer and Mechanical Engineering in the Major and in EPICS



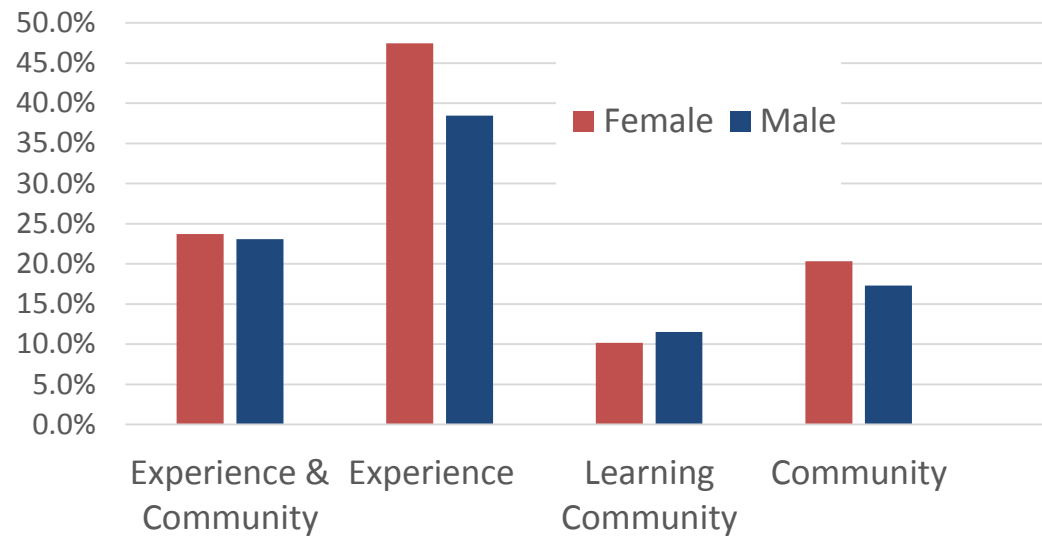
20+ semesters, average participation rates of women in EPICS were more than 70% higher than in their respective majors.

From *Why Women Choose Service-Learning: Seeking and Finding Engineering-Related Experiences* by Holly M. Matusovich, William Oakes, and Carla B. Zoltowski. Appeared in the *International Journal of Engineering Education*, Vol. 29, No. 2, 2013, pp. 388-402.

