



STEM Student Enrollment and Engagement through Connections

Assessing your STEP Project:
***Approach to Disentangling the Effects of
Interwoven Project Strategies***

Presentation at the STEP 2011 Grantees Meeting
Washington, D.C.
March 17, 2011



Grant No. 0653236
July 2007–July 2012

STEM Student Enrollment and Engagement through Connections

Workshop Presenters

Diane Rover, Professor
Electrical and Computer Engineering [PI]

Frankie Santos Laanan, Associate Professor
Educational Leadership & Policy Studies [Co-PI]

Steven Mickelson, Professor
Agricultural and Biosystems Engineering [Co-PI]

Mack Shelley, Professor
Political Science and Statistics [Co-PI]

STEM Student Enrollment and Engagement through Connections

AGENDA	Time
Welcome	10:45 AM
About SEEC (Rover) <ul style="list-style-type: none"> • Conceptual Model of SEEC Effect (Laanan & Mickelson) • Preliminary Results (Mickelson) • Other assessment/evaluation approaches (Laanan & Shelley) 	10:50-11:15 AM
Learning Activity (Mickelson) <ul style="list-style-type: none"> • Work in STEP Teams • Group Sharing 	11:15-12:00 PM
Q & A & Wrap-Up	12:00-12-15 PM

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Workshop Objectives

- Highlight a methodological strategy to assess/evaluate pre-engineering and post-transfer experiences of students at a research university.
- Understand the extent to which prior experiences at the community college relate to students' academic performance and retention in engineering at the university.
- Present a conceptual model of the “SEEC Effect” used to understand engineering transfer student success.
- Engage participants in aspects of development and analysis through small and large group discussion. Participants will also be guided in a short exercise related to measuring the effect of their own STEP project.

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The STEM Student Enrollment and Engagement through Connections (SEEC) project seeks to increase the number of engineering graduates at Iowa State University by approximately 100 per year. The means to that end are connections rooted in community: learning communities, community colleges, and Iowa communities. The project is collaborative between Iowa State University (ISU) and Des Moines Area Community College (DMACC). The cornerstone of SEEC is the success of learning communities for recruitment and retention, and the project builds upon Iowa State's established learning community infrastructure, leadership, and expertise. Retention at DMACC and ISU will be increased by a new learning community model, called a learning

Fast Facts about ISU Engineering

The College of Engineering continues to be ranked among the top 25 public engineering colleges in the country, according to the graduate and professional school rankings.

The programs are among the top 10 in the Midwest among all engineering colleges (USN & WR ranking).

Data Briefs

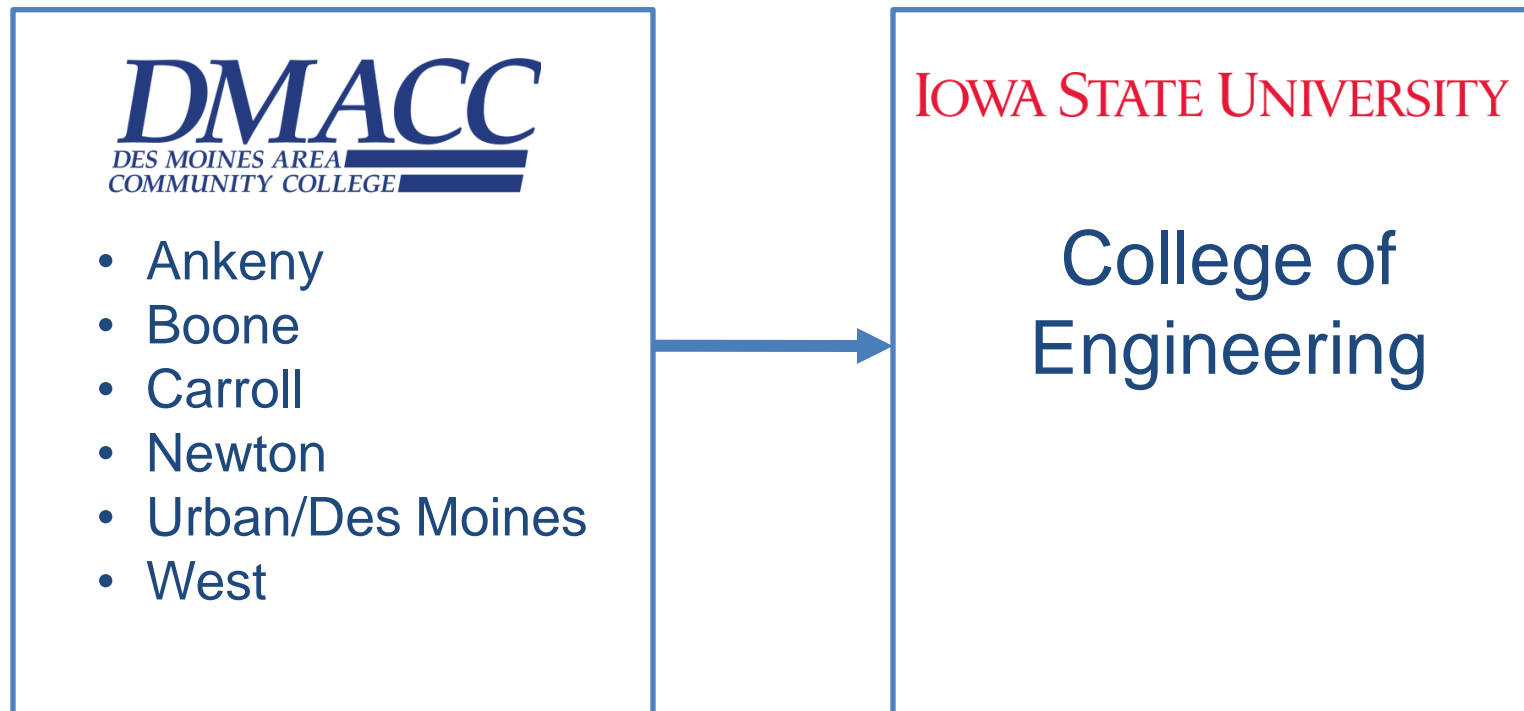
[SEEC Data Brief: Engineering Admissions Partnership Program \(E-APP\) \(PDF\)](#)
November 2010

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SEEC: STEM Student Enrollment and Engagement through Connections



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Overall Grant Goal

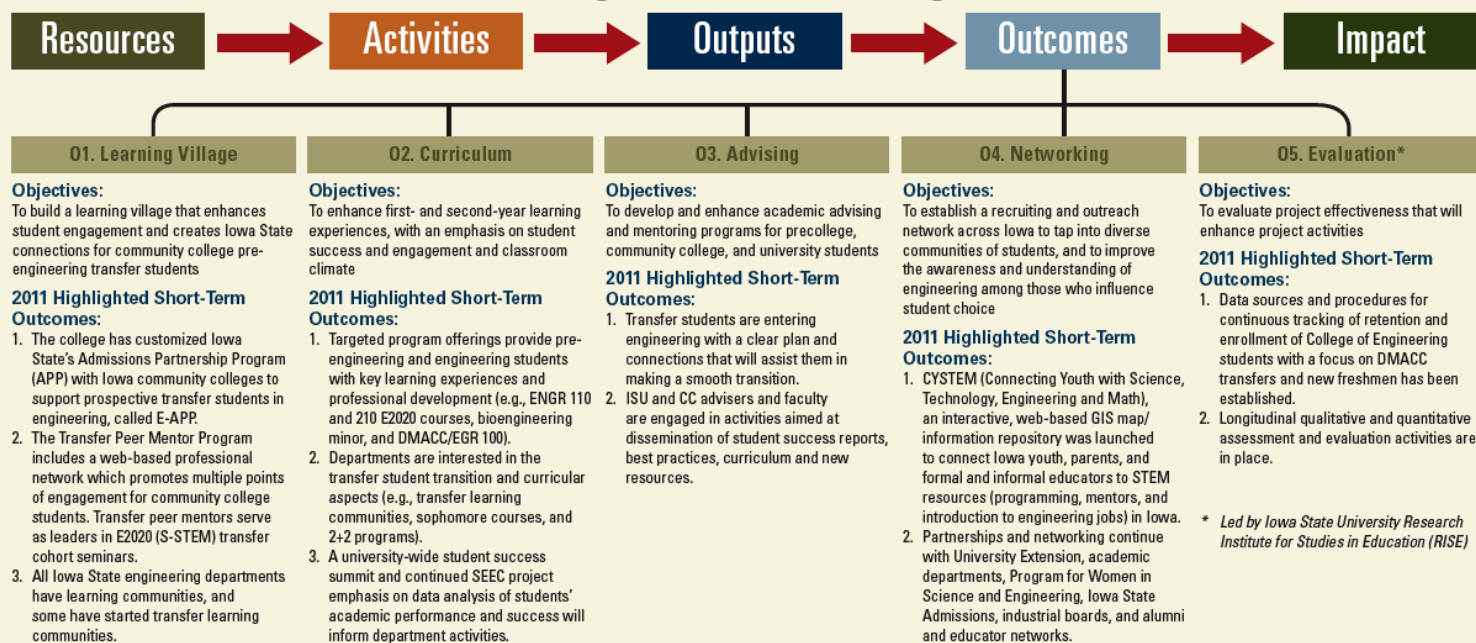
Increase College of Engineering graduates to 900, by approximately 100 per year. Included with this goal are increases in the number of pre-engineering students at DMACC and in the percentages of women and minority students in engineering at ISU and DMACC.

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Project Goals

Increase the number of engineering graduates at Iowa State by 100 per year to approximately 900 graduates annually. Included with this goal are increases in the percentages of women and minority graduates in engineering at Iowa State and the number of pre-engineering students at Des Moines Area Community College.

