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

First Year Engineering Experience Conference
Columbus, Ohio
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The First Year Experience at
Ohio State is...

...both an **ethos** and an **office**.



First Year Engineering Experience Conference

“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?



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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?



Questions to consider...

- What do first-year engineering students need to know and do to succeed?
- 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?**



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



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Why a call to *action*?



Today's Workforce

True or false?

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

FALSE

They will have 10-14 jobs *by age 38!*



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



Today's Workforce

True or false?

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

TRUE



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



Beyond the Labor Market...

What about national goals
and expectations?



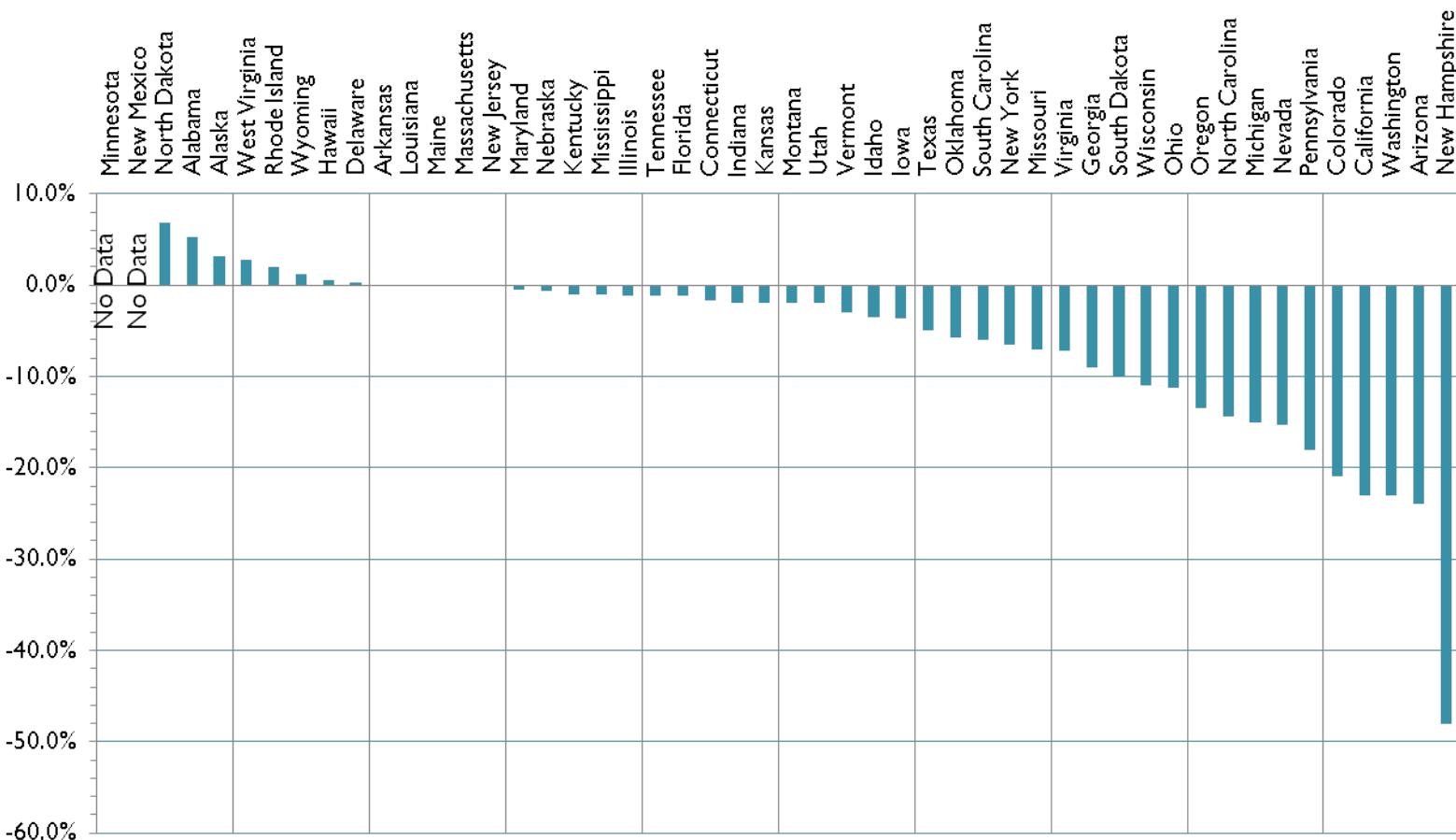
President Obama's 2020 College Completion Goals

- 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



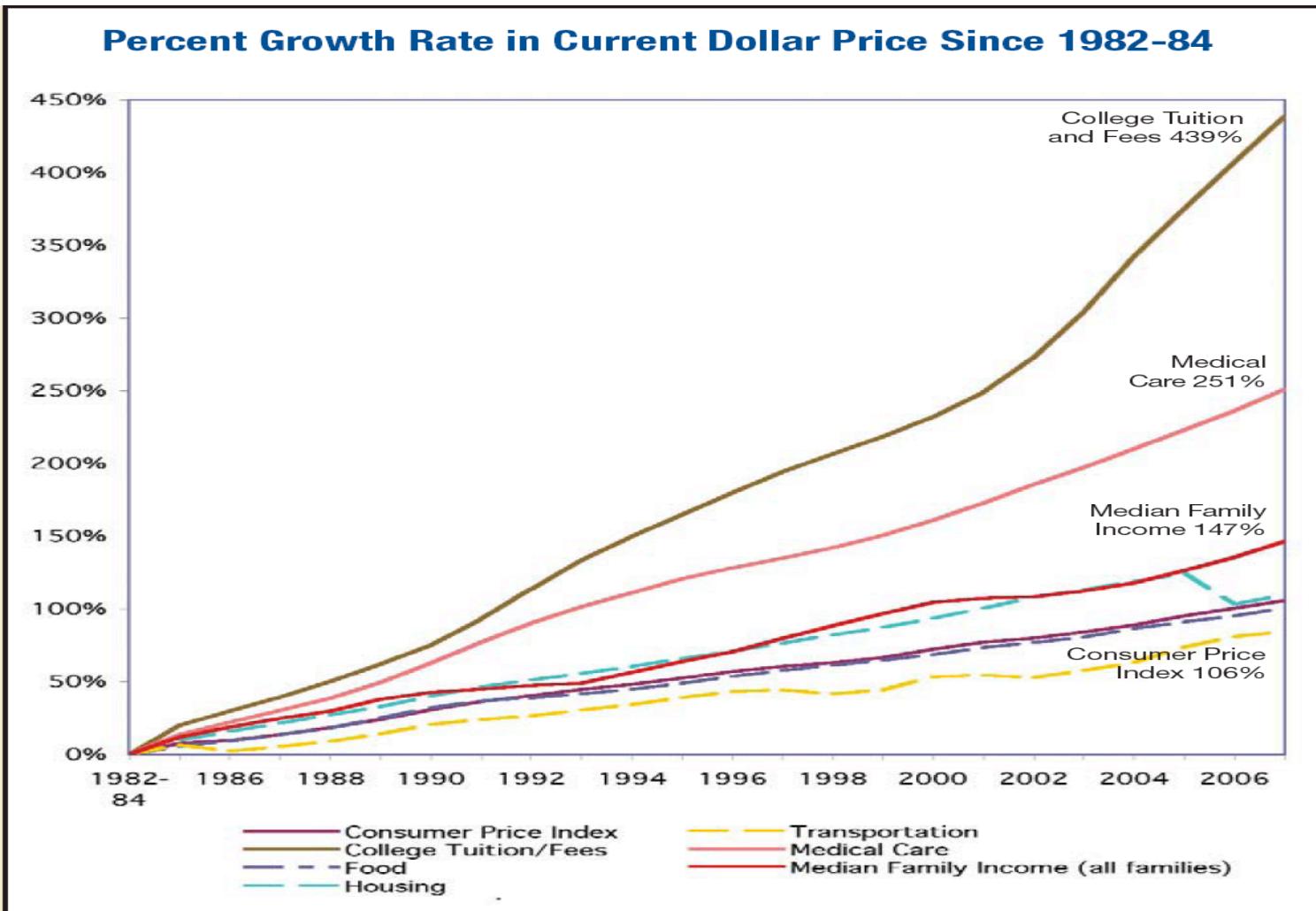
Challenges: Funding Reductions

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





Challenges: Affordability





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.*



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



*“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.”*

So, what is our role
in the *first year*?



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Historically speaking...