EPICS First Year Learning Community



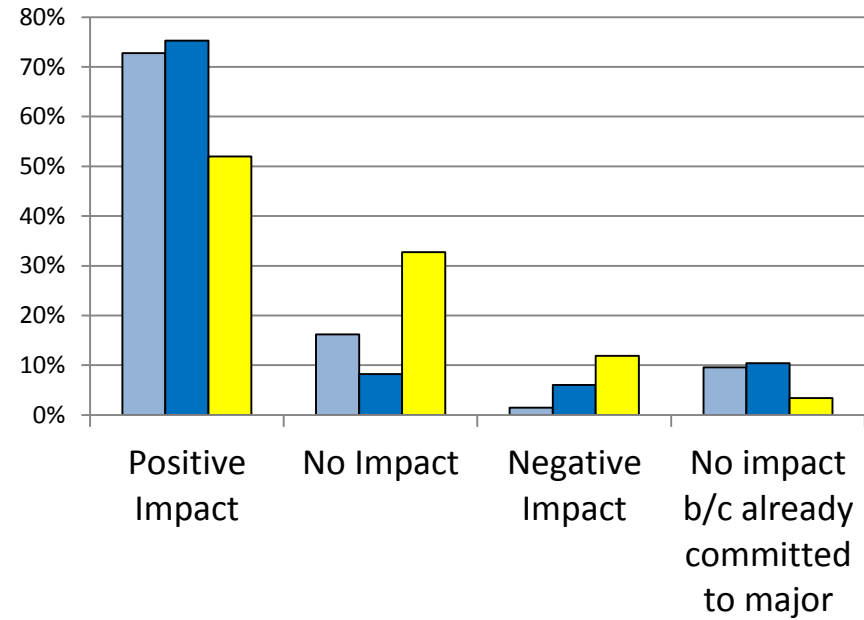
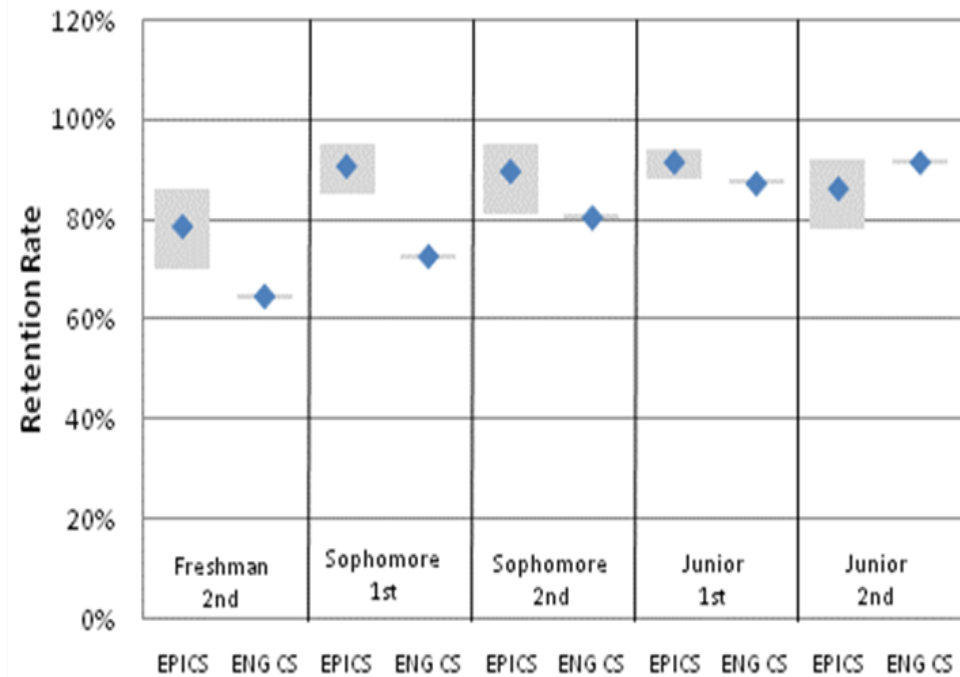
Why Students Chose the EPICS Learning Community



54% Female
120 Students
Fall 2014



Student Retention in Engr/CS



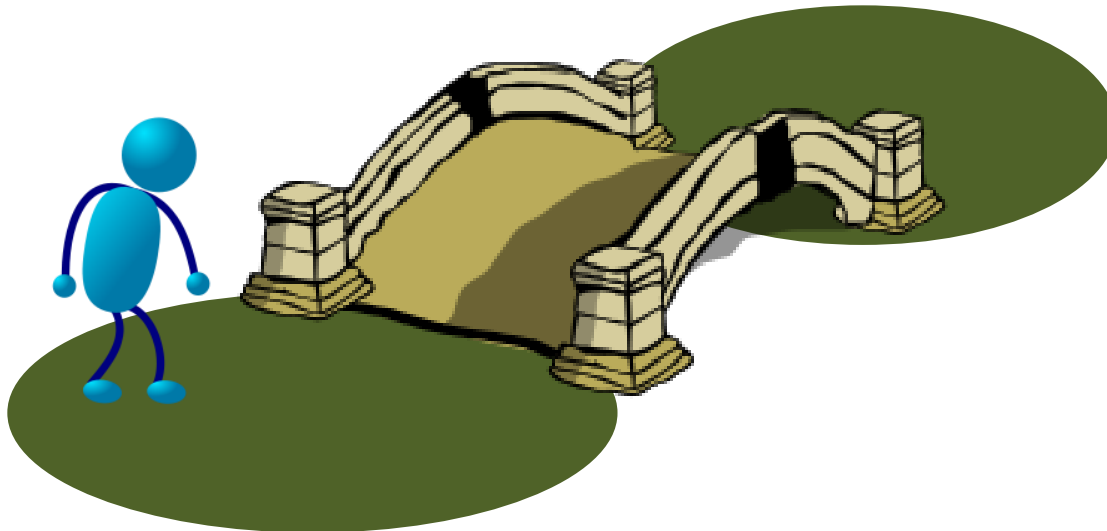
Retention in Engineering/CS
Column = Semester Began EPICS
(Through 2007)

"What Impact has the EPICS Program had on your resolve to continue in your major?"