Logic Model Planning



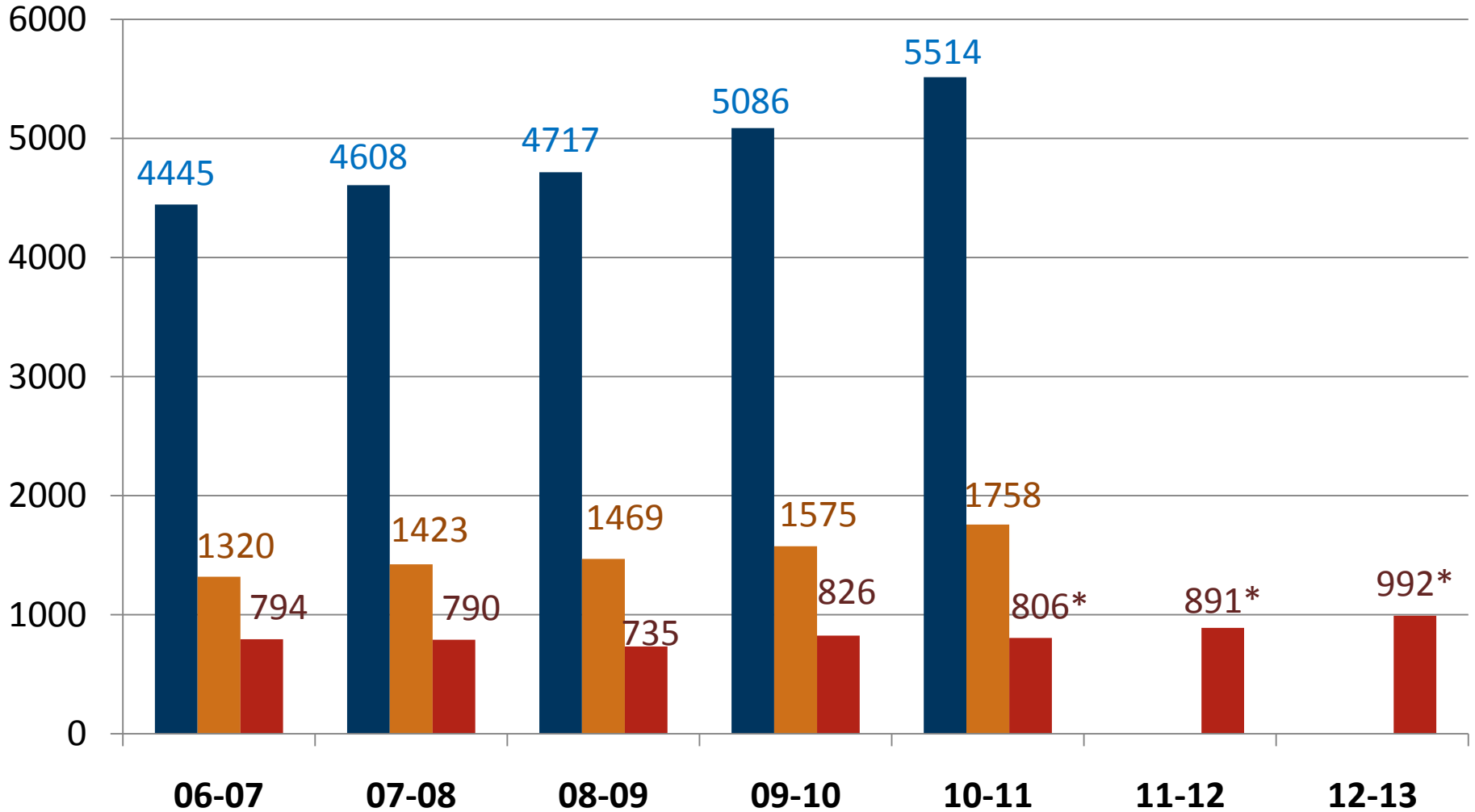
* Led by Iowa State University Research Institute for Studies in Education (RISE)

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Enrollment Data

**Source: College of Engineering Data Analysis.
Prepared by Marcia Laugerman and Jason Pontius. Iowa State
University, March 2011.**