RETENTION

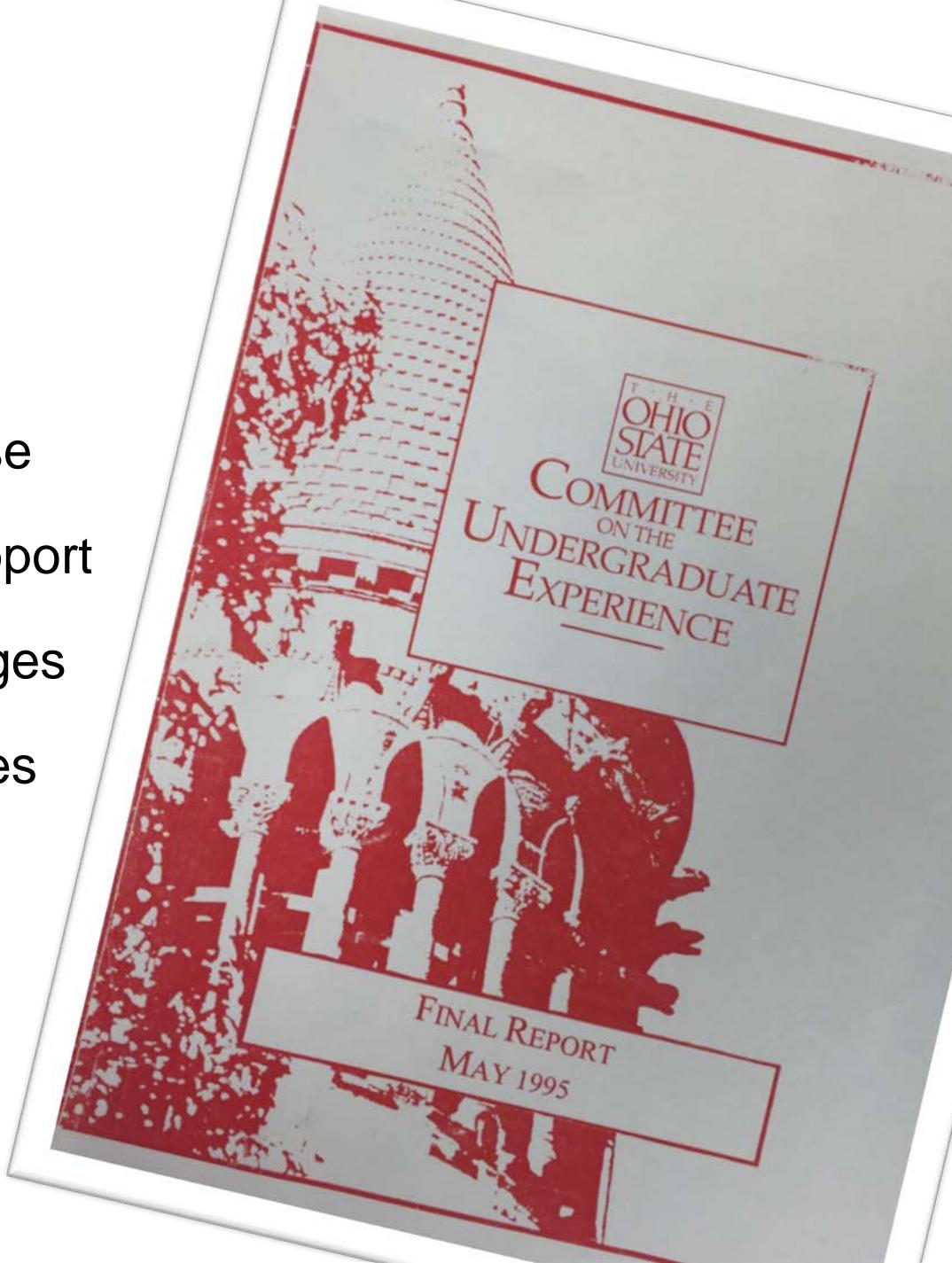


History of first-year efforts

- 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



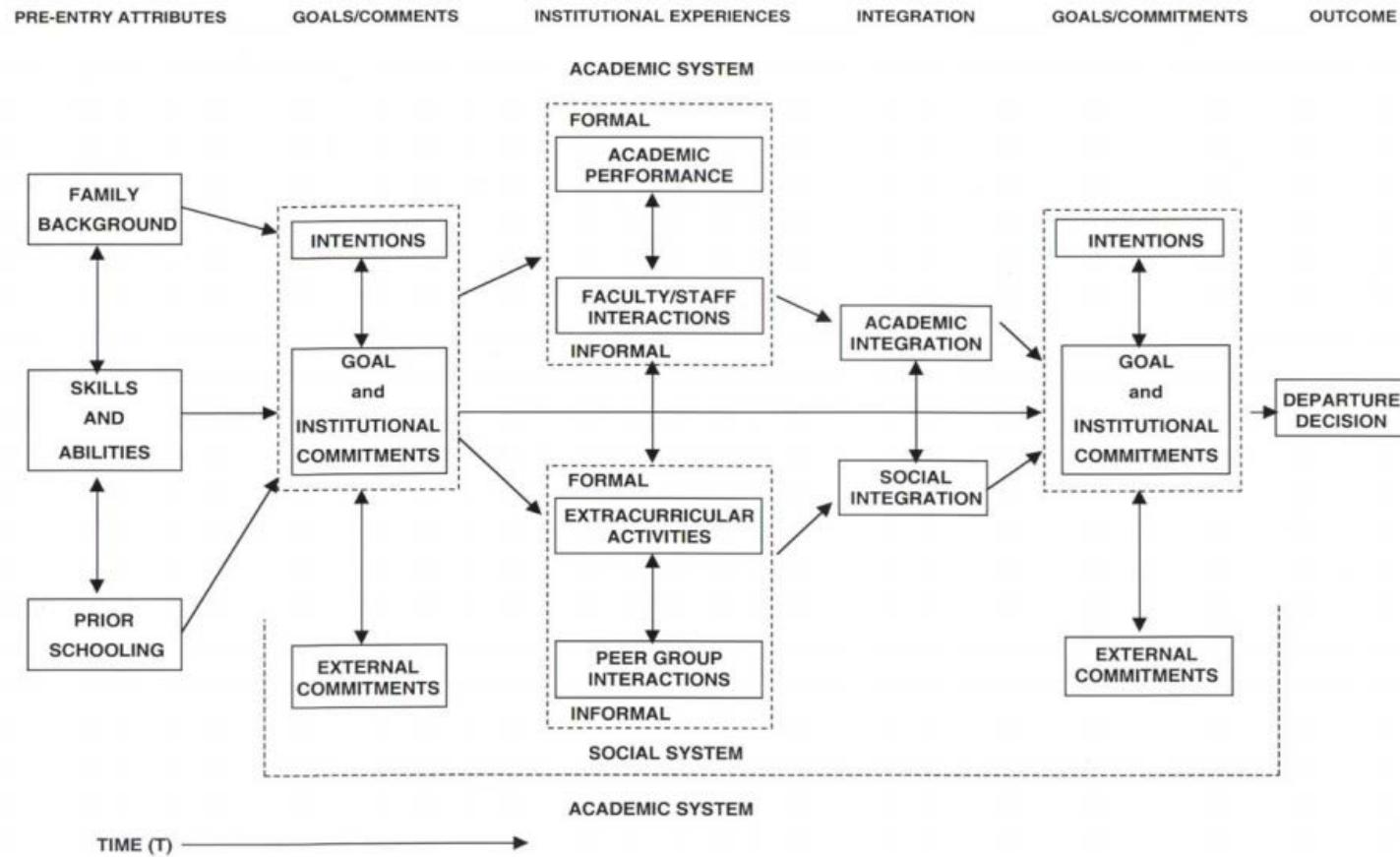


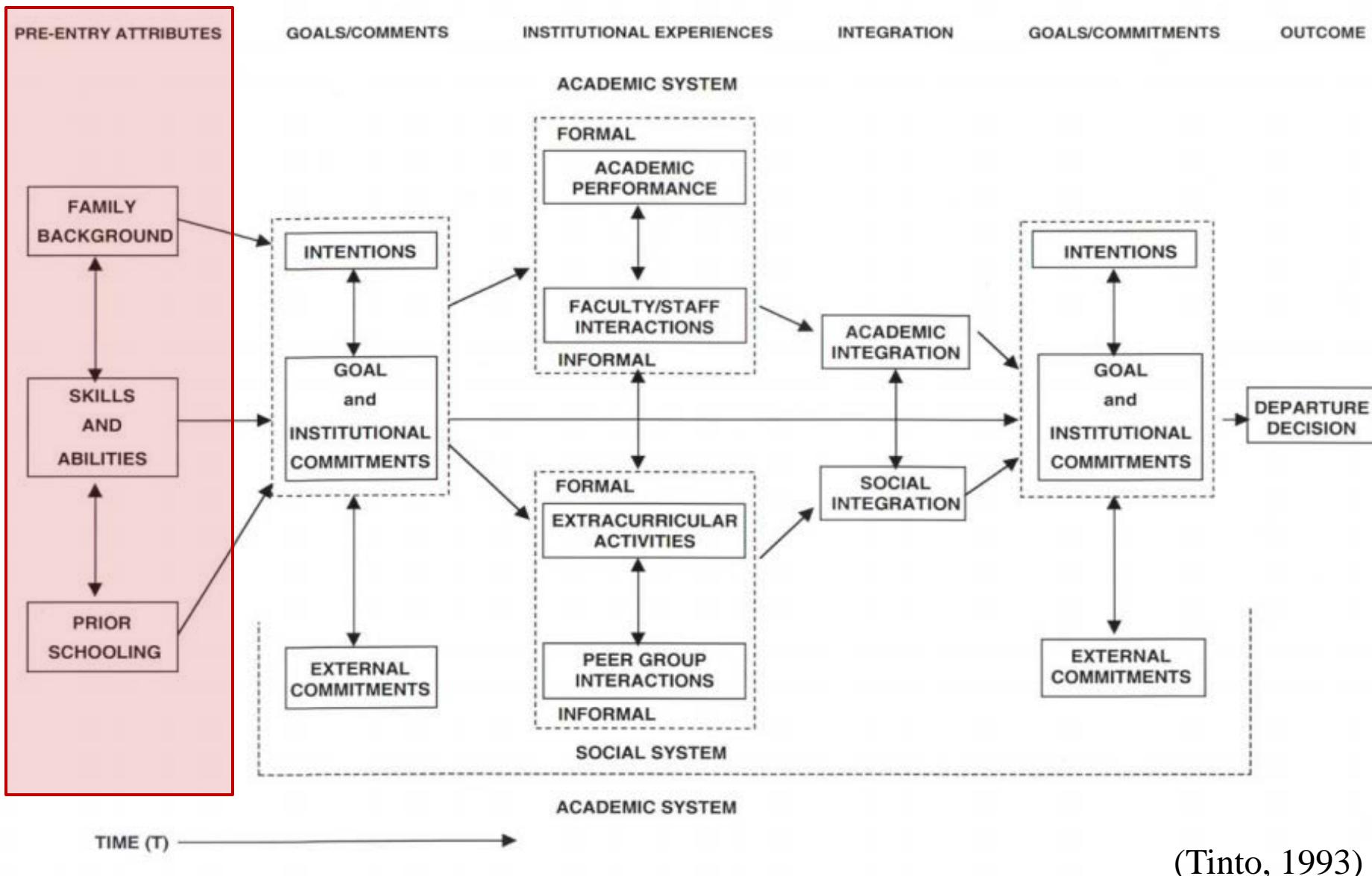
That's what we're doing
in practice, but what does
the *research* say?