Research on EPICS Alumni

Safe
Structured
Engineering
Education

Real
Free
Service
Practice



524
Surveyed

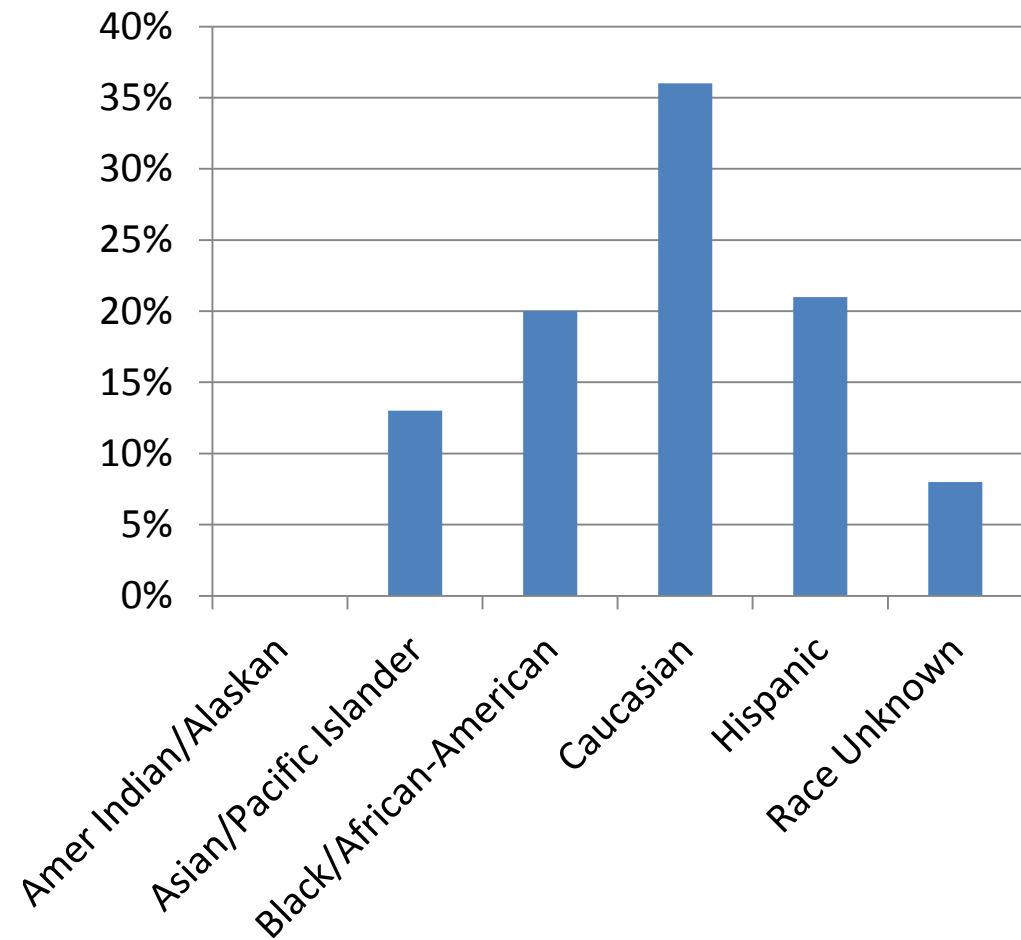
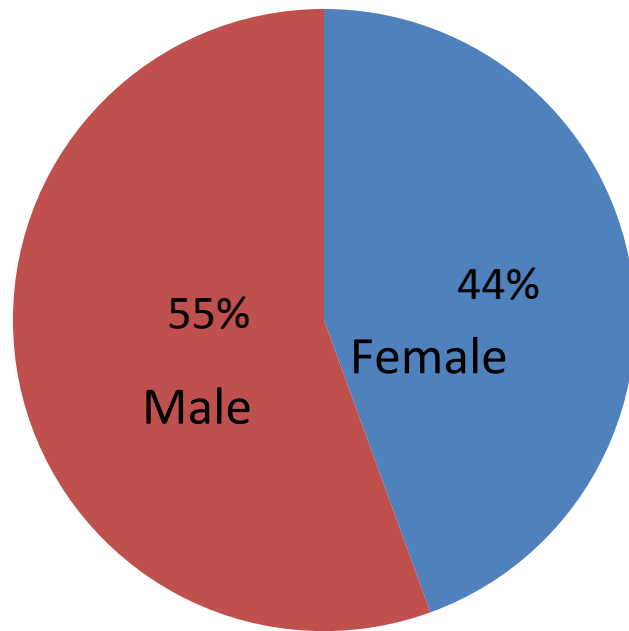