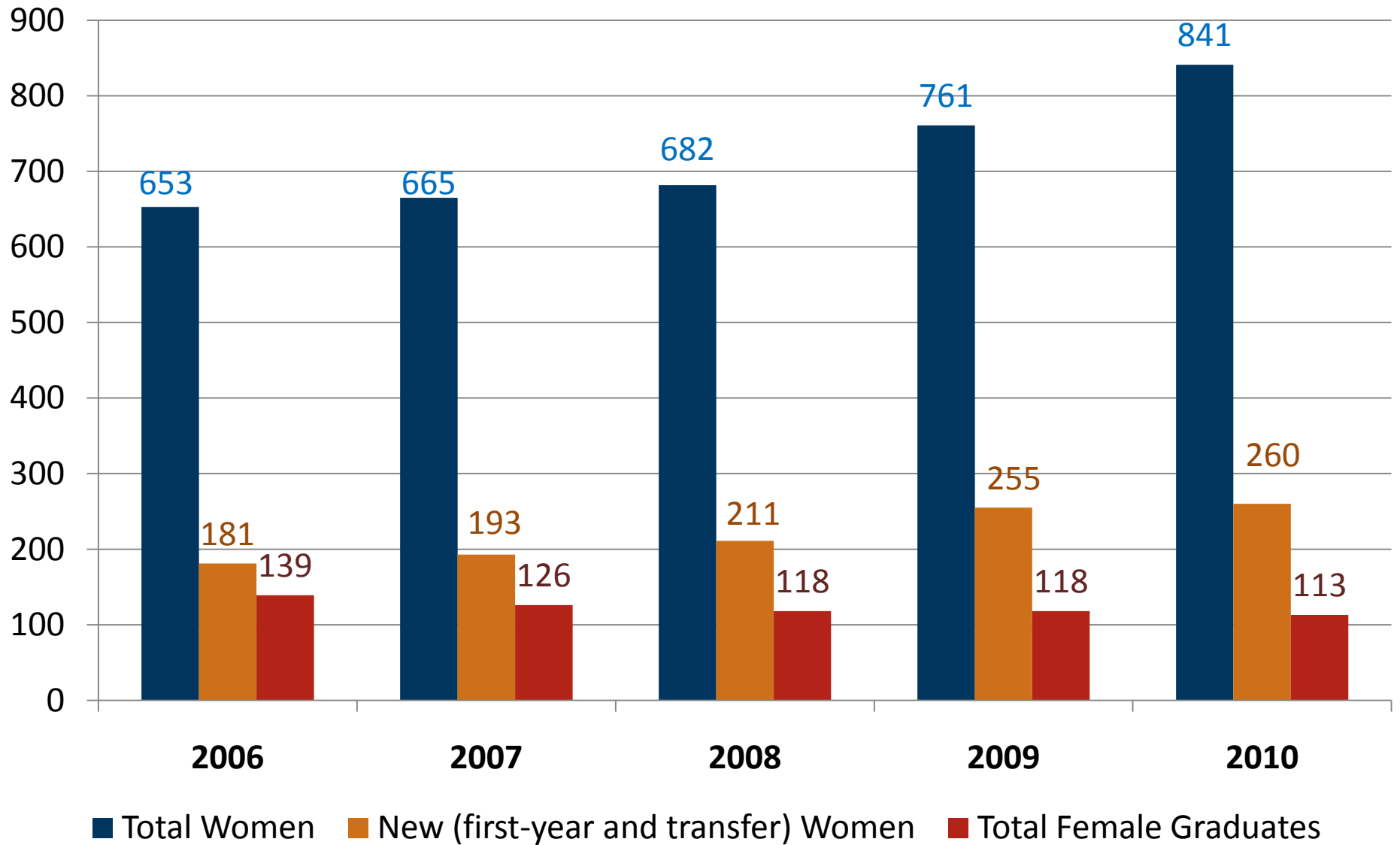
CoE Total Enrollment and Graduates



■ Total Students ■ New (first-year and transfer) Students ■ Total Graduates

*Predicted – Based on Iowa State University Institutional Research

CoE Female Enrollment and Graduates



CoE Minority Student Enrollment and Graduates

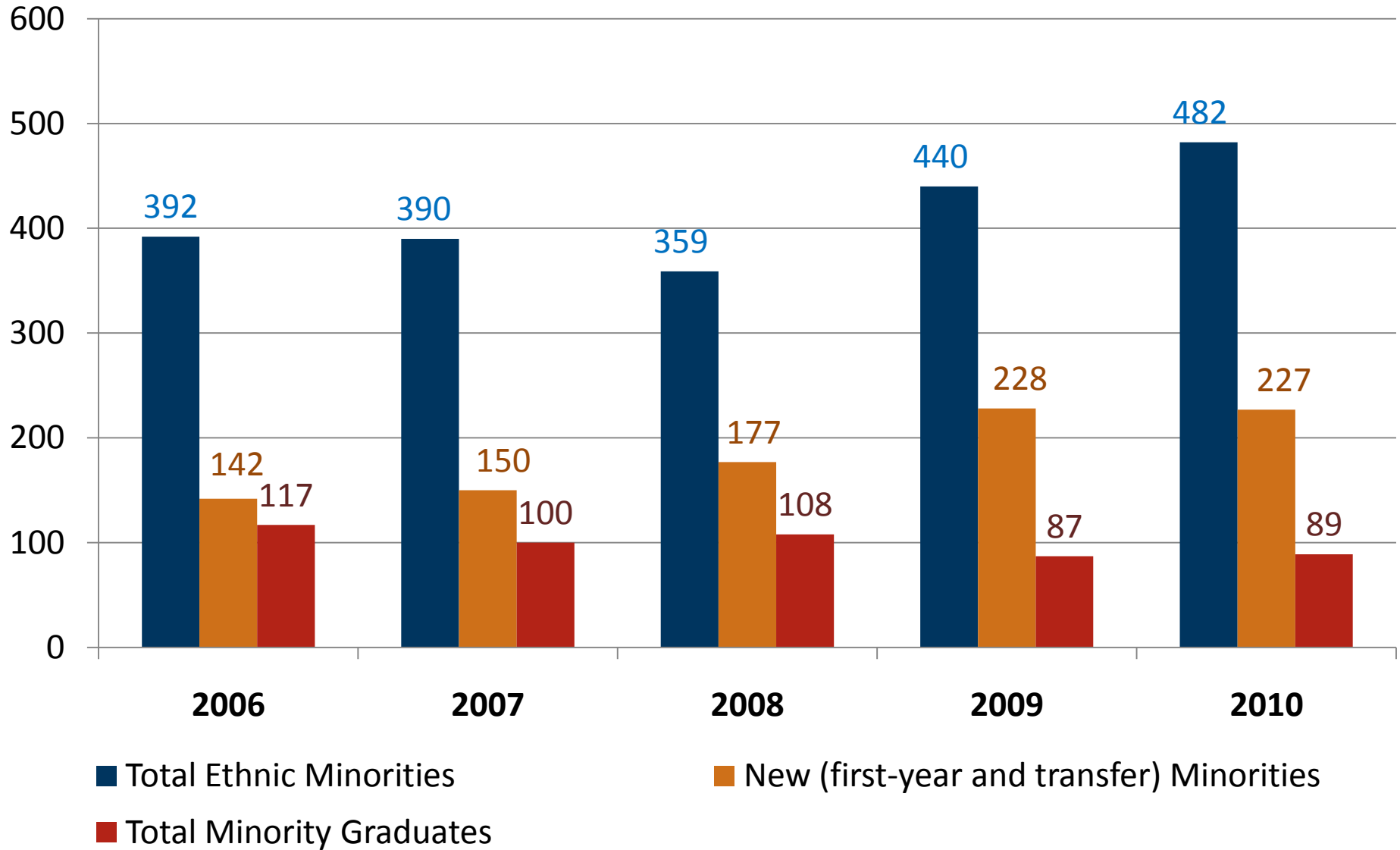
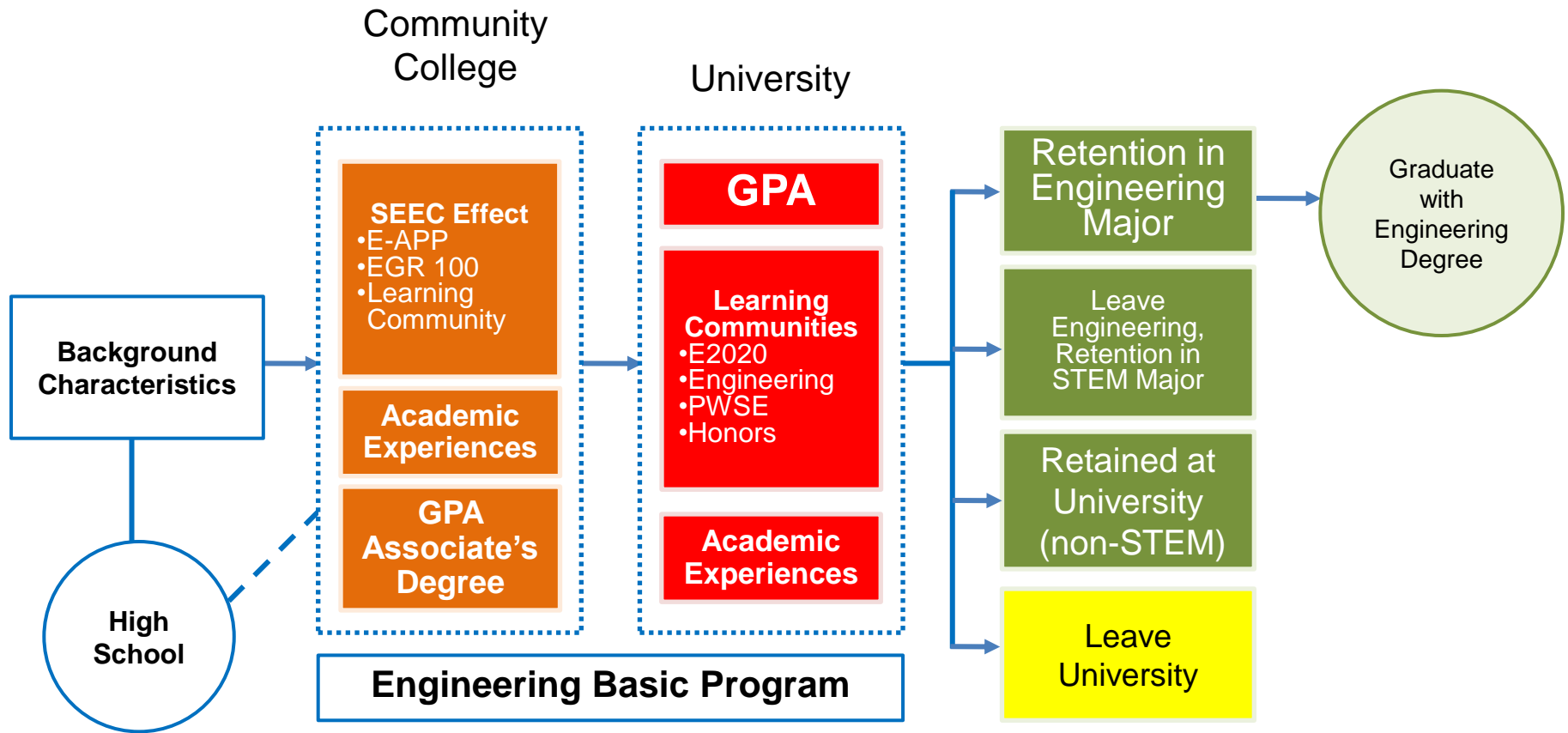
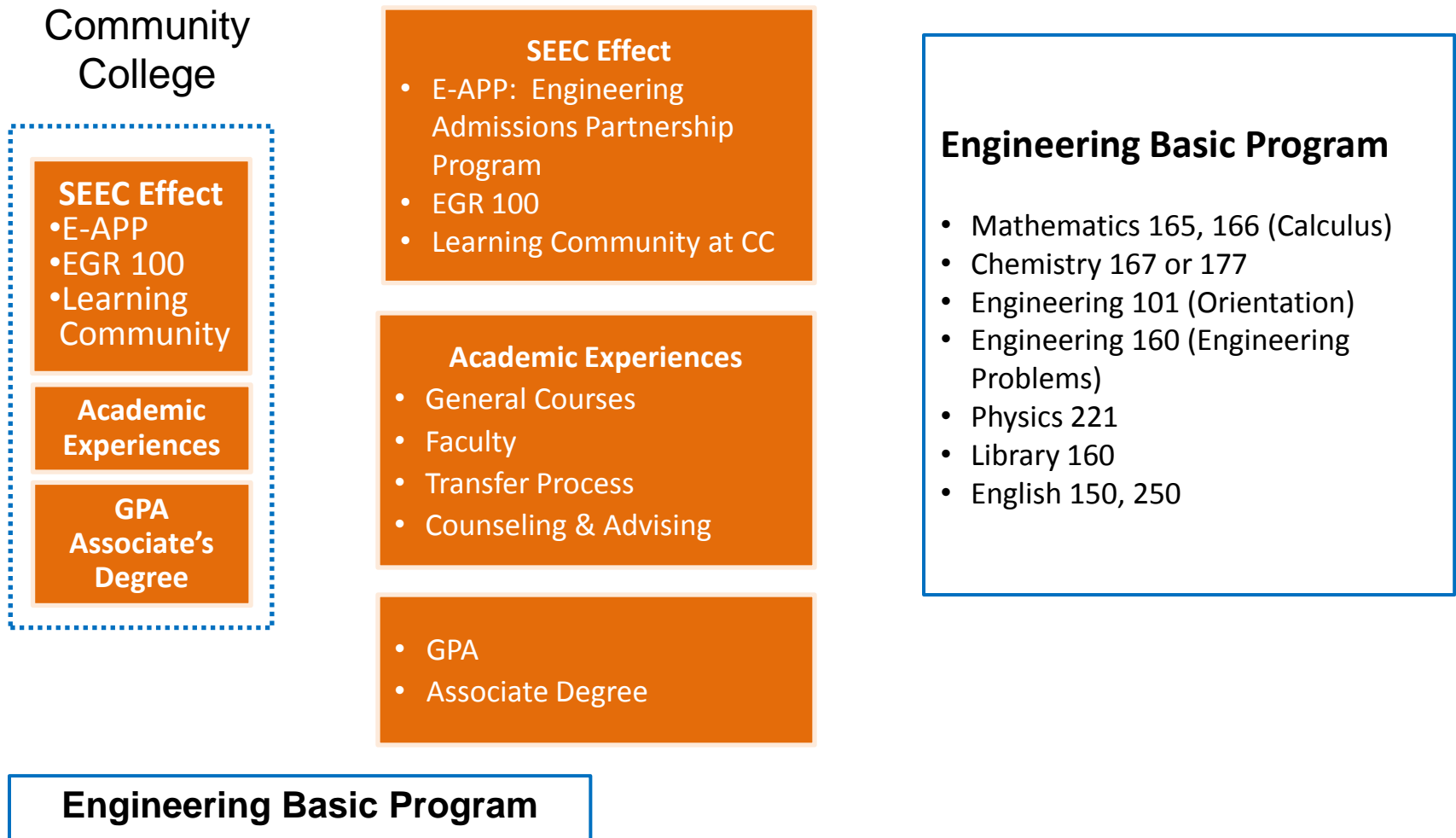


Figure 1. Conceptual Model of SEEC Effect
Engineering Transfer Student Retention and Success



Source: Laanan, F., Rover, D., Bruning, M., Mickelson, S., & Shelley, M. (2011). Iowa State University.