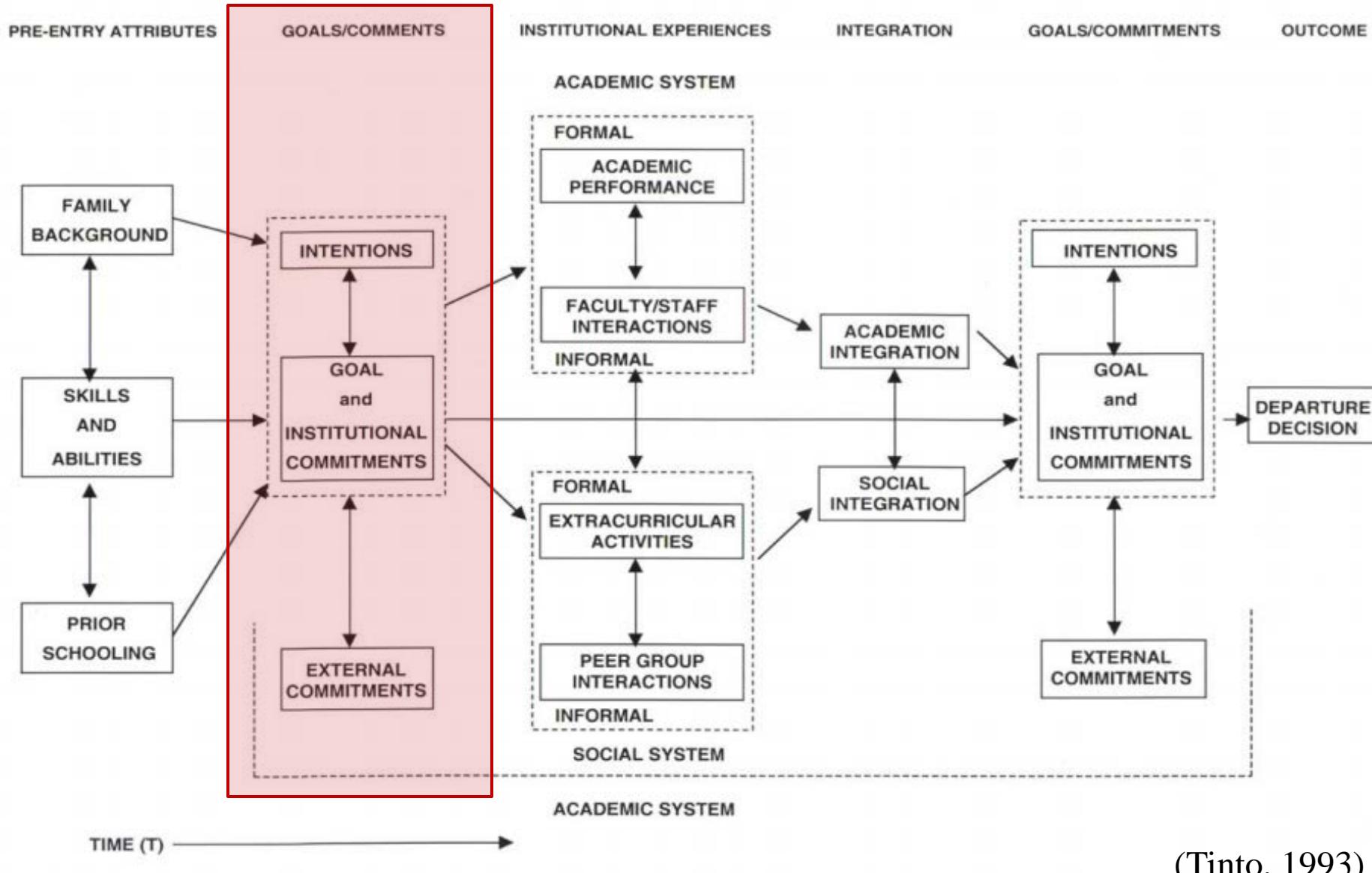


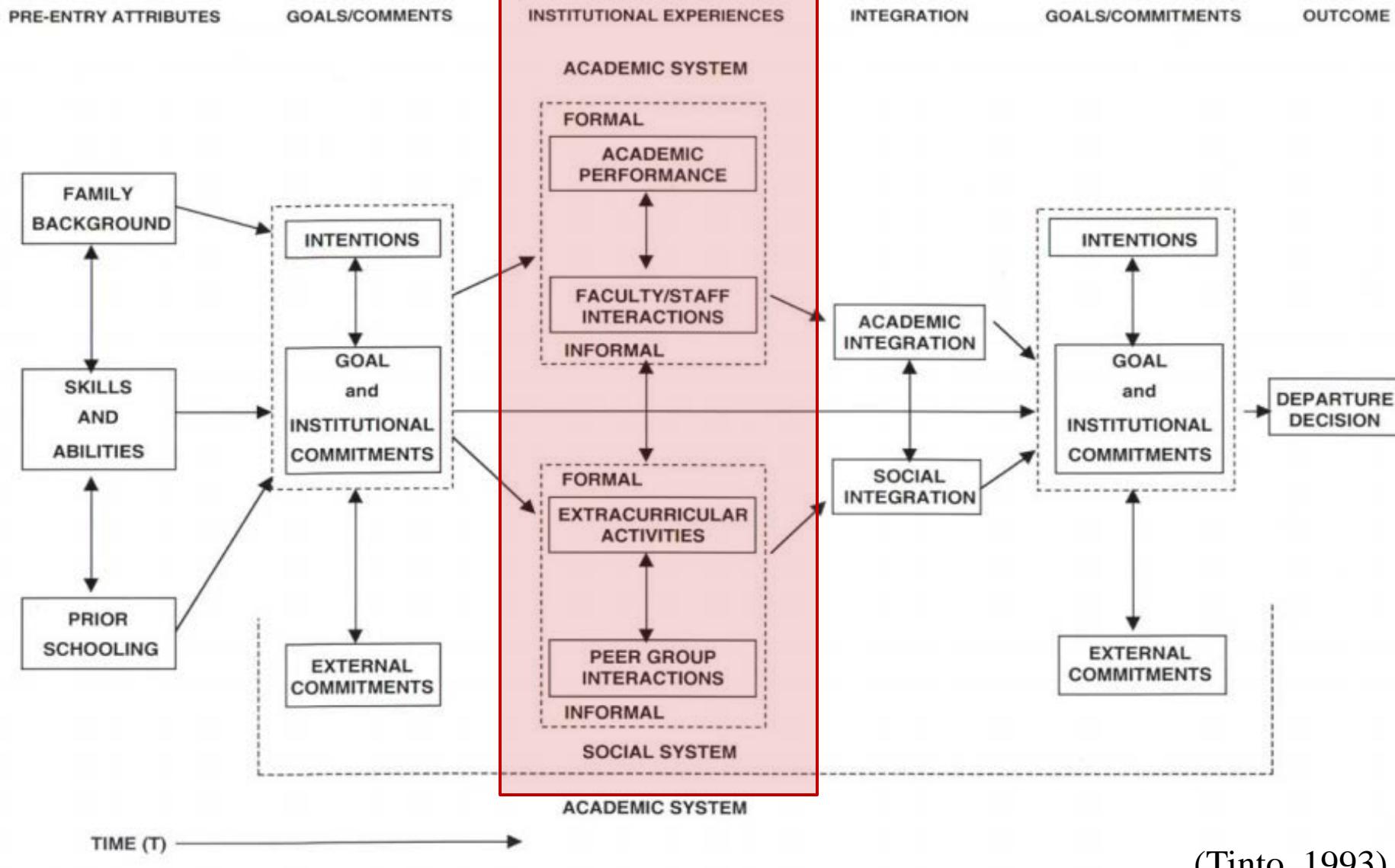
Model of Voluntary Departure

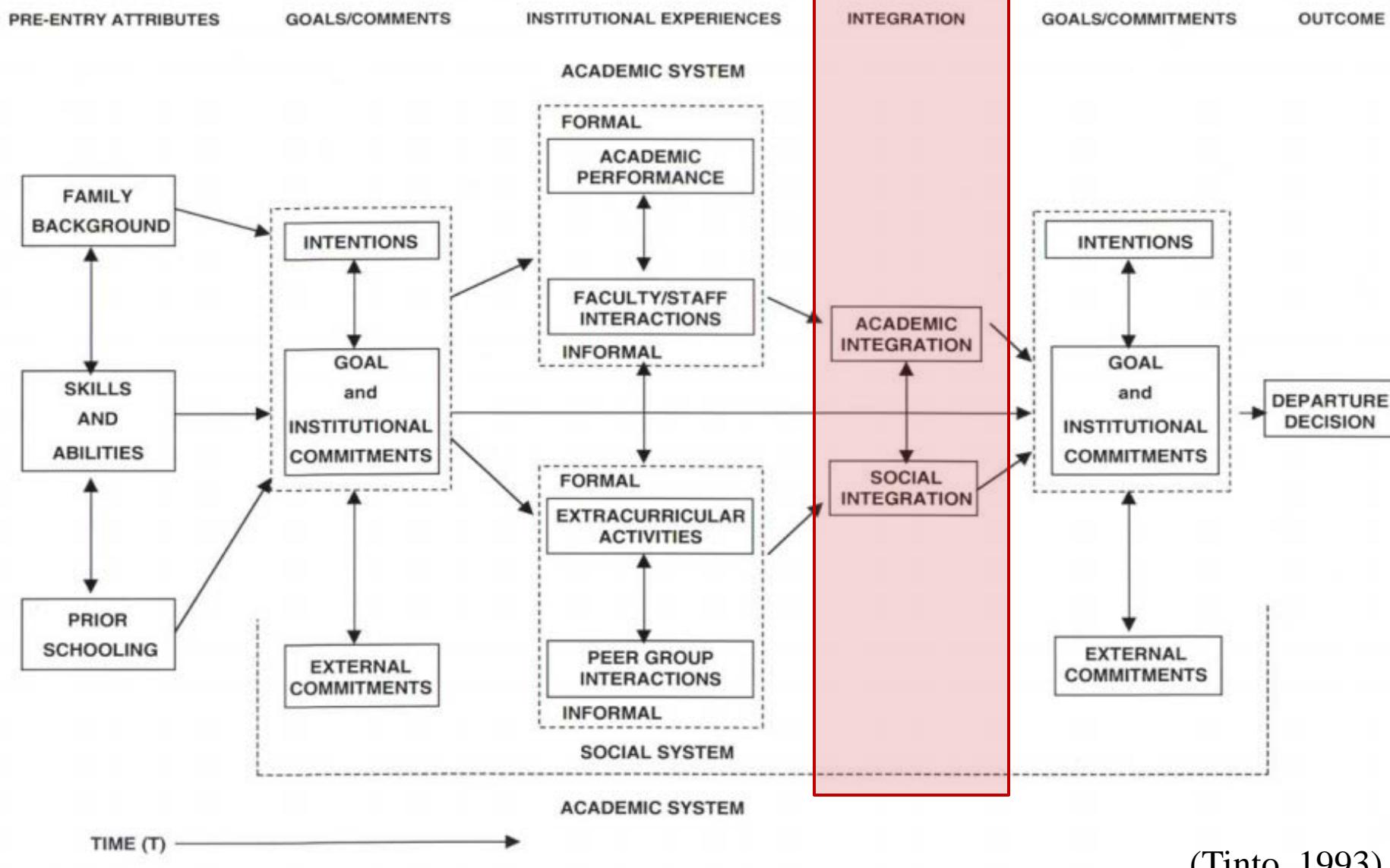
(Tinto, 1993)



