Not Leaving Success Up to Chance:
Moving from Best Practice to High Impact

First Year Engineering Experience Conference
Columbus, Ohio
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Bernie Savarese
Director
Orientation & First Year Experience

@BernieSavarese
The First Year Experience at Ohio State is…

...both an ethos and an office.
“FYEE is an opportunity for academic and industry representatives to discuss and share relevant topics in the first year engineering experience…. The goal of FYEE is to facilitate learning and sharing among attendees …and to continue the dialogue started at [past conferences].”
Questions to consider…

• What do first-year engineering students need to know and do to succeed?
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• What programs and practices are you currently using that are promising?
• What more do you need to know and do to be more effective in your work with new students?
• What obstacles need to be addressed and what resources are needed to help more of your students finish what they’ve started?

(Kuh, 2016)
Bernie’s Keynote Roadmap

• Why a call to action?
• The role of the first year
• What we know about best practices
• From best practice to high impact
• Not leaving success up to chance
• Taking a data informed approach
Why a call to *action*?
True or false?

College graduates will have 10-14 jobs in their lifetime.

FALSE

They will have 10-14 jobs by age 38!

Department of Labor – Bureau of Labor Statistics
Today’s Workforce

What percentage of the entire labor force changes jobs ANNUALLY?

(a) 9%  (b) 15%  (c) 21%
(d) 27%  (e) 33%

Answer: (e) 33+%
Today’s Workforce

Every year, more than ________________ Americans are working in jobs that did not exist in the previous year.

(a) 25,000  (b) 500,000  (c) 5 million
(d) 30 million  (e) 50 million

Answer: (d) 30 million

Department of Labor – Bureau of Labor Statistics
True or false?

Half of workers have been with their employer less than 5 years.

TRUE

Department of Labor – Bureau of Labor Statistics
Key Capabilities Open the Door for Career Success and Earnings

“Irrespective of college major or institution selectivity, what matters to career success is students’ development of a broad set of cross-cutting capacities…”

Anthony Carnevale, Georgetown University Center on Education and the Workforce
Our shared task…

*Teach students to:

• **Reflect** – think about their thinking and experience in and out of the classroom, on and off campus

• **Apply** – transfer and use what one has learned in different settings that present novel challenges and opportunities

• **Integrate** – connect and grasp the relevance of what they are learning from different courses, out-of-class experience and life beyond the institution

*George Kuh: 2016 Focusing on the First Year Conference*
Beyond the Labor Market... What about national goals and expectations?
President Obama’s 2020 College Completion Goals

• Close the opportunity gap by increasing access and improving affordability
• Increase degree and certification completion
• Special attention to first-gen, under-represented and economically disadvantaged
• 10 million more graduates by 2020
• Best educated, most competitive workforce in the world
Challenges: Funding Reductions

Approximate Percentage Change in FY 2012 State Operating Support for Four-Year Public Universities (AASCU, 7-2011)
Challenges: Affordability

Percent Growth Rate in Current Dollar Price Since 1982-84

- College Tuition and Fees: 439%
- Medical Care: 251%
- Median Family Income: 147%
- Consumer Price Index: 106%
- Transportation
- Medical Care
- Food
- Housing
*A recent report by the President’s Council of Advisors on Science and Technology (PCAST) estimates there will be **one million fewer** STEM graduates over the next decade than U.S. industries will need.

[https://www.whitehouse.gov/sites/default/files/microsites/ostp/stem_stratplan_2013.pdf](https://www.whitehouse.gov/sites/default/files/microsites/ostp/stem_stratplan_2013.pdf)
President Obama’s STEM Strategic Plan

Strategic Plan National Goals

• Prepare 100,000 new K-12 STEM teachers by 2020
• Support a 50% increase in the number of youth who have a STEM experience annually before finishing high school
• Graduate one million additional students with degrees in STEM fields over the next 10 years
• Increase the number of women and students from groups that have been underrepresented in STEM fields that graduate with STEM degrees in the next 10 years

https://www.whitehouse.gov/sites/default/files/microsites/ostp/stem_stratplan_2013.pdf
“Increasing the retention of STEM majors to 50 percent would generate approximately three-quarters of the targeted one million additional STEM graduates over the next decade… Furthermore, such an increase appears feasible.”

https://www.whitehouse.gov/sites/default/files/microsites/ostp/stem_stratplan_2013.pdf
So, what is our role in the *first* year?
Historically speaking…

RETENTION
History of first-year efforts

• New student orientation programs (early 1900s)
• First year seminars/advising (1960s/70s)
• Academic support services/learning centers
• Welcome weeks/extended orientation
• Learning communities
• Student activities and cultural centers
• Outgrowth to “SYE”
- First Year Experience
- Welcome Week
- Freshman Seminar Course
- Student Organization Support
- Academic Advising Changes
- Student Advocacy Services
- Student Activities
- Learning Communities
- Safety Services
That’s what we’re doing in practice, but what does the research say?
Model of Voluntary Departure
(Tinto, 1993)
(Tinto, 1993)
(Tinto, 1993)
Why students leave...