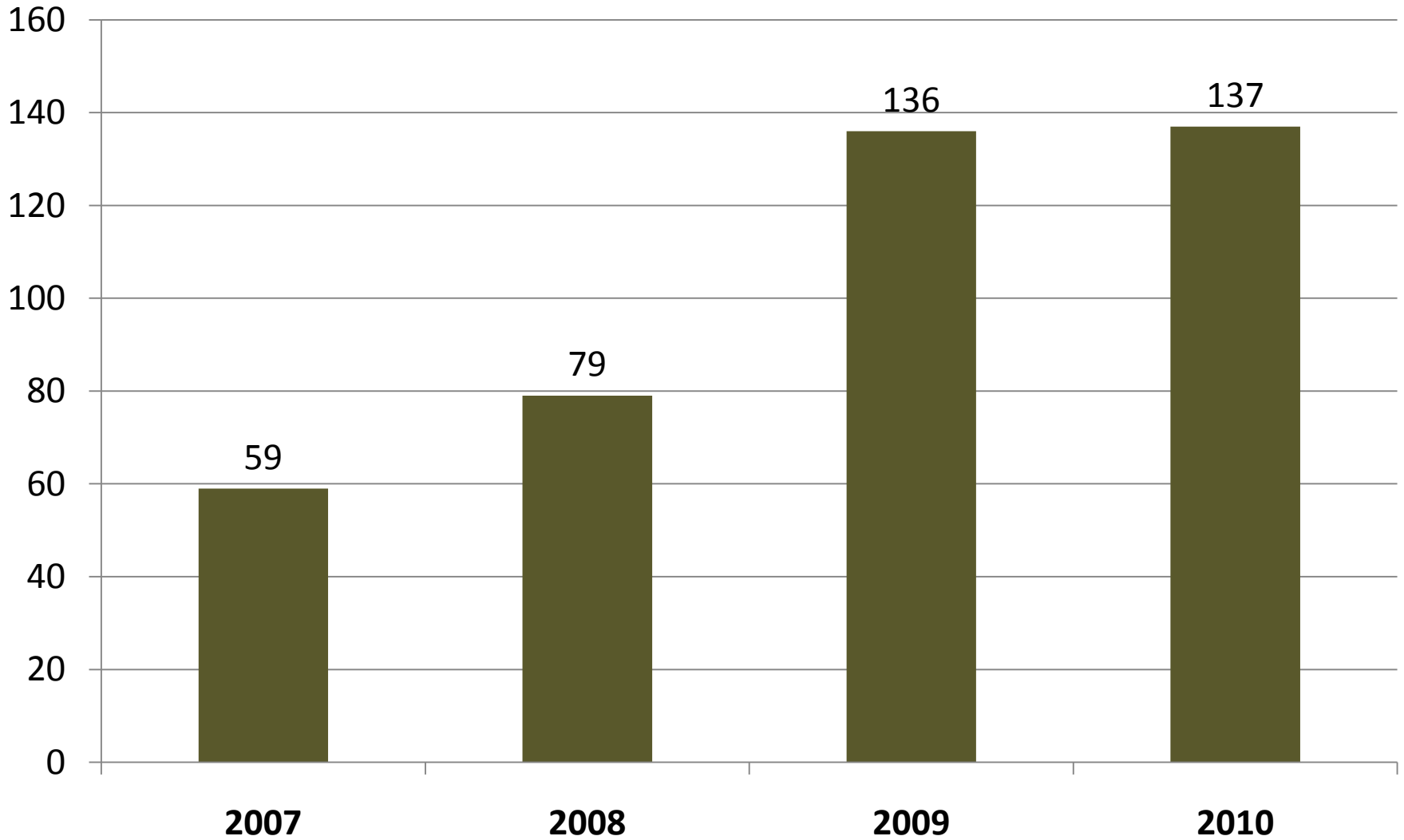
Figure 2. Conceptual Model of SEEC Effect:
Community College Environment



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SEEC Effect

CoE E-APP Enrollment



Enrollment in Des Moines Area Community College (DMACC) EGR 100

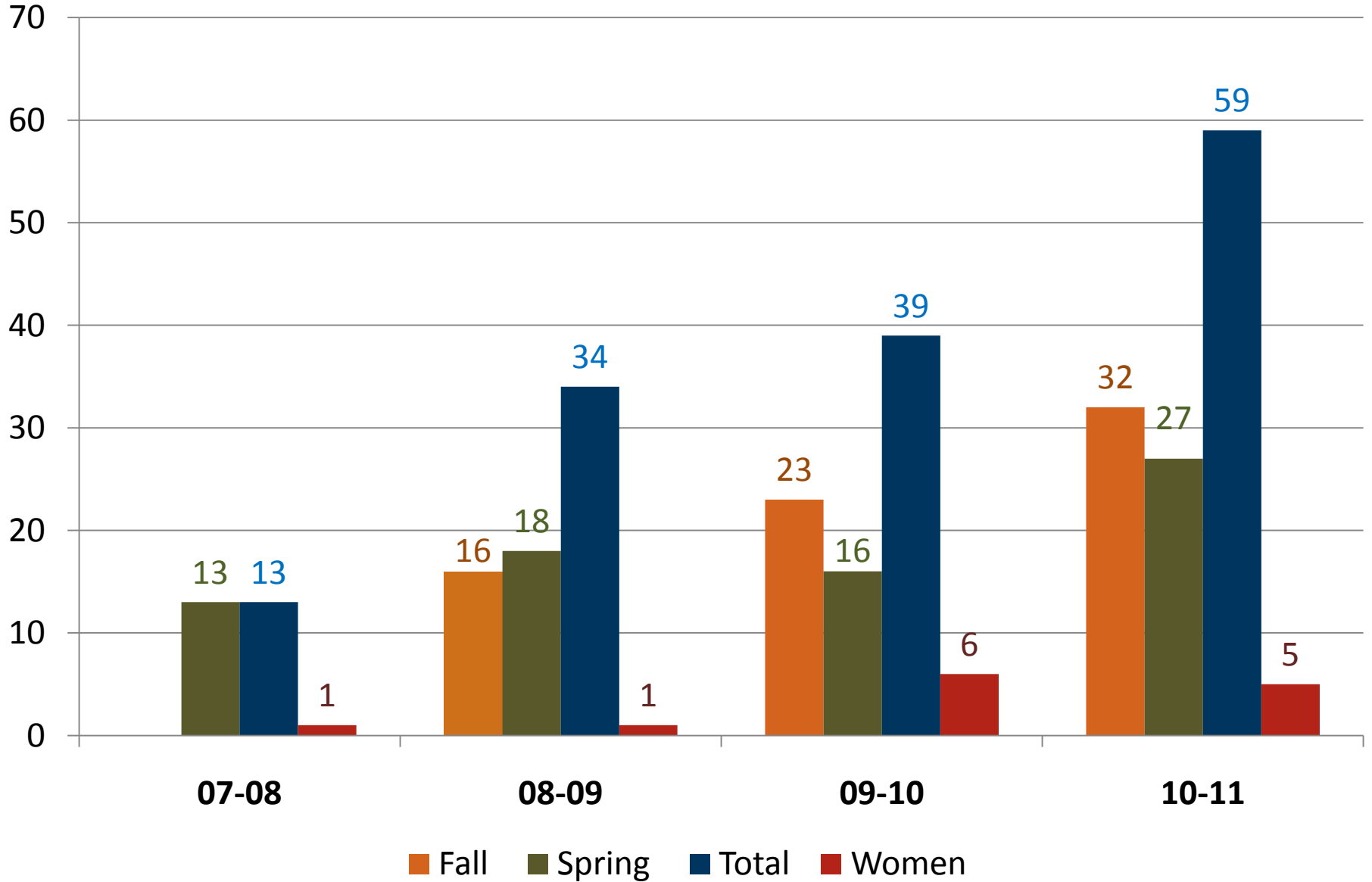
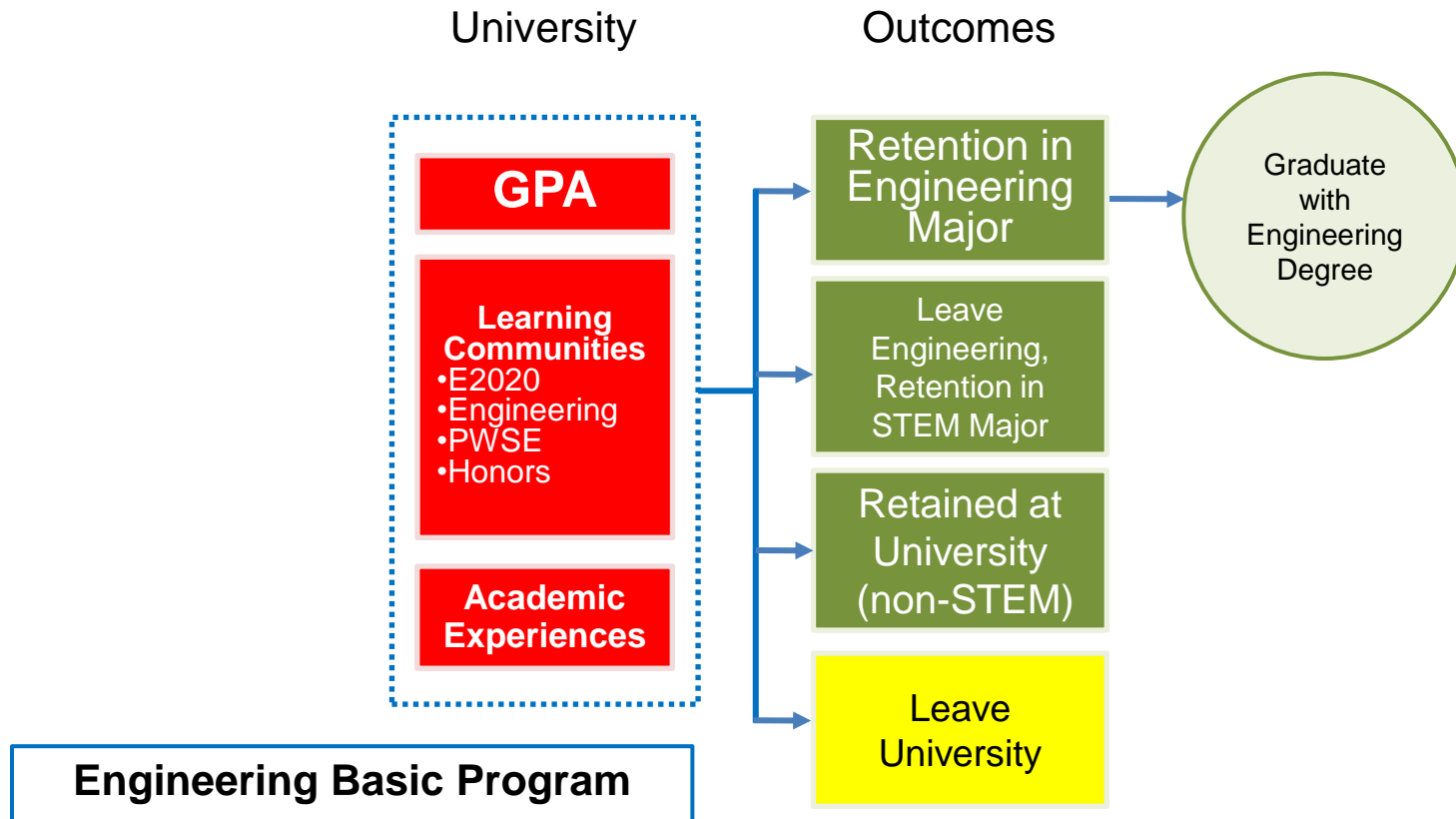