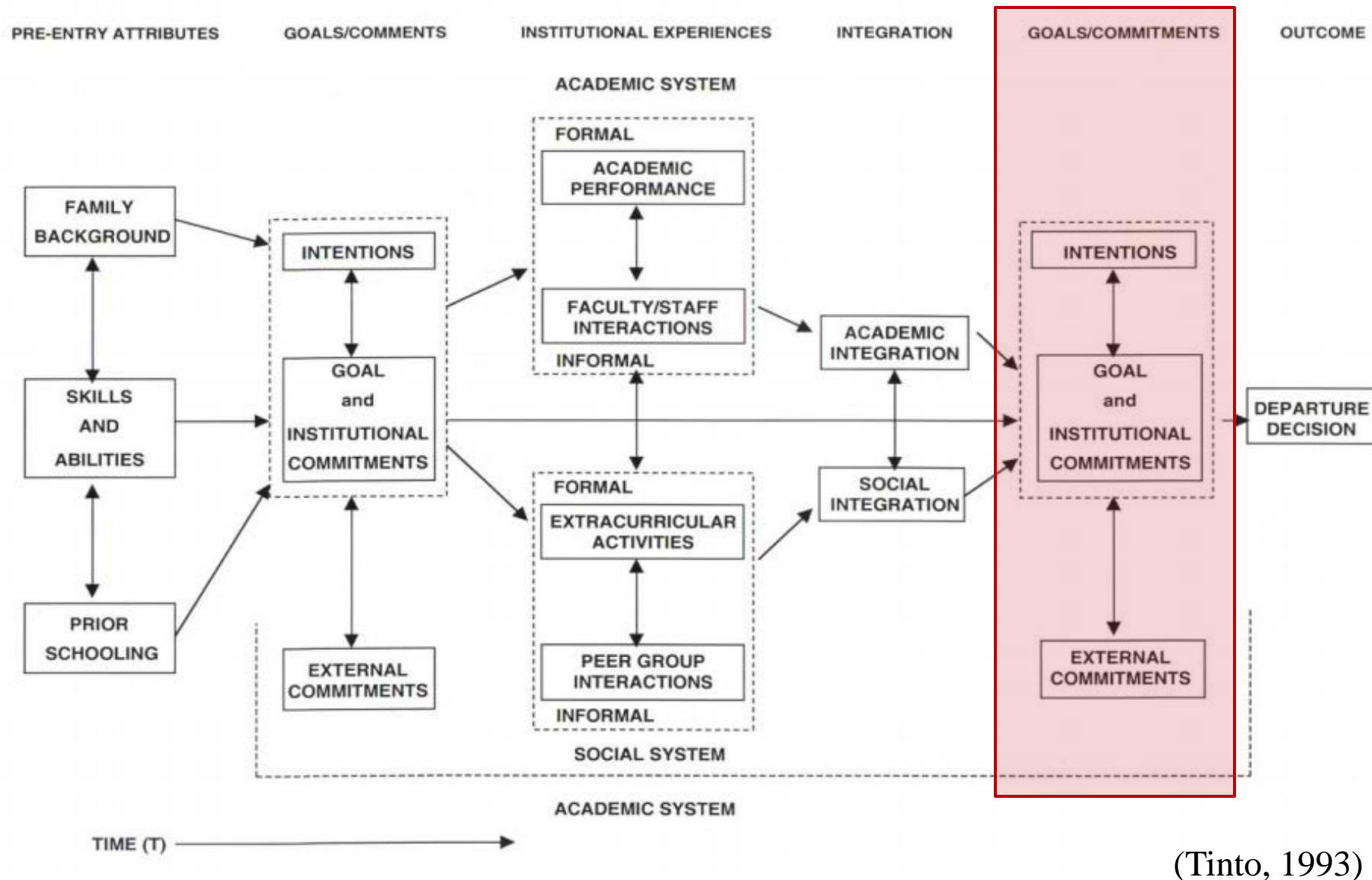


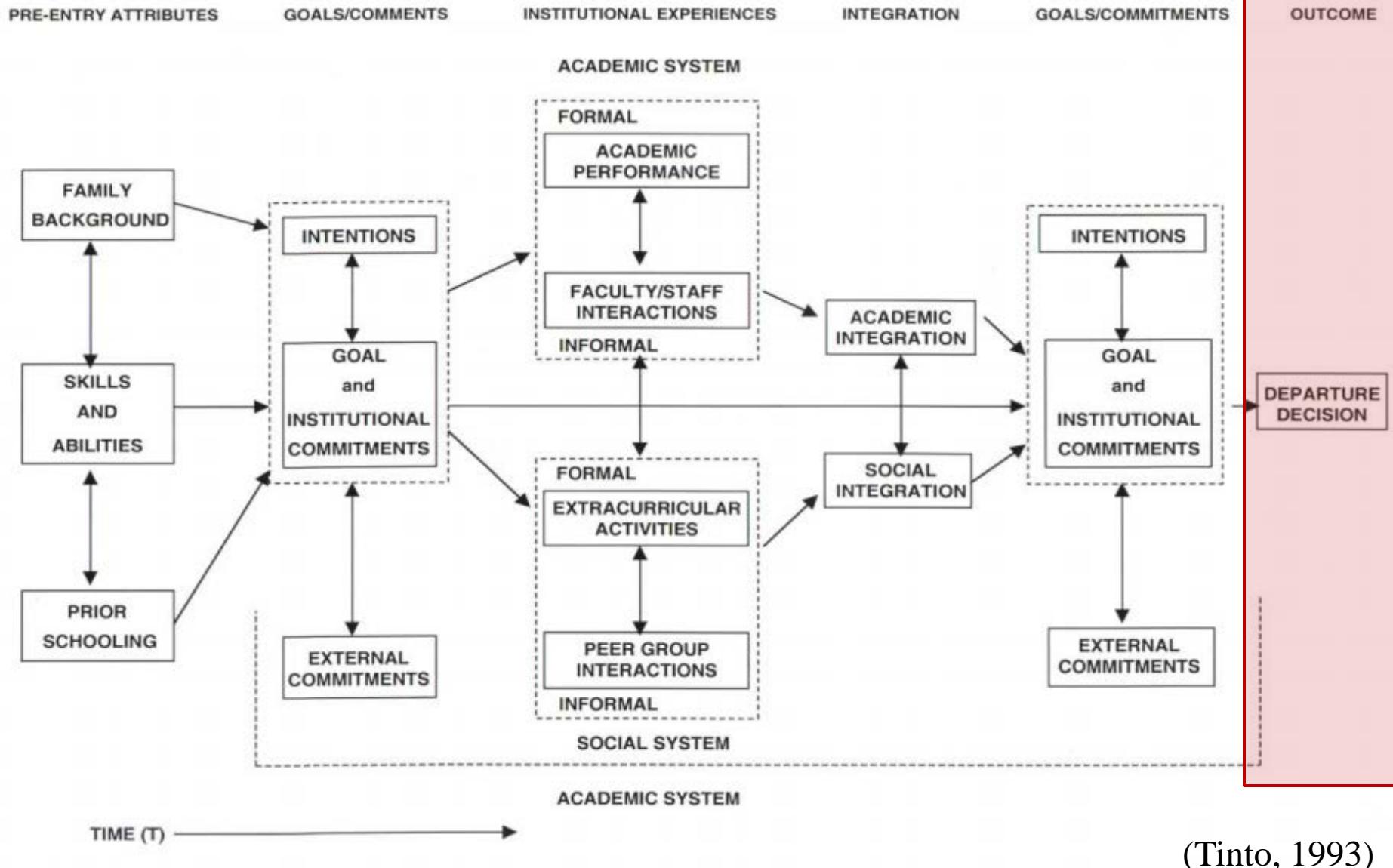






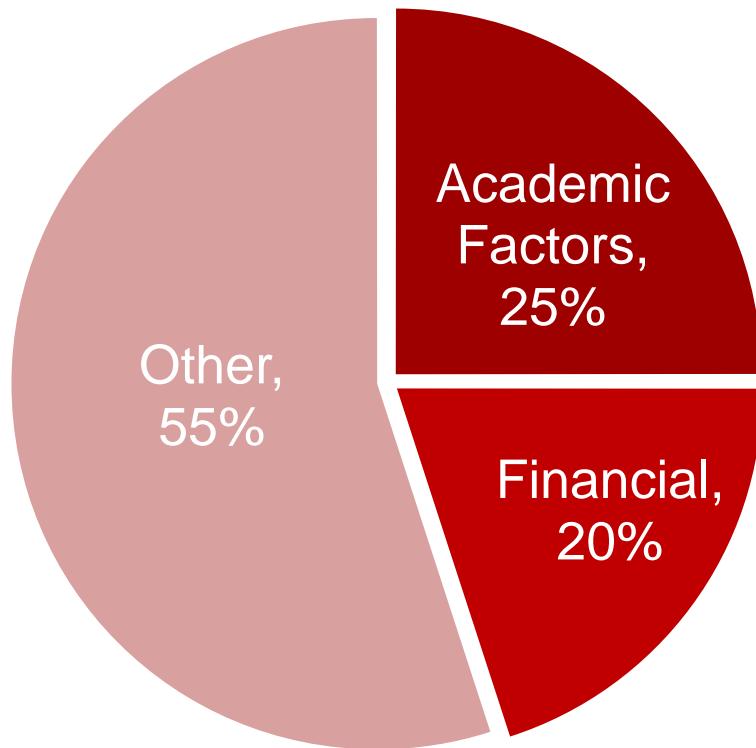
(Tinto, 1993)







Why students leave...



(Strayhorn, 2012)



What the research tells us...

Early Indicators of Persistence and Success

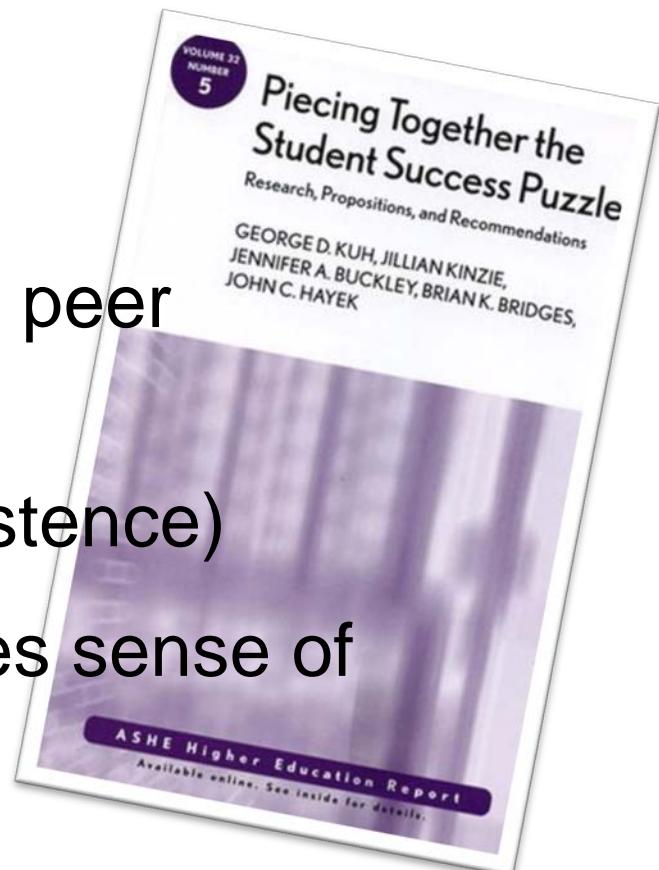
- Psycho-social fit
- Credit hours completed
- Academic and social support
- Goal realization
- Involvement (in the “right” kind of activities)



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)