Academic Factors, 25%
Financial, 20%
Other, 55%

(Strayhorn, 2012)
What the research tells us…

Early Indicators of Persistence and Success

• Psycho-social fit
• Credit hours completed
• Academic and social support
• Goal realization
• Involvement (in the “right” kind of activities)
What the research tells us…

Student Behaviors Associated with Persistence and Success

• Faculty-Student Contact
• Peer Interactions (meaningful, peer teaching/tutoring)
• Co-curricular (critical for persistence)
• Student Satisfaction (influences sense of belonging)

Given what we know and what we’re doing, is first-year retention *improving*?
National First-to-Second-Year Retention Rates at Four-Year Colleges
But this is information across all majors. What about STEM, and *Engineering* in particular?
Factors that underlie STEM attrition:

- STEM attrition occurs more frequently among students with weaker academic backgrounds.
- There is significant evidence linking STEM attrition to attitudinal factors such as motivation, confidence and [self-efficacy].

The Research: STEM Attrition (NCES)

Course related factors:

- Negative experience in gatekeeper courses
- Limited exposure to STEM coursework in the first 2 years
- Poor performance in STEM courses (especially relative to performance in non-STEM courses)
- Taking lighter credit loads in STEM courses in the first year
- Taking less challenging math courses in the first year

Persistence in the major:

• Persistence in Engineering is comparable with other majors, but…

• Those who leave Engineering are disproportionately from groups underrepresented in Engineering, including first-generation college students

• Few migrate into Engineering majors after starting college

• The Result: a net loss of students of more than 15% (greater than most other majors)
Figure 2.2-B: Persistence in matriculating major (left bars), migration into major (middle bars), and net loss/gain in major (right bars) in the NSSE sample

- Engineering
- Science/technology/math
- Computer science
- Business
- Social sciences
- Arts & humanities
- Other

Legend:
- Black: Percent persistence
- Light green: Percent migration in
- Blue: Net change
The Research: Engineering Student Attrition (CAEE)

Motivation Matters!

• Students’ motivation to study engineering takes shape early on and college reinforces their existing motivation

• First-year students enjoyment of engineering for its own sake (Psychological motivation) is correlated with intention to complete an engineering major

• “Switchers” were more motivated to study engineering by their parents
How do we begin to address the *challenge* of retention? What are its component parts?
4 Ps of Student Retention

(Kalsbeek, 2012)

• Profile
• Progress
• Process
• Promise
4 Ps of Student Retention

(Kalsbeek, 2012)

• **Profile** – The strongest predictor of student retention and success is the profile of the student and the institution

• Progress

• Process

• Promise
4 Ps of Student Retention

(Kalsbeek, 2012)

• Profile

• **Progress** – Educators should focus on students’ progress toward a degree and not just their presence or persistence

• Process

• Promise
4 Ps of Student Retention

(Kalsbeek, 2012)

• Profile

• Progress

• Process – retention and success is contingent upon systematic attention to processes that hinder and facilitate retention

• Promise
4 Ps of Student Retention

(Kalsbeek, 2012)

• Profile
• Progress
• Process

• Promise – “…student attrition is a function of unmet expectations…, unfilled promises, and unrealized experiences of the ‘brand’.”
The value of focusing on the process...
A focus on the process...

A transformative education repeatedly exposes students to *multiple opportunities for intentional learning* through the formal academic curriculum, student life, collaborative curricular programming, community-based and global experiences.
A focus on the process…

Not all educational practices are made the same

- Many educational effects are “conditional”
- Some are compensatory
- Some have unusually positive effects…

HIGH-IMPACT PRACTICES (HIP)
Definition of High-Impact Practices

“Teaching and learning practices that have been widely tested and have been shown to be beneficial for college students from many backgrounds. These practices take different forms, depending on the learner characteristics and on institutional priorities and contexts. [HIPs are] practices that educational research suggest increase rates of retention and student engagement.”