Figure 3. Conceptual Model of SEEC Effect:
University of Environment



CoE Learning Community Participation

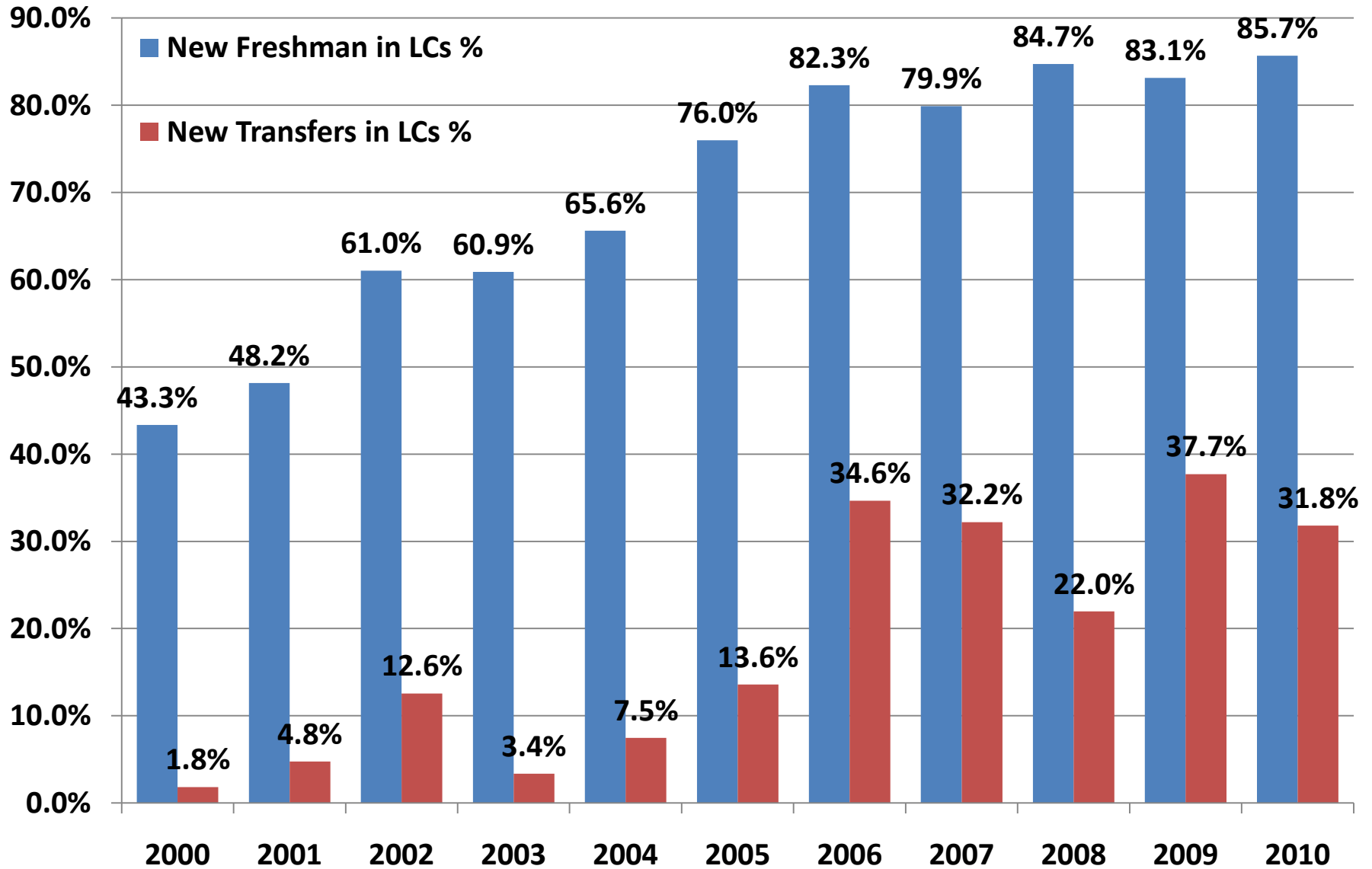
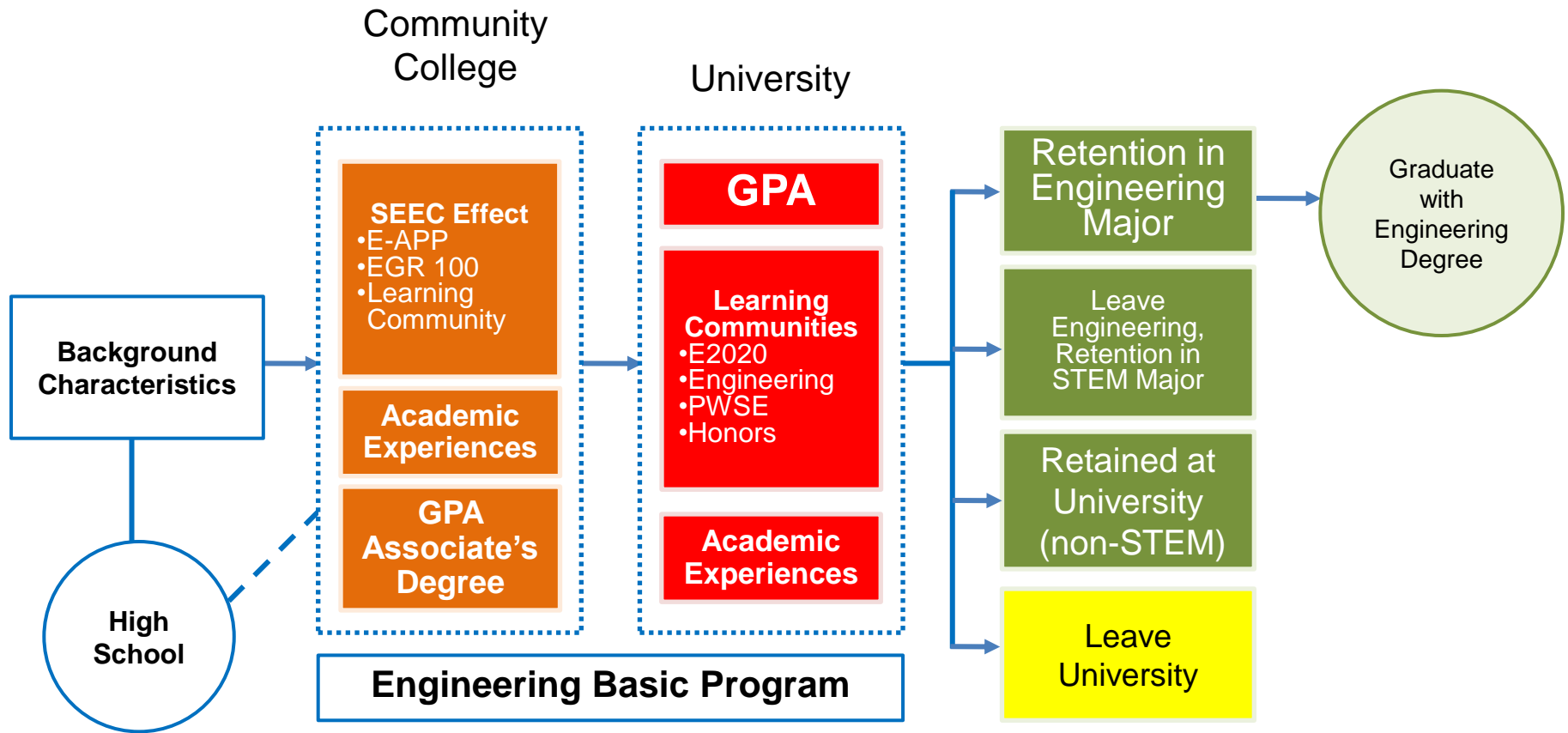