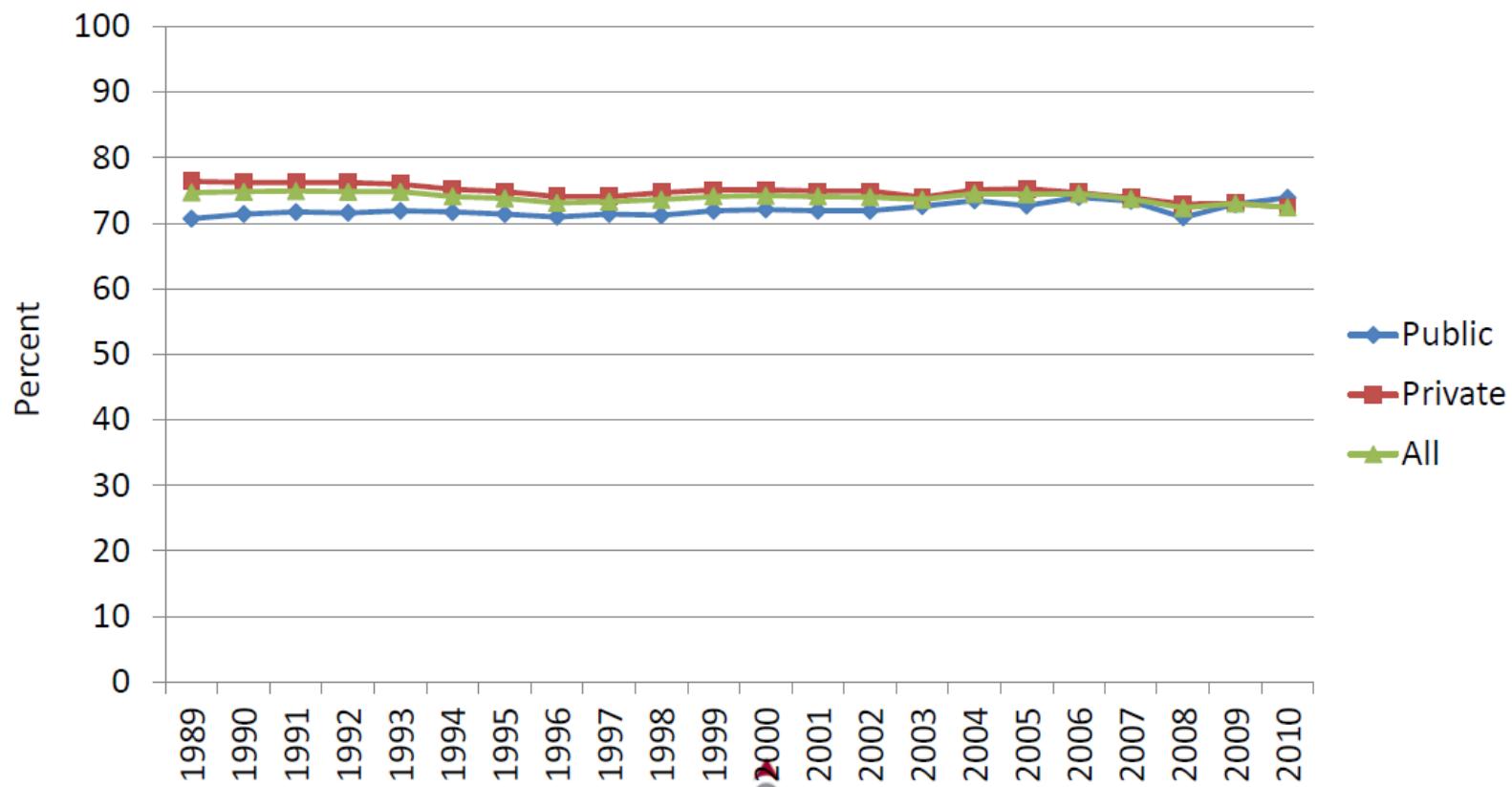




Given what we know and
what we're doing, is first-
year retention *improving*?



National First-to-Second-Year Retention Rates at Four-Year Colleges





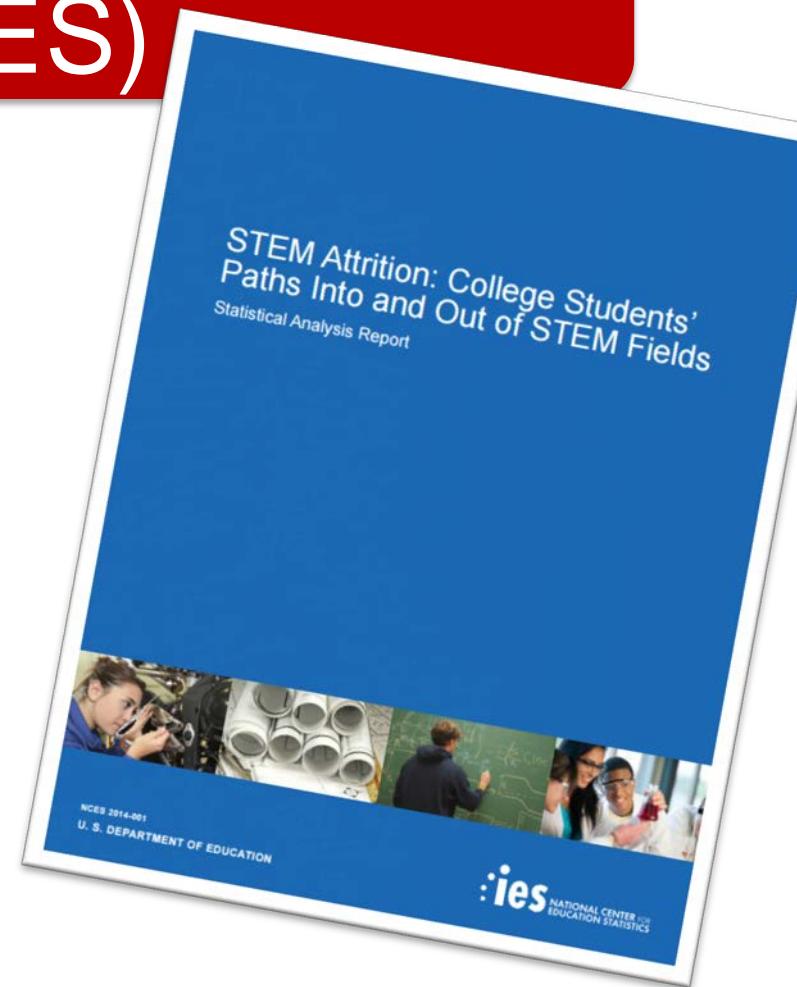
But this is information
across all majors. What
about STEM, and