(Kuh, 2010)
High-Impact Practices

- First-Year Seminars & Experiences
- Common Intellectual Experiences
- Learning Communities
- Writing-Intensive Courses
- Collaborative Assignments and Projects
- Undergraduate Research and Other Demanding Inquiry Experiences
- Diversity/Global Learning
- Service Learning, Community-Based Learning
- Internships and Field Placements
- Capstone Courses/Projects

https://www.aacu.org/leap/hips
High-Impact Practices

*Compensatory Effects*

- “Findings, suggest… high-impact practices, while good for all students, might be particularly beneficial for historically underserved students.”

- “A subsequent literature review examining the research on a select group of high-impact practices (first-year seminars, learning communities, service learning, undergraduate research, and capstone experiences) provided additional support…”

*https://www.aacu.org/sites/default/files/files/assessinghips/AssessingHIPS_TGGrantReport.pdf*
Evidence of Effectiveness?

YES!
BUT...

- We overemphasize the impact of simply offering and participating in HIPs on learning outcomes and retention.

- It is **what** we are doing within the HIPs that is contributing to these outcomes.
  - Innovative and integrative pedagogies
  - Evidence-based good practices
What are some evidence-based “good practices”?

- Effective teaching
- A variety of teaching methods
- Teaching clarity and organization
- Active learning
- Frequent feedback
- Cooperative learning
- High expectations
- Integrative learning
- Investment of time and energy
- Quality non-classroom interaction with faculty
- Influential interactions with peers
- Academic rigor and challenge
- Diversity experiences
- Meaningful discussions and homework
- Productive use of class time

*https://www.aacu.org/sites/default/files/files/assessinghips/AssessingHIPS_TGGrantReport.pdf*
Components of Successful HIP

Example: Learning Communities

- Intentionally link to courses
- Use engaging pedagogies
- Provide support to students in “gateway courses” with high DFW rates
- Incorporate extended orientation or integrated seminar
- Use instructional teams
- Invest in faculty development to ensure that courses are fully integrated, with coordinated materials, assignments and grading rubrics

https://www.cuny.edu/about/administration/offices/ue/cue/ResearchonHighImpactPracticesAACU2010.pdf
Components of Successful HIP

Example: Service-Learning

• Create opportunities for structured reflection
• Ensure that faculty connect classroom material with the service experience
• Require enough service hours to make the experience significant
• Focus on the quality of the service, ensuring that students have direct contact with clients
• Oversee activities at the service site

https://www.cuny.edu/about/administration/offices/ue/cue/ResearchonHighImpactPracticesAACU2010.pdf
How do we ensure students are *engaging* in high-impact practices?
High-Impact Practices

Students *don’t* do optional!
*(especially first-year students)*

- Have **every student** do at least one high-quality, High-Impact Practice in the **first year** and at least one more later, linked to their major.

- Infuse the characteristics of high-impact activities into your classroom, lab, studio or other learning environment!
AAC&U HIP Resources
Don’t leave success up to chance...
FYE at Ohio State: Not leaving success up to chance

- Our top priority: the students who need us most
- Evidence-based and data-informed approach
- Traditional “programs” often our last option
- Peer outreach and success coaching at the center of all we do
FYE Peer Leaders

Peer Learning: an effective, engaging pedagogy for all students

“The student’s peer group is the single most potent source of influence on growth and development during the undergraduate years”

(Astin, 1993)
FYE Peer Leaders

- Engage in year-round outreach and success coaching
- Focus: the students who need them most
- Data informed/targeted outreach
- Experts in students transition and support
- Trained to leverage authentic/vulnerable peer voice
- Trust is their capital
- Infused into all aspect of our work
Peer Leaders: data informed

Summer: collect and model

- PL observations tracked in a CRM using “tags”
  - “Stop Light” Data (academic, social, engagement)
- Students’ self-reported (non-cognitive) information
  - College Student Inventory by Ruffalo Noel-Levitz
- Predictive modeling: Office of Analysis and Report

Fall: focused outreach

- Move from 7,000+ to approx. ≤700 “priority students” (i.e. from 250:1 to 25:1)
Peer Leaders: data informed

**Targeted early outreach and intervention**
- *Students need immediate feedback to understand what is expected*
- Feedback in the first 3 weeks to modify behavior accordingly

Recommendations
Recommendations

1. Put your money and resources where it makes a difference to student success
2. Sunset redundant, less effective efforts
3. Focus on implementation fidelity
4. Infuse the features of high-impact activities into classrooms, labs and other learning environments
5. Measure and act on what matters to students success
Thank you!
Bernie Savarese
Director
Orientation & First Year Experience
savarese.3@osu.edu
@BernieSavarese