

IOWA STATE
UNIVERSITY

DMACC
DES MOINES AREA
COMMUNITY COLLEGE



NATIONAL SCIENCE FOUNDATION
STEM Talent Expansion Program (STEP)

STEM Student Enrollment and Engagement through Connections



ISU-DMACC External Advisory Board

November 29, 2011

Grant No. 0653236, July 2007–July 2012

STEM Student Enrollment and Engagement through Connections

Agenda

Welcome and team/board introductions

Project update

SEEC effect evaluation

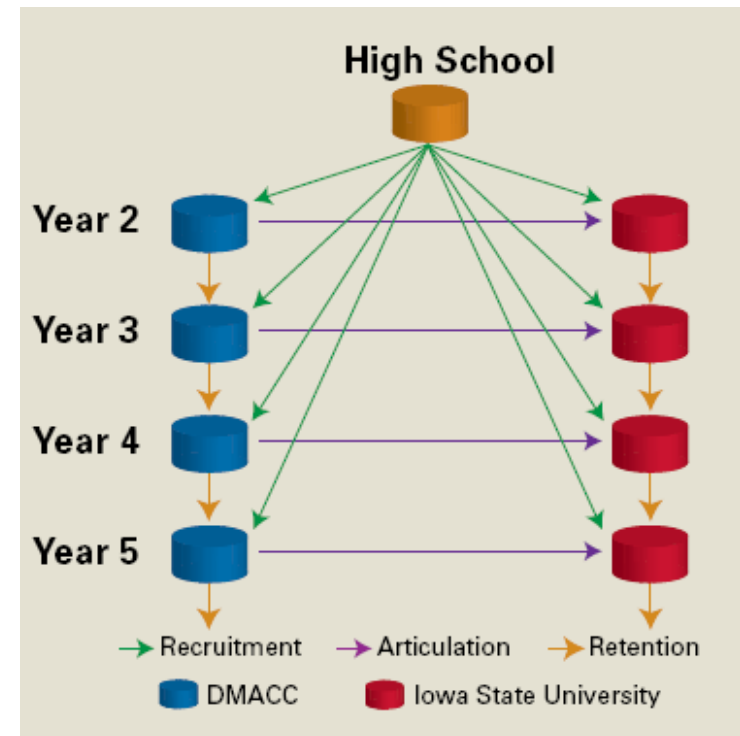
Discussion and feedback

STEM Student Enrollment and Engagement through Connections

Overall Grant Goal

Increase engineering graduates to 900, by approximately 100 per year.

- Increase the number of pre-engineering students at DMACC.
- Increase the percentages of women and minority students in engineering at ISU and DMACC.



STEM Student Enrollment and Engagement through Connections

NSF Third Year Review – Panel Feedback

- Activities are based on best practices.
- PIs have been quick to learn and adapt when things do not appear to be working as anticipated.
- Use of logic models for project planning is seen as an innovative strategy.
- Meaningful partnerships have been established.
- Partnership with DMACC has been strengthened and will ensure long-term impact.

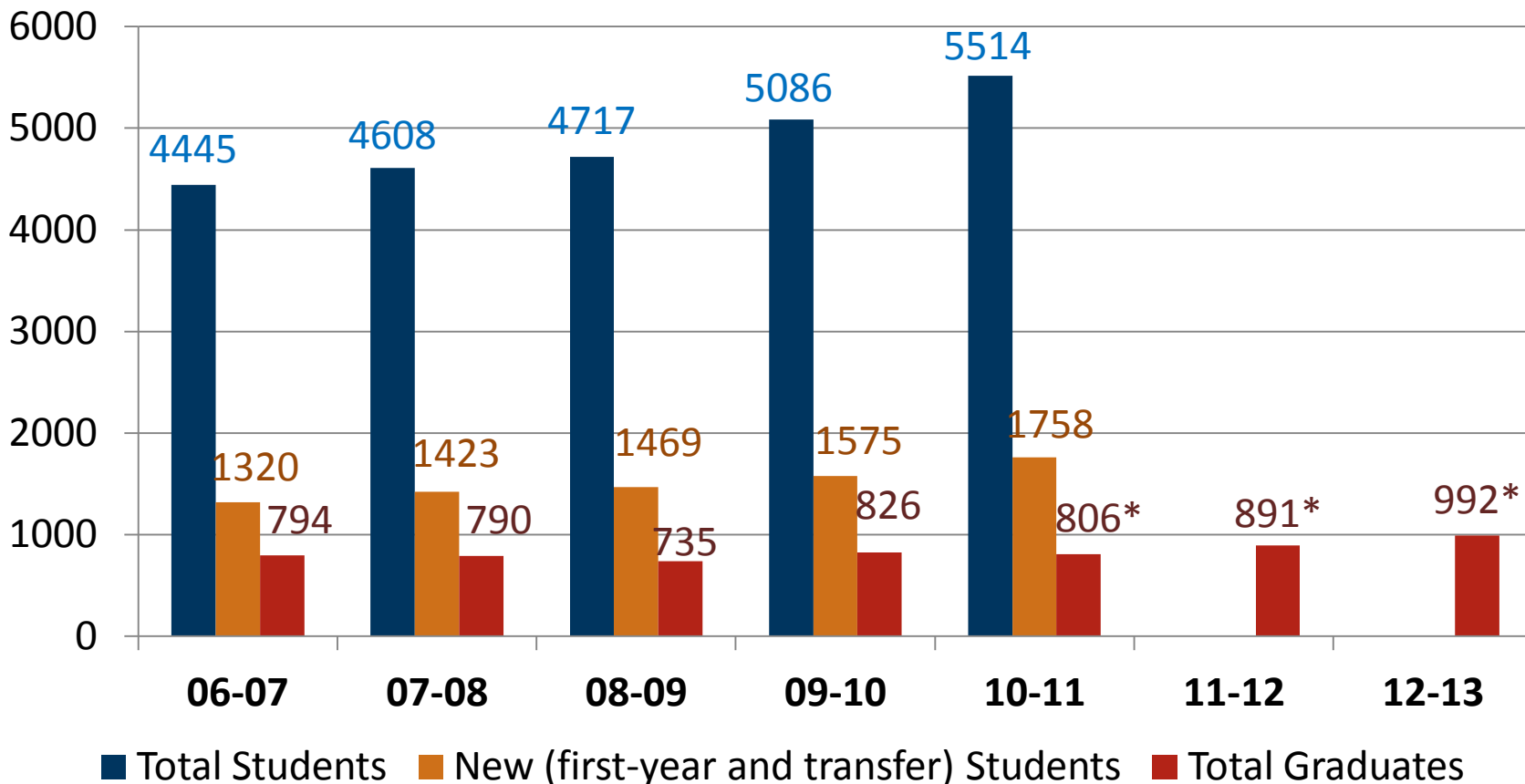
STEM Student Enrollment and Engagement through Connections

NSF Third Year Review – Panel Feedback

- Recommendations
 - RE: project evaluation
 - Explore ways to better measure and document the “SEEC Effect”.
 - RE: the percentage of women students in engineering at ISU
 - Pursue a strategy that is intellectually rigorous based on all available data.

STEM Student Enrollment and Engagement through Connections

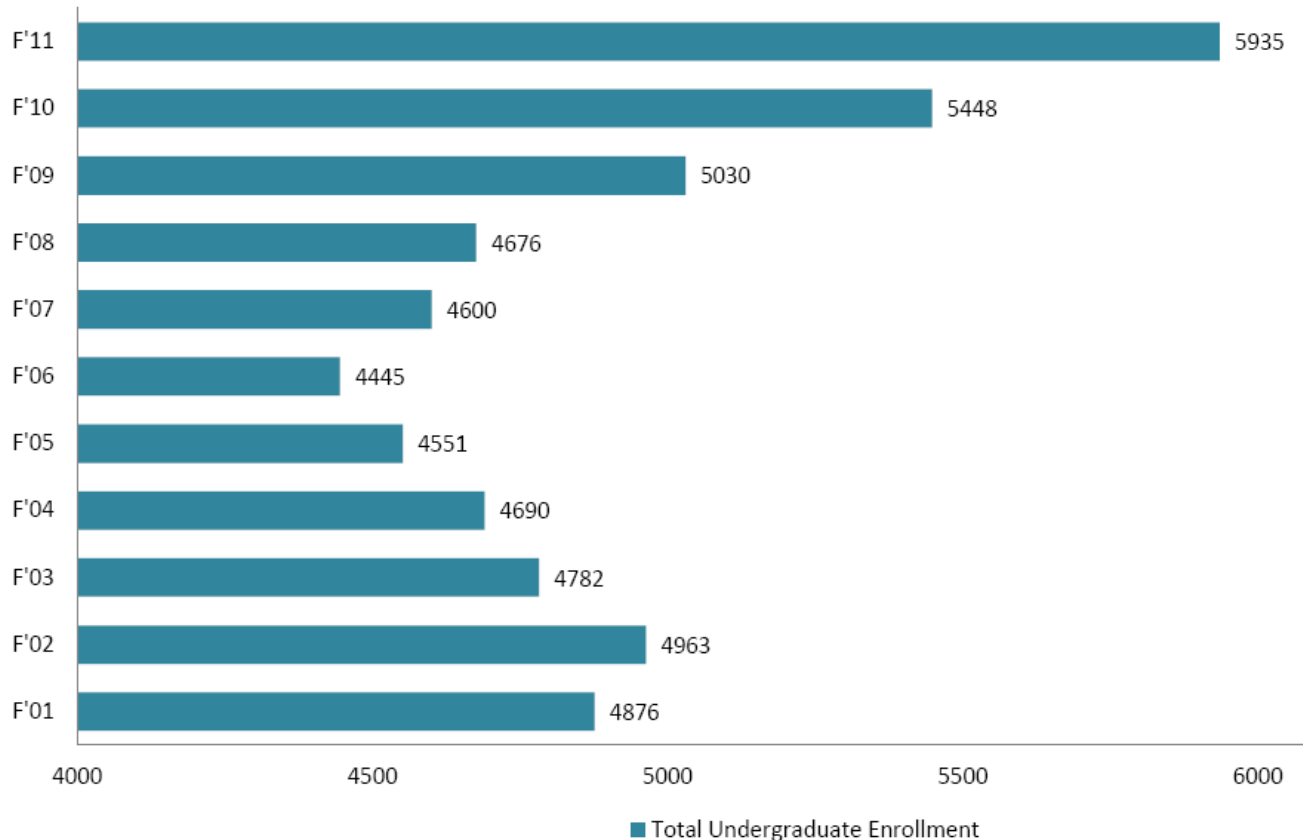
CoE Total Enrollment and Graduates



*Predicted – Based on Iowa State University Institutional Research

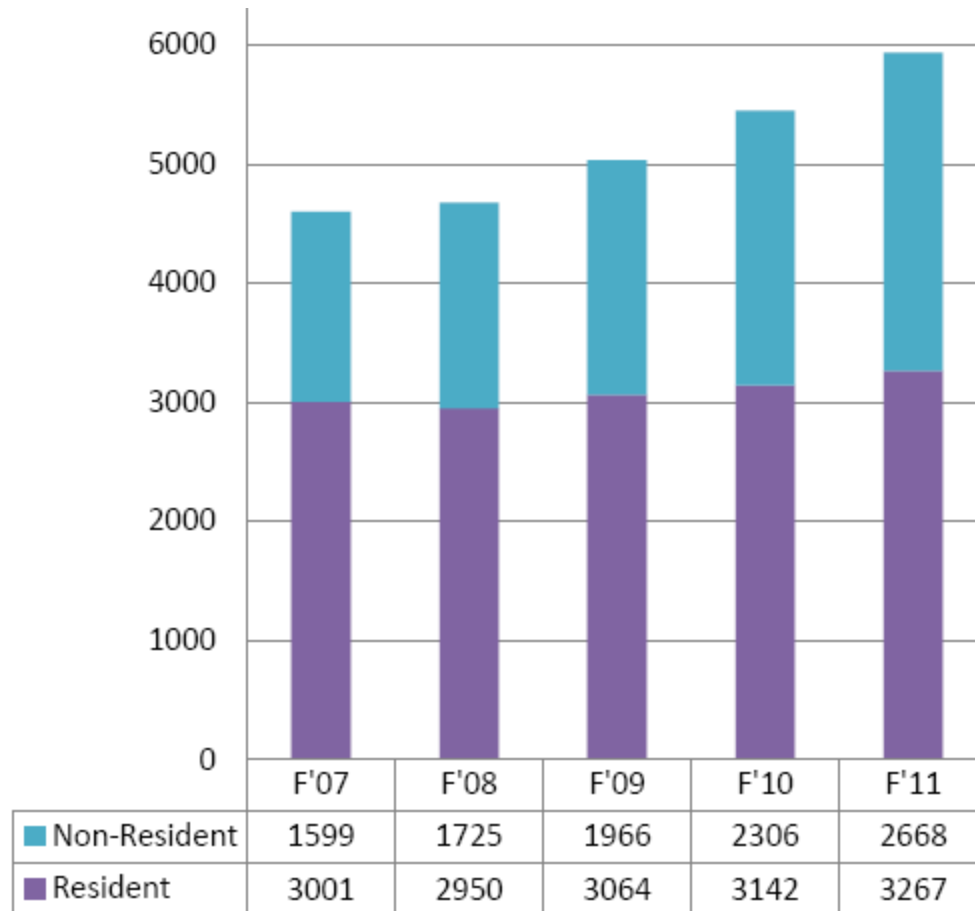
STEM Student Enrollment and Engagement through Connections

Engineering Undergraduate Enrollment (COE KPI)



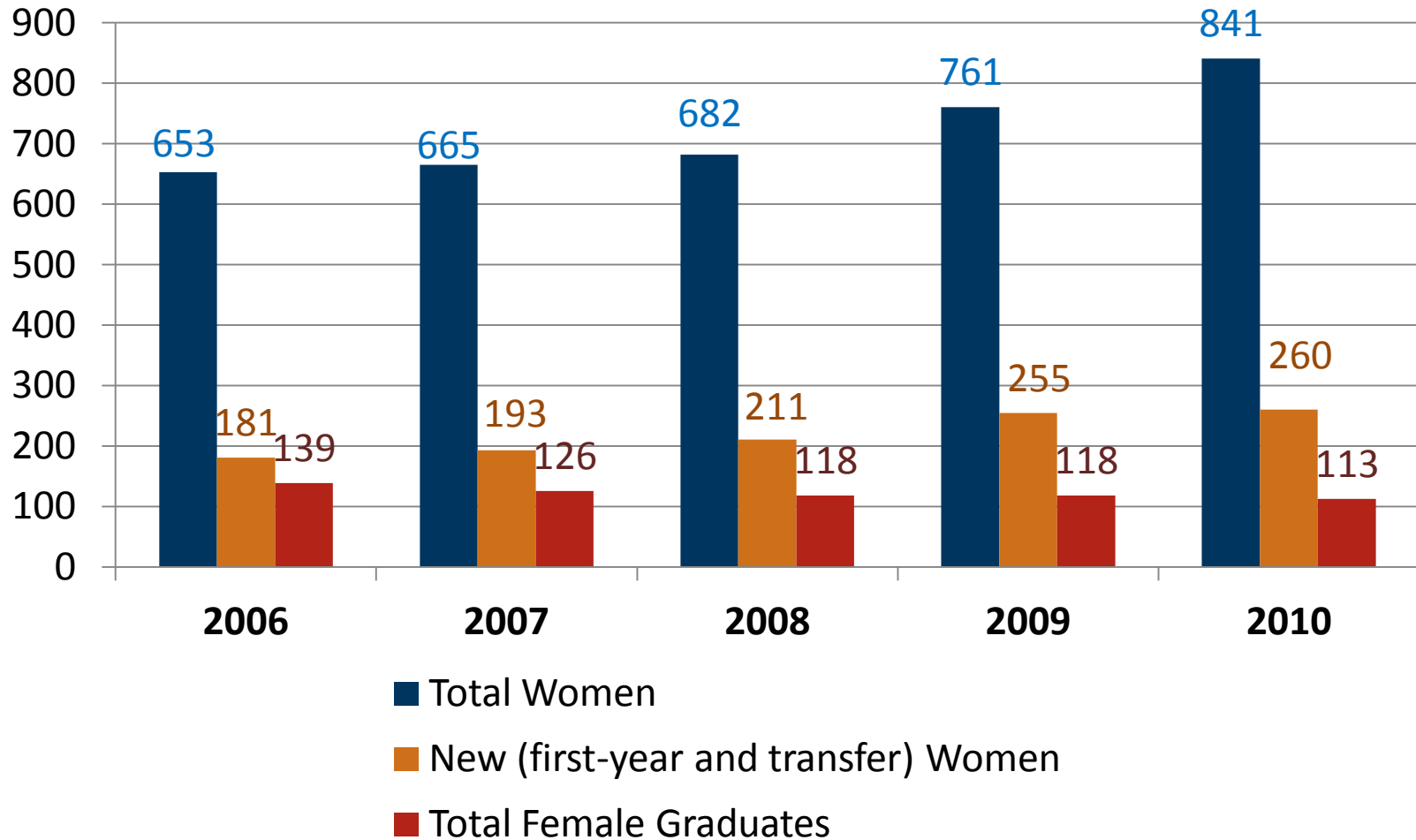
STEM Student Enrollment and Engagement through Connections

Engineering Undergraduate Enrollment (COE KPI)



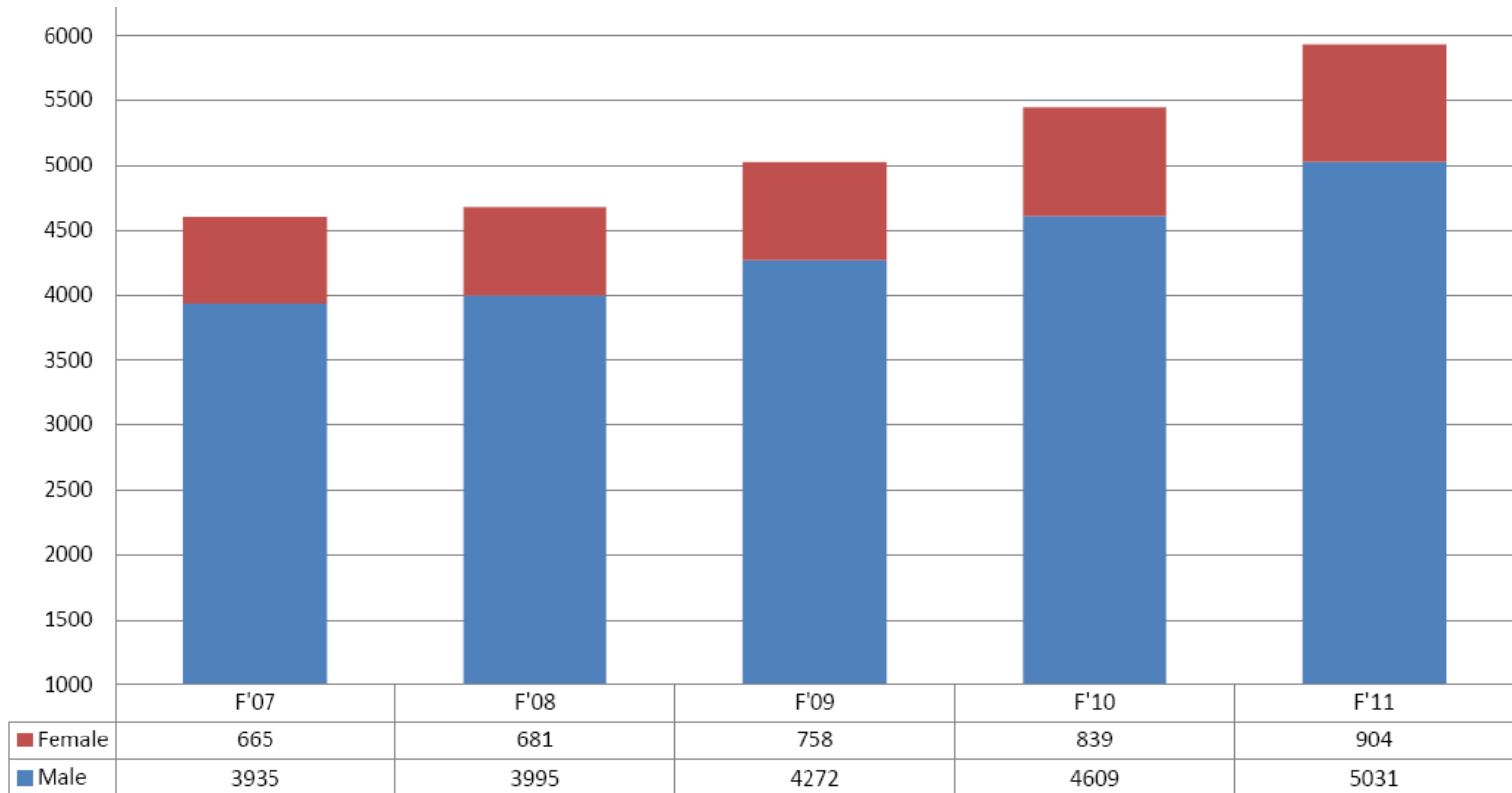
STEM Student Enrollment and Engagement through Connections

CoE Female Enrollment and Graduates