Engineering in particular?



The Research: STEM Attrition (NCES)

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

The Research: Engineering Student Attrition (CAEE)

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)

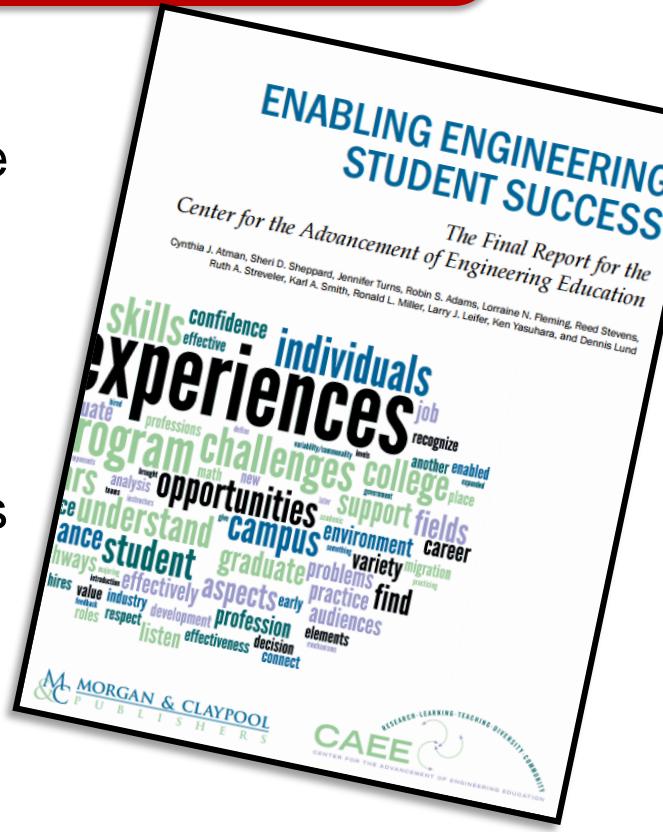
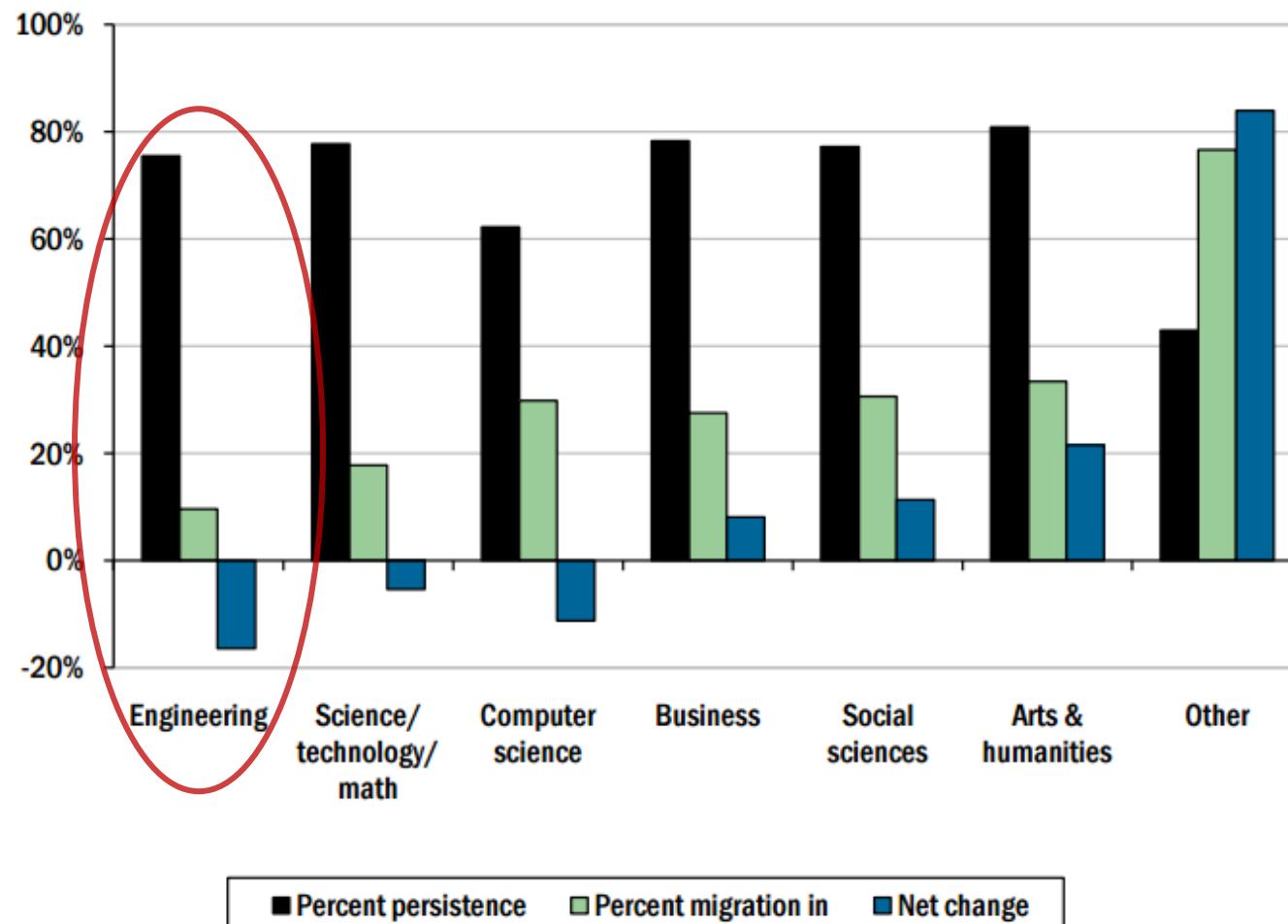