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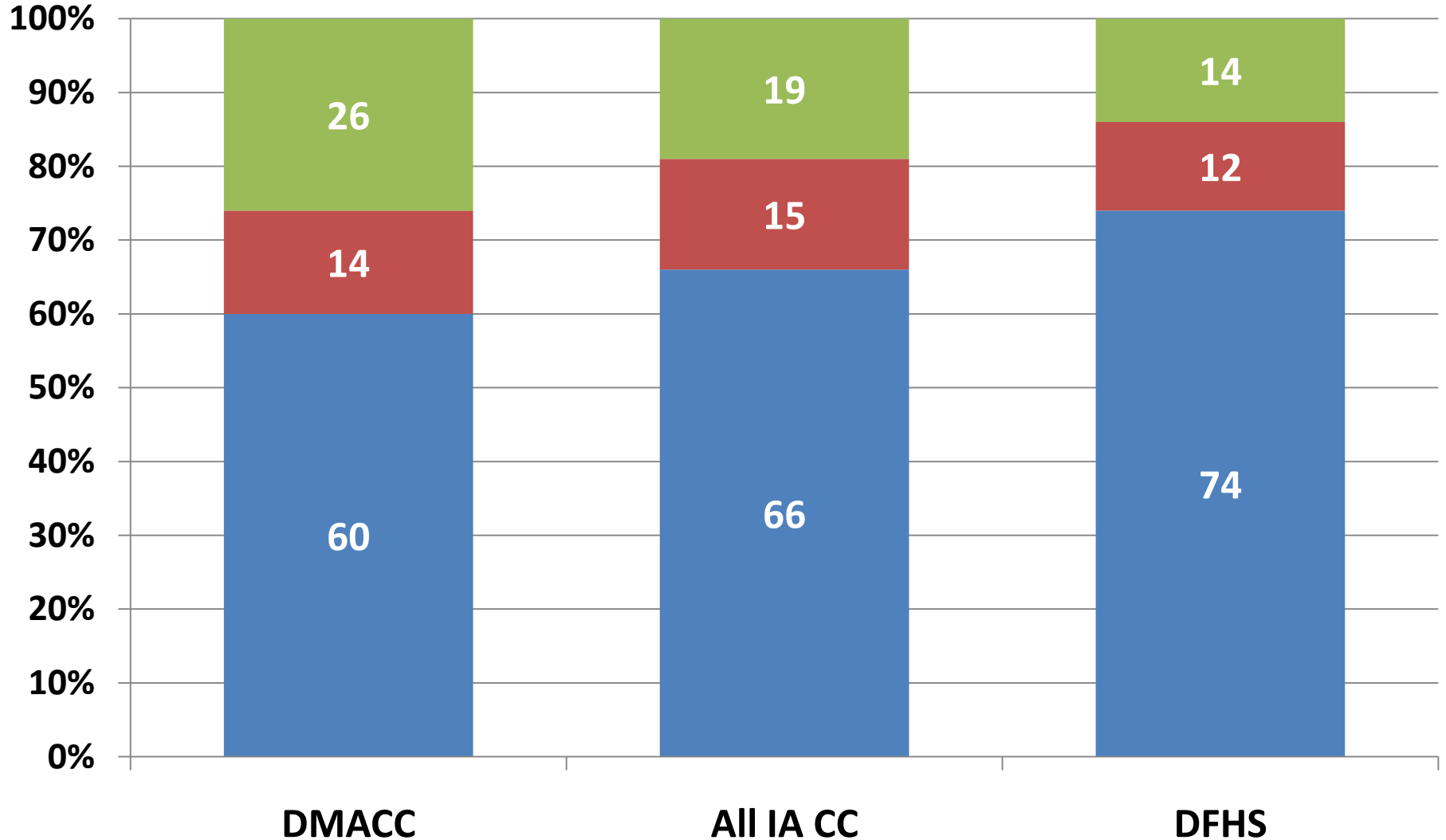
E-APP and Retention

- E-APP students are retained at significantly higher levels than non-E-APP students.
- E-APP significantly improves retention over Non-E-APP in early studies.
- E-APP is statistically significant for improving retention even when controlling for transfer GPA and basic program GPA.
- This is especially true for DMACC students.

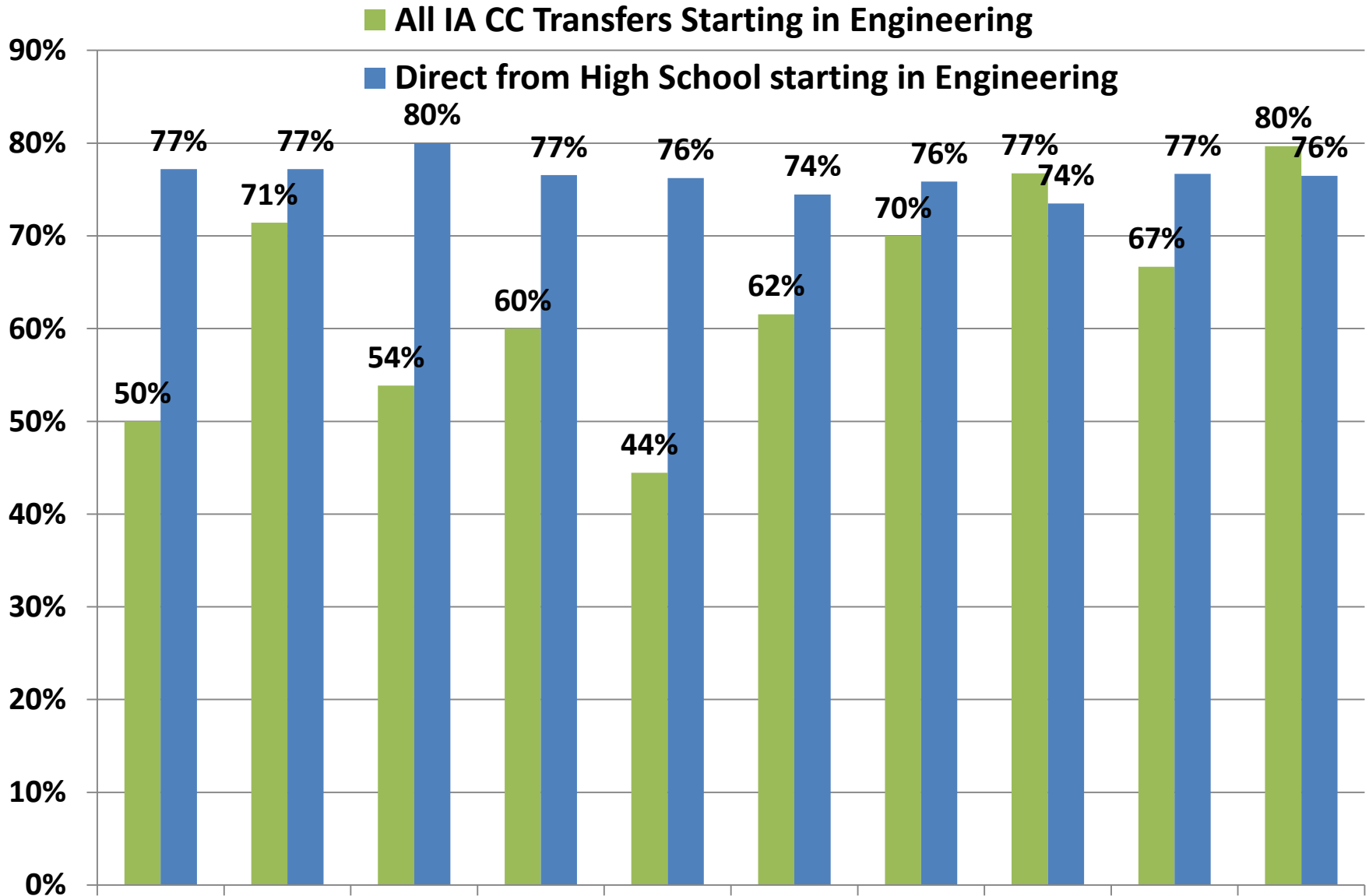
10 Year Averages for Retention: One Year

For Each 100 Students that Start in Engineering:
This Shows Where They are 1 Year Later