27
Interviewed

Findings:

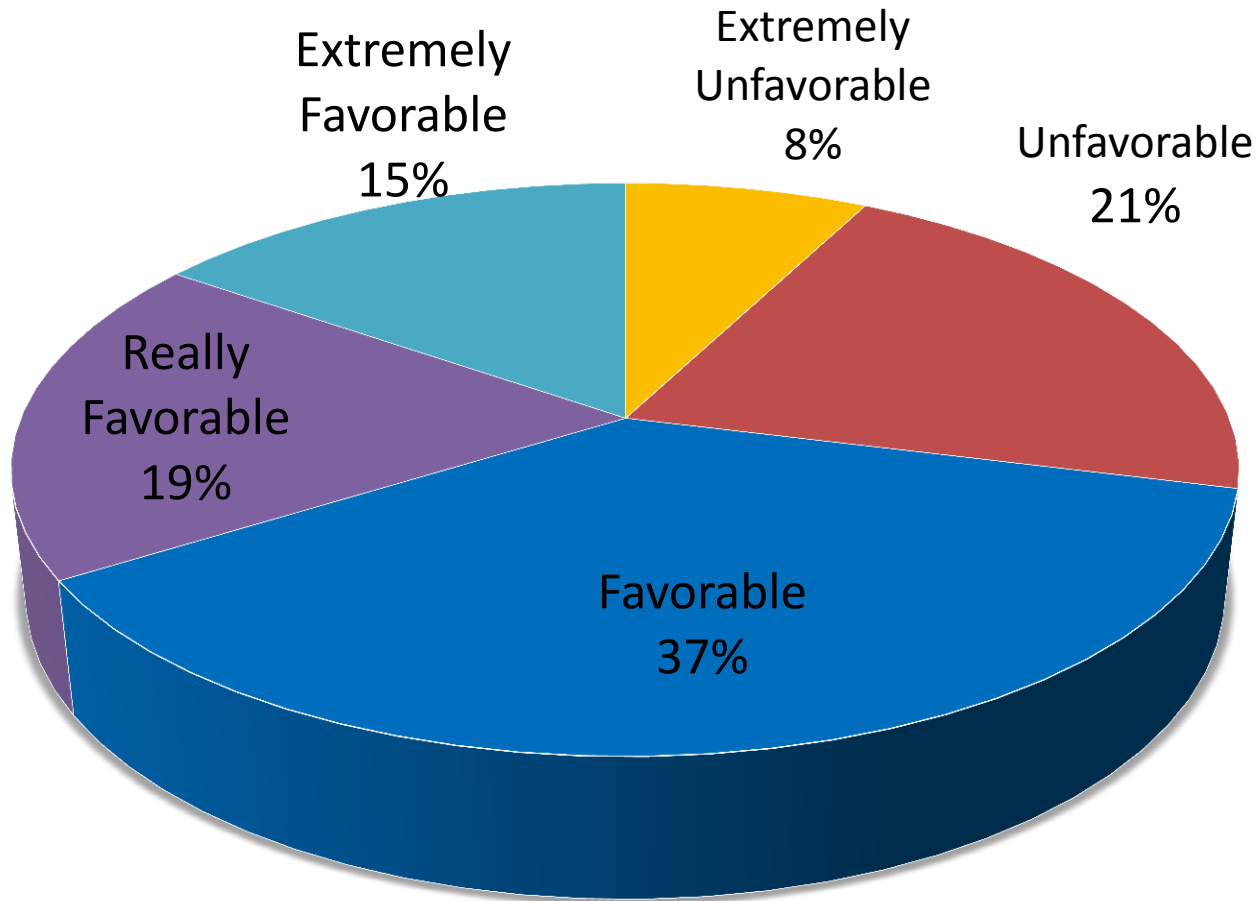
EPICS Prepared students for leadership roles in a wide range of industries