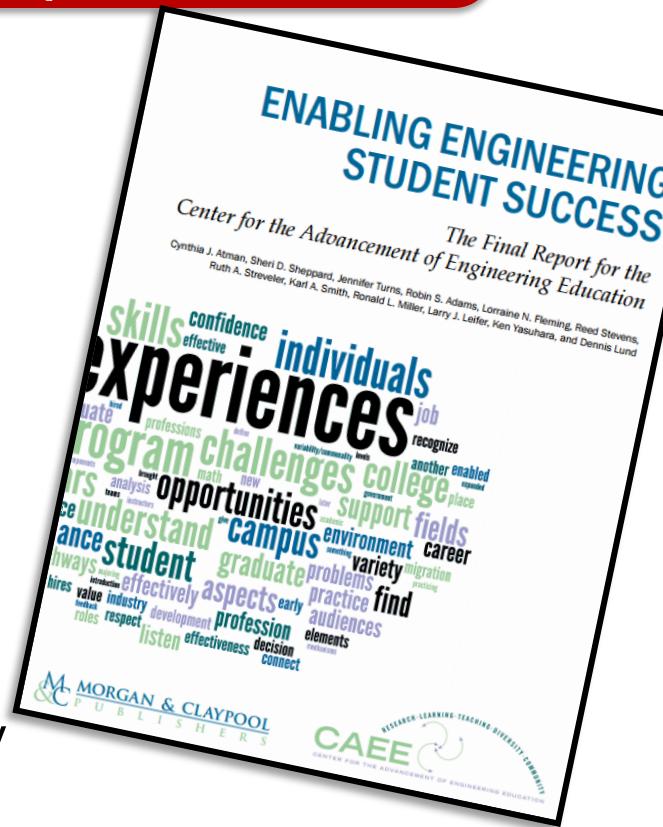
Figure 2.2-B: Persistence in matriculating major (left bars), migration into major (middle bars), and net loss/gain in major (right bars) in the NSSE sample



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’.”

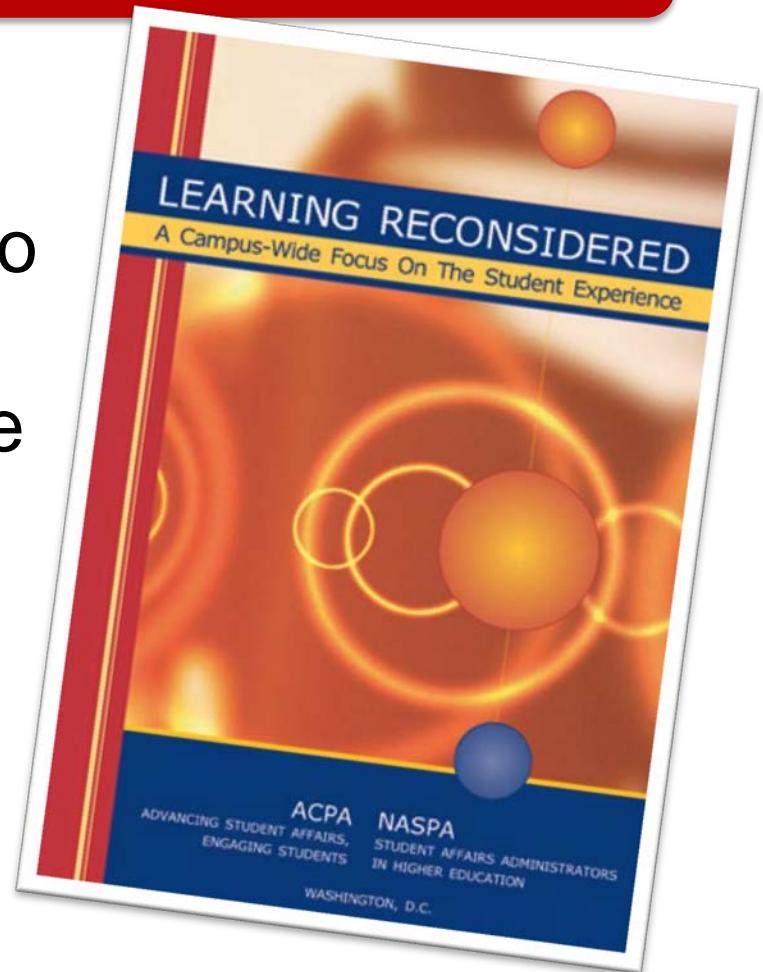


The value of focusing
on the *process...*



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



High-Impact Practices

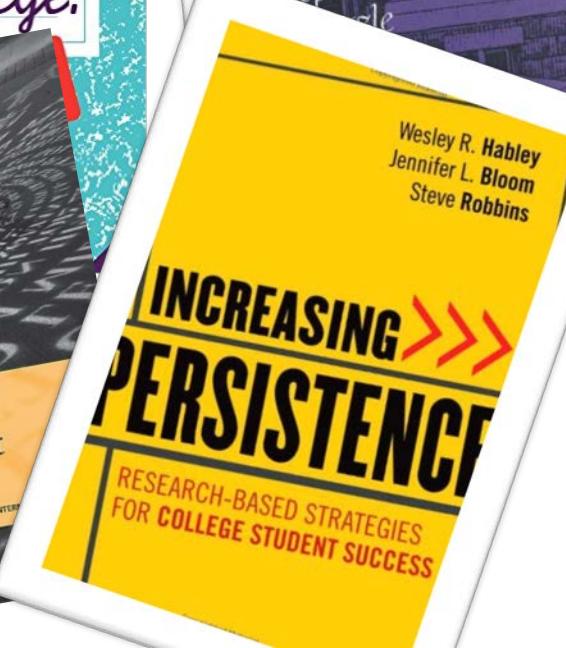
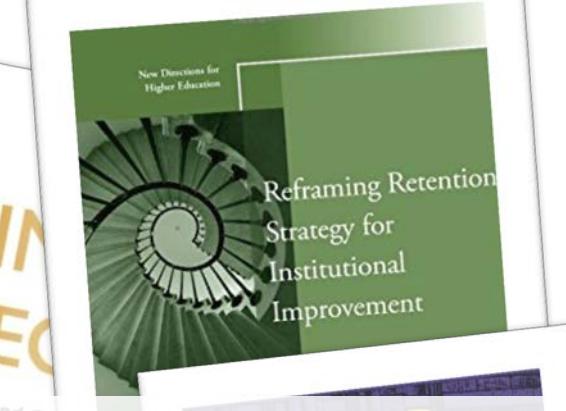
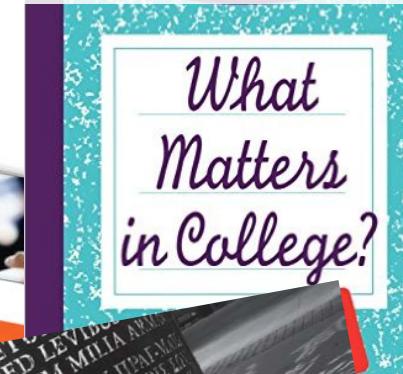
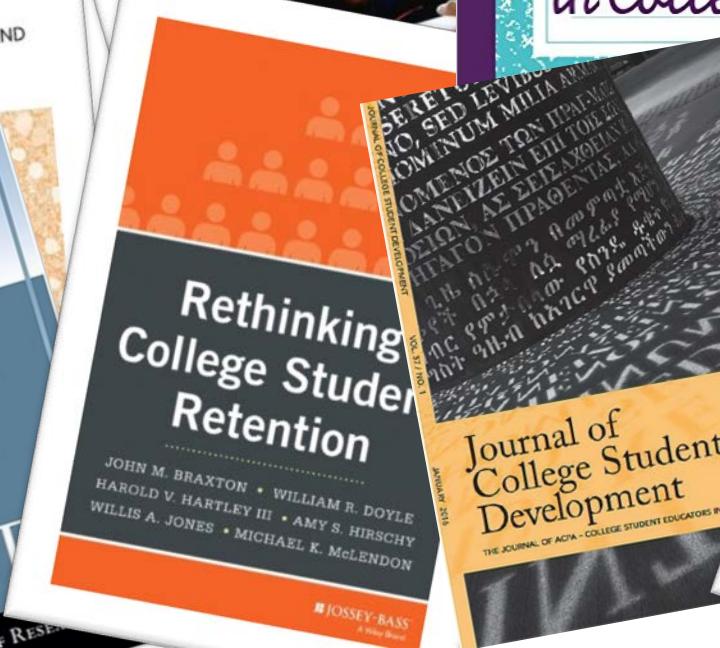
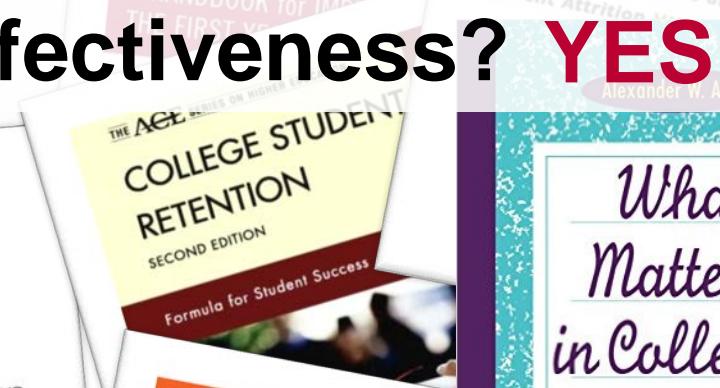
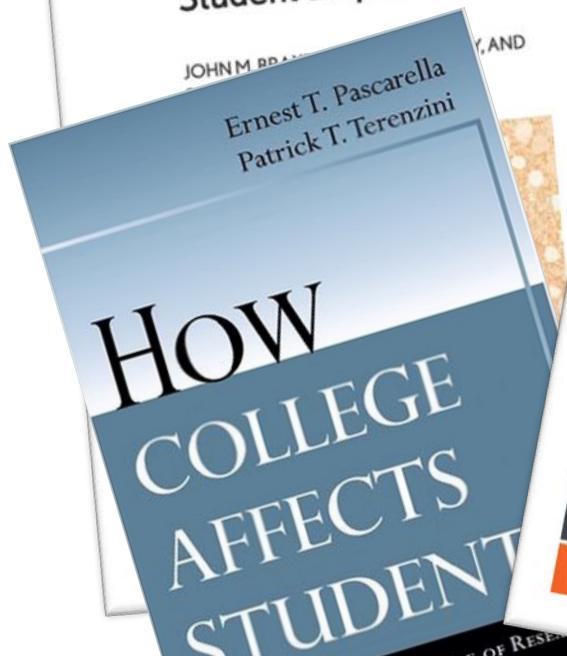
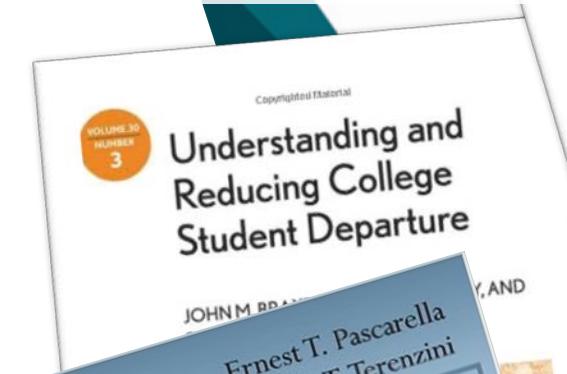
*Compensatory Effects