■ Still in Engr ■ Still at ISU ■ Left ISU

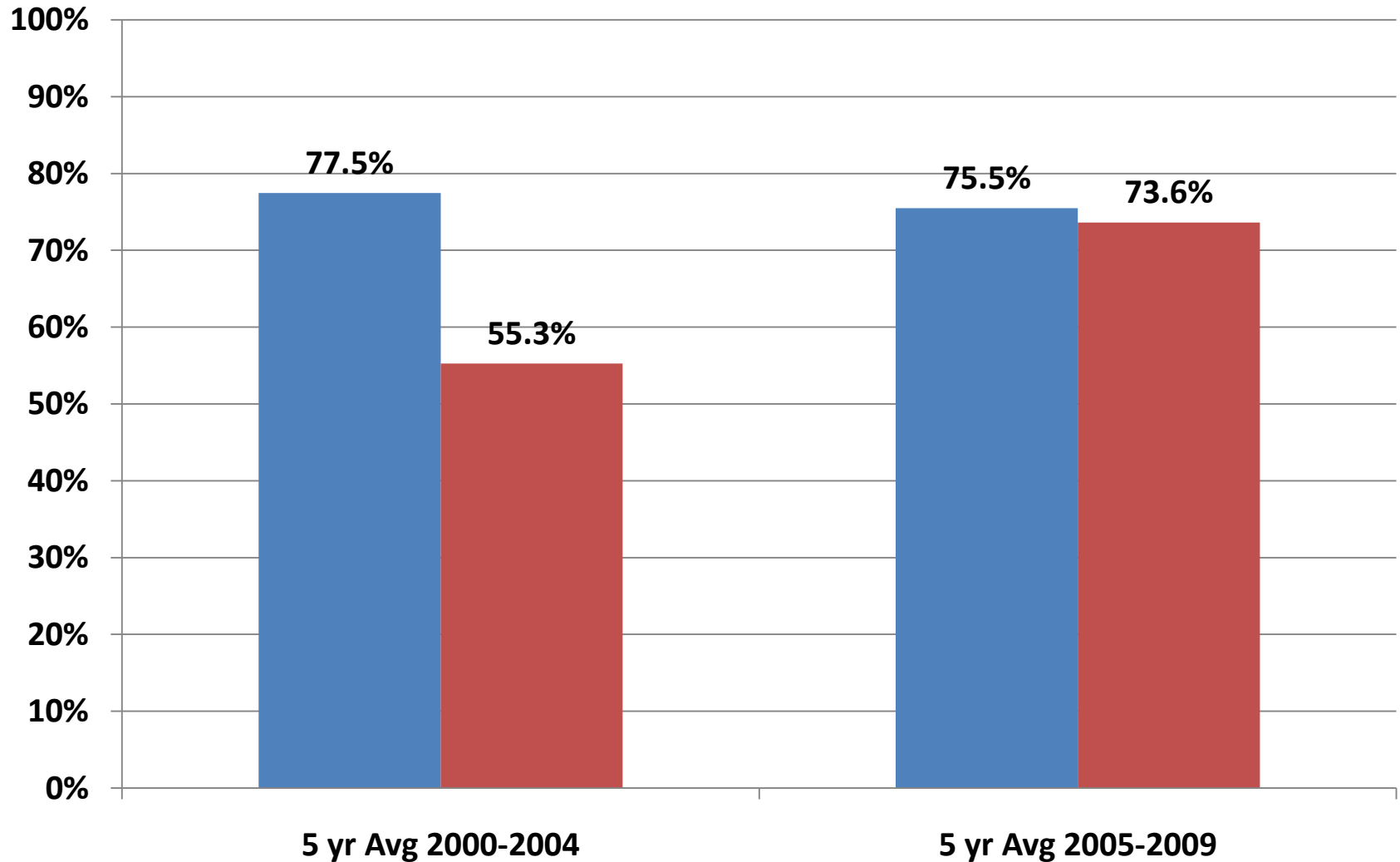


CoE LC One Year Retention Rates in Engr



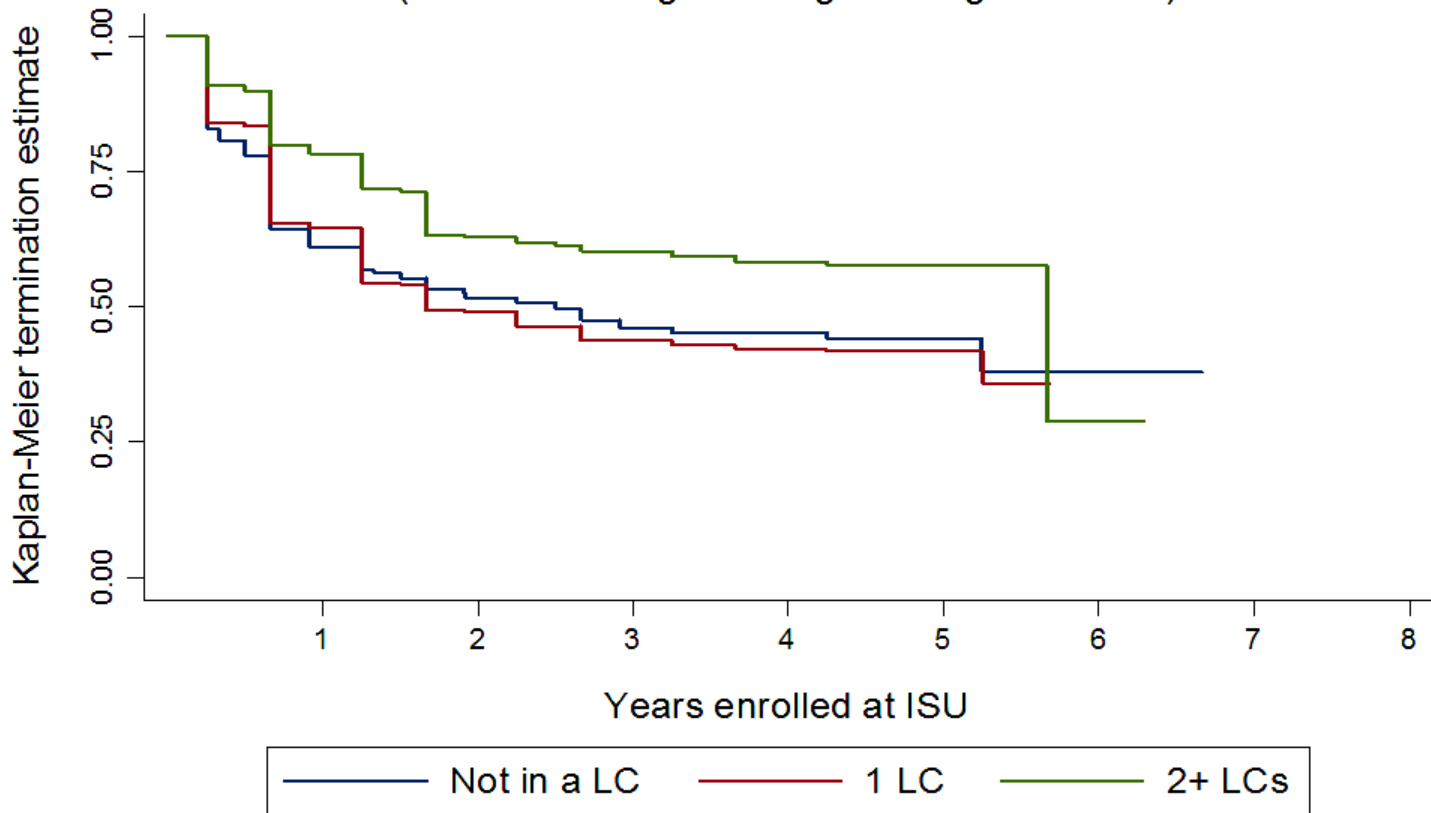
CoE One Year LC Retention in Engr

■ Direct From High School ■ IA CC Transfer Students



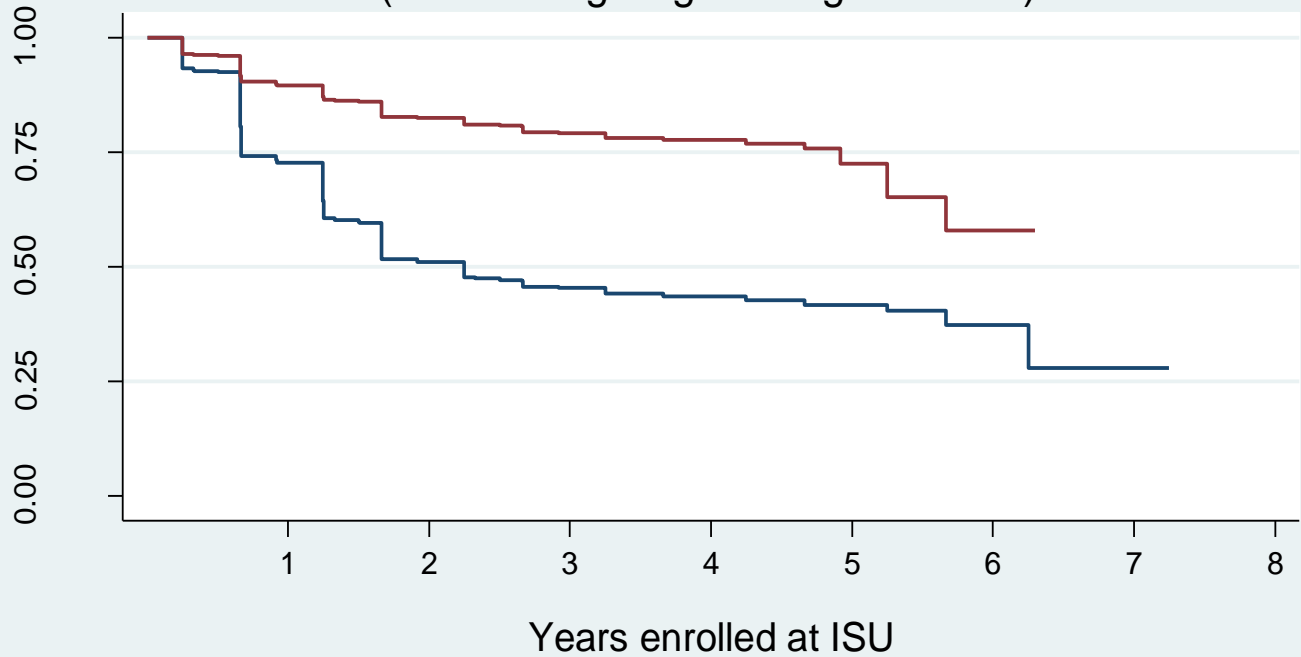
Multiple-Learning Community Effect on Retention of Women in Engineering

Impact of LC Participation on COE Retention (Female College of Engineering Students)



Source: 2011 SEEC Grant College of Engineering Retention Analysis

ENGR 160 Student Retention within COE (All Entering Engineering Students)