EPICS K12: Attracting Diverse Students



Affordably Addressing
Underrepresentation

Motivation to Pursue a STEM Major



~30% start with no interest in engineering or computing
~1/2 change to strong interest

Educating Citizens

- Connecting engineering/computing to community, human and environmental needs is consistent with diversity literature
- Benefits to learning engineering
 - Experiences with real users
- Engineering's responsibility to educate future professionals and leaders
 - Corporate, government and community leaders
- Lifelong impact
 - Career choices
 - Interests and activities
 - Civic Engagement

Resources

Web Resources:

Purdue EPICS Program (www.purdue.edu/epics)

EPICS University Program (<https://engineering.purdue.edu/EPICSU>)

EPICS Pre-College (<https://engineering.purdue.edu/EPICSHS>) and (www.EPICSk12.org)

Campus Compact (www.compact.org)

International Journal for Service-Learning in Engineering, (<http://library.queensu.ca/ojs/index.php/ijsle/index>)

Service-Learning

Lima, M.B., Oakes, W.C., *Service-Learning: Engineering in Your Community*, 2nd Ed, Oxford Press, 2013.

McIlrath, L. and MacLabhrainn, I., (2007) "Higher Education and Civic Engagement: International Perspectives" Ashgate Publishing, Burlington, VT.

Nejmeh, Brian (2012) *Service-Learning in the Computer and Information Sciences*, IEEE Press and John Wiley and Sons, 2012.

Tsang, E, editor, (2000) *Projects that Matter: Concepts and Models for Service-Learning in Engineering*, AAHE, Washington DC, 2000.

EPICS Papers

Coyle, Edward J., Jamieson, Leah H., Oakes, William C, "Integrating Engineering Education and Community Service: Themes for the Future of Engineering Education", *Journal of Engineering Education*, Vol. 95, No. 1, January 2006, pp. 7-11.

Coyle, Edward J., Jamieson, Leah H., Oakes, William C, "EPICS: Engineering Projects in Community Service", *International Journal of Engineering Education* Vol. 21, No. 1, Feb. 2005, pp. 139-150.

Matusovich, Holly M. , William Oakes, and Carla B. Zoltowski, "Why Women Choose Service-Learning: Seeking and Finding Engineering-Related Experiences", *International Journal of Engineering Education*, Vol. 29, No. 2, 2013, pp. 388-402.

Nation, Sarah, Oakes, William, Bailey, Lowell, Heinzen, Jill, "Conversion of Collegiate EPICS to a K-12 Program", *Proceedings of the Frontiers in Education Conference*, Indianapolis, IN, October 2005.

Thompson , Michael, Pamela Turner and William Oakes, "Teaching Engineering In High School Using Service-Learning: The Epics Model", *Proceedings of the 2008 ASEE Annual Conference*, Pittsburgh, PA, June 2008

Zoltowski, C., Oakes, W., and Cardella, M., "Students' Ways of Experiencing Human-Centered Design", *Journal of Engineering Education*, Vol. 101, No. 1, January 2012, pp. 1-32

Zoltowski, C. B., and Oakes, W.C., "Learning by Doing: Reflections of the EPICS Program", *Special Issue: University Engineering Programs That Impact Communities: Critical Analyses and Reflection*, *International Journal for Service-Learning in Engineering*, 2014, pp. 1-32.