- “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...”



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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



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



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



How do we ensure
students are *engaging* in
high-impact practices?

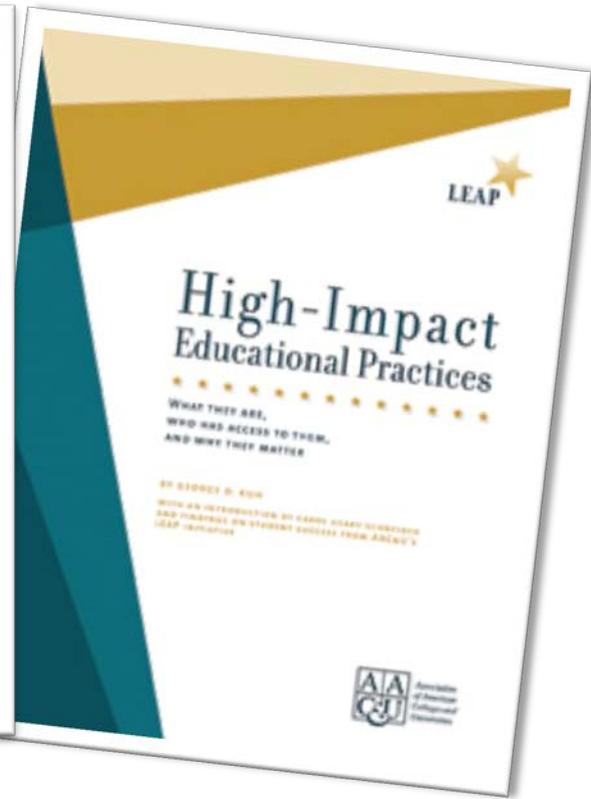
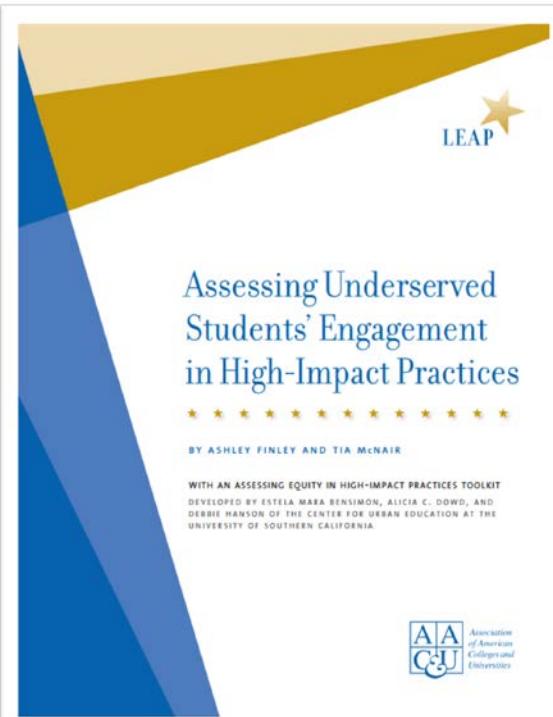


High-Impact Practices

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





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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

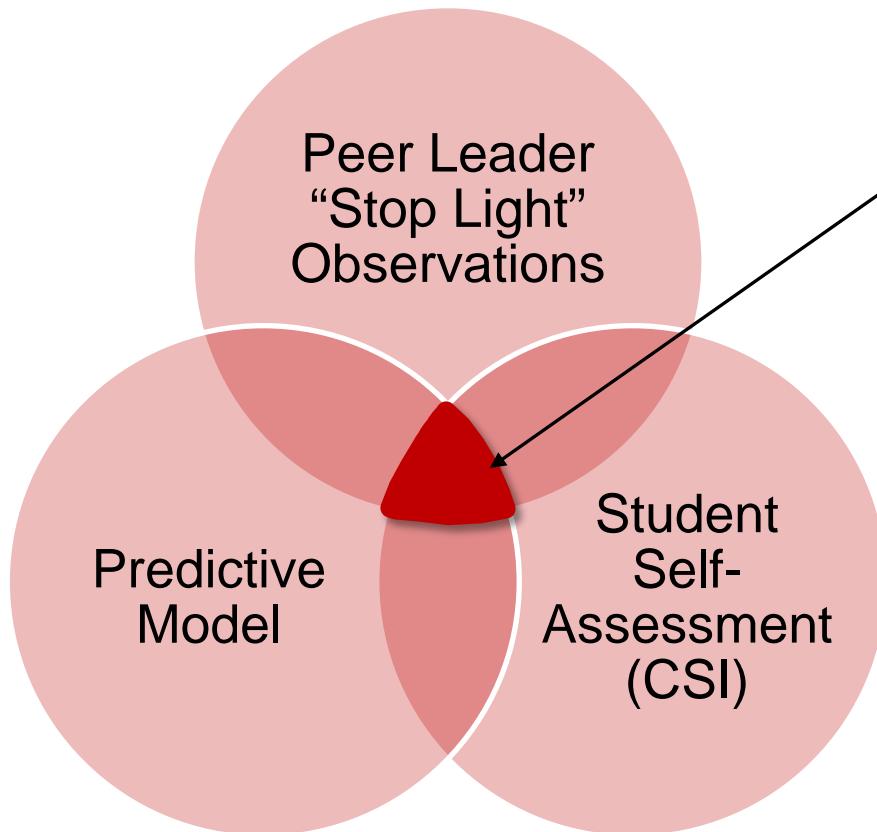
- PL observations tracked in a CRM using “tags”
 - “Stop Light” Data (academic, social, engagement)
- Students’ self-reported (non-cognitive) information
 - College Student Inventory by Ruffalo Noel-Levitz
- Predictive modeling: Office of Analysis and Report

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



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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



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Thank you!



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