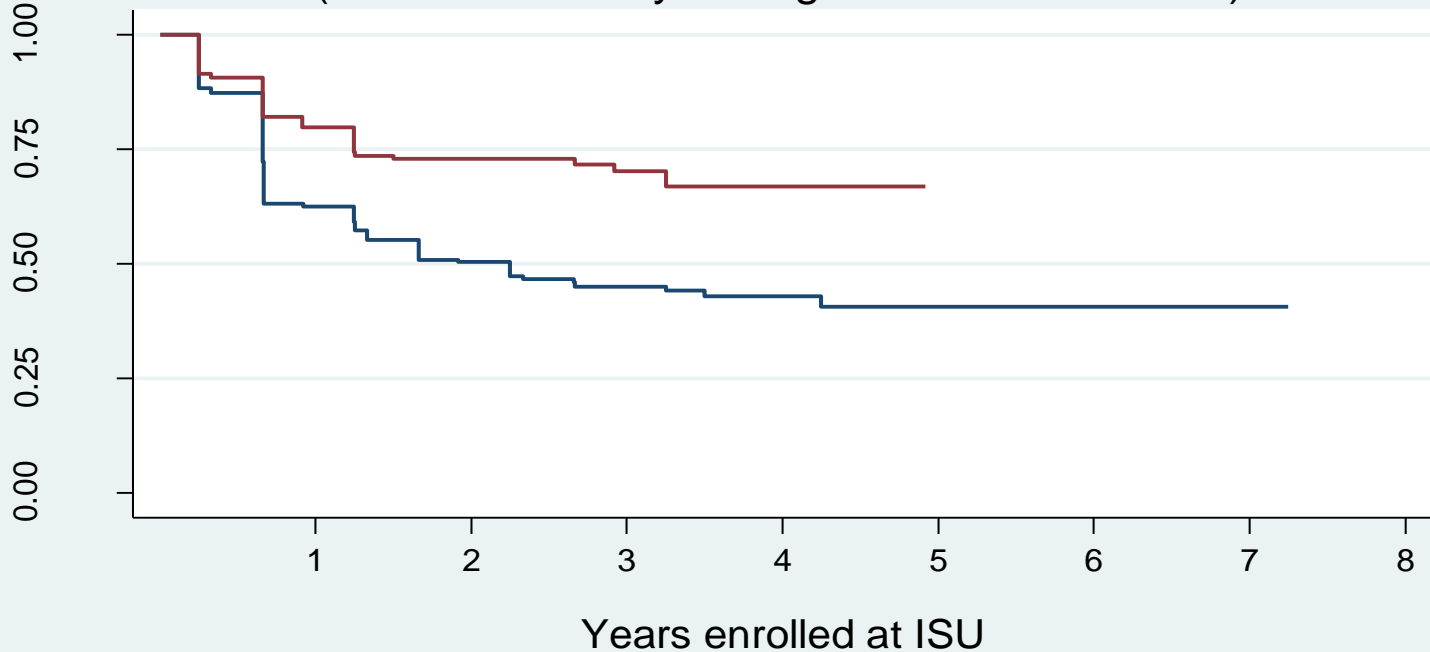


Number at risk		0	1	2	3	4	5	6	7	8
engr160hilo = 0	1288	895	736	514	69	8	1	0		
engr160hilo = 1	1144	1029	895	545	32	3	0	0		

— 0.00 - 3.00 GPA
 — 3.01 - 4.00 GPA

Source: 2011 College of Engineering Retention Analysis

ENGR 160 Student Retention within COE (Iowa Community College Transfer Students)



Number at risk		1	2	3	4	5	6	7	8
engr160hilo = 0	129	99	61	19	5	1	1	0	0
engr160hilo = 1	103	88	42	11	0	0	0	0	0

— 0.00 - 3.00 GPA
 — 3.01 - 4.00 GPA

Source: 2011 College of Engineering Retention Analysis

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Other Assessment Approaches

E-TSQ: Engineering Transfer Student Questionnaire

- Online survey instrument; 133-item and open-ended questions
- Adapted from L-TSQ (Laanan, 1998, 2004)
- Comprehensive instrument that collects demographic information about transfer student and their academic and social experiences at the 2- and 4-year environments.
- Ability to link E-TSQ with student academic transcripts

E-TSQ: Engineering Transfer Student Questionnaire

Demographics

Community College Experiences

- General Courses
- Academic Advising/Counseling Services
- Transfer Process
- Course Learning
- Experience with Faculty
- Learning and Study Skills

University Experiences

- Reasons for Attending University
- Course Learning
- Experiences with Faculty
- General Perceptions
- Adjustment Process
- College Satisfaction

Open-Ended Questions

- What factors helped you adjust to university?
- What might the community college have done to enhance your success or ease the transition?
- If you could give some advice to community college students, what would that advice be?
- What have we not asked that you would like us to know about your experience at the community college or university?

SEEC Effect (E-TSQ)

- Participated in E-APP
- Attended ISU's CoE Transfer Student Career Fair Event
- Participated in the E-APP Online Professional Network
- Interacted with an ISU Engineering Transfer Peer Mentor
- Interacted with an ISU Engineering Advisor
- Participated in an Engineering 100 course in your community college
- Interacted with an ISU Engineering faculty member
- Attended an ISU campus event/activity
- Obtained an ISU student ID
- Obtained an ISU email account
- Used ISU's CoE Career Management System (CMS)
- Attended "Experience Iowa State Days"
- Attended Transfer Visit Days
- Attended Admissions Partnership Program (APP) Days
- Came to ISU campus during a prospective student visit
- Developed a Transfer Plan
- Utilized ISU's TRANSIT to develop an ISU Transfer Plan
- Participated in an ISU student organization
- Participated in a community college learning community
- Interacted with community college advisors
- Interacted with community college pre-engineering faculty
- Interacted with ISU's CoE website
- Lived in ISU residence halls

Indicate the services or programs that you participated in at the community college by selecting NO or YES. Please indicate the extent to which they influenced your transfer preparation using the four-point scale: 1) disagree strongly, 2) disagree somewhat, 3) agree somewhat, 4) agree strongly

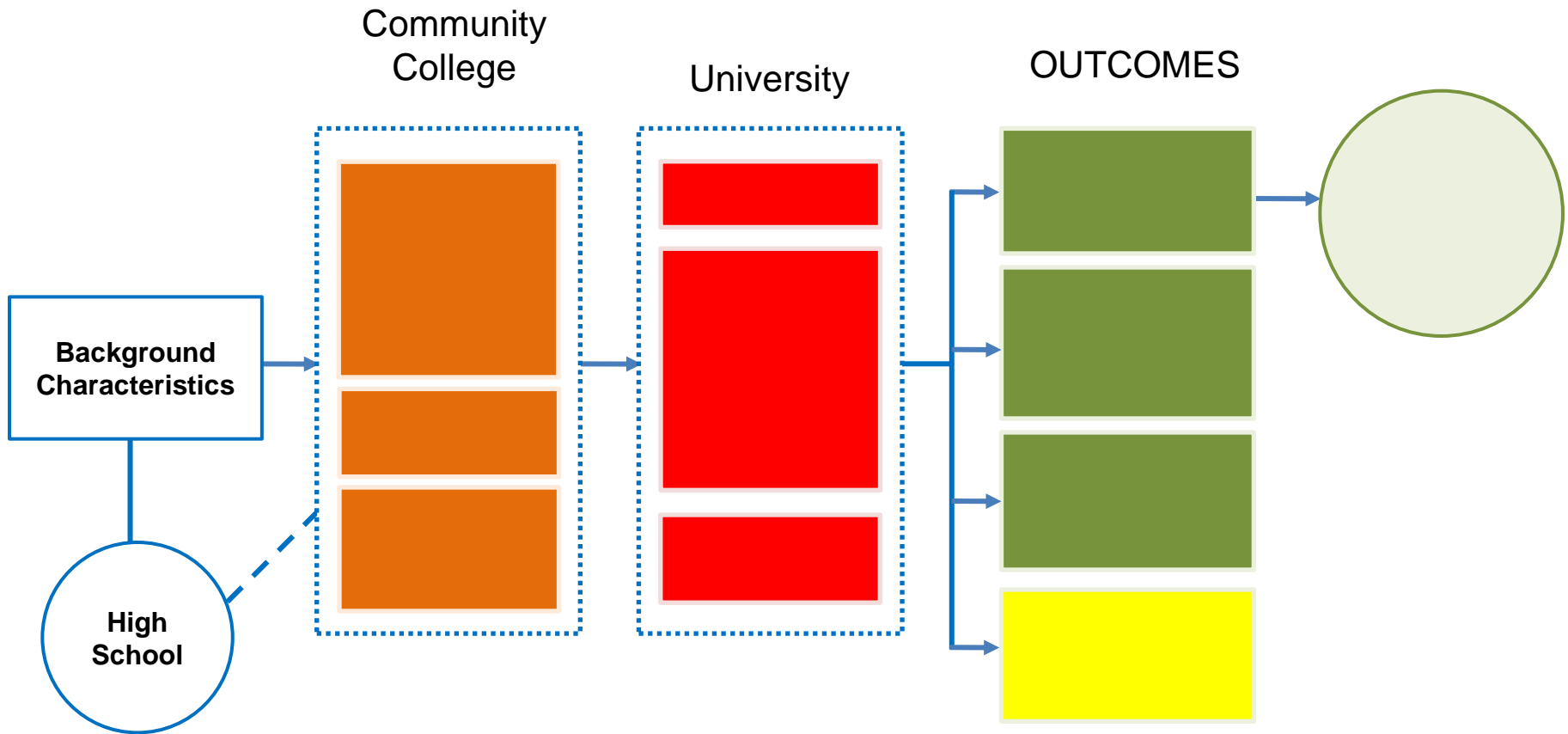
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Learning Activity

Instructions:

- Develop a conceptual model of your STEP project.
- Identify secondary data and other data collection strategies needed to measure your outcomes.
- Be prepared to report your results to the group.

Figure 1. Conceptual Model of your STEP Effect



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Sharing Session

- What issues emerged as a result of this learning activity?
- What did you learn?
- What steps do you plan to take from this workshop?
- What did you learn about developing a conceptual map?
- Other issues?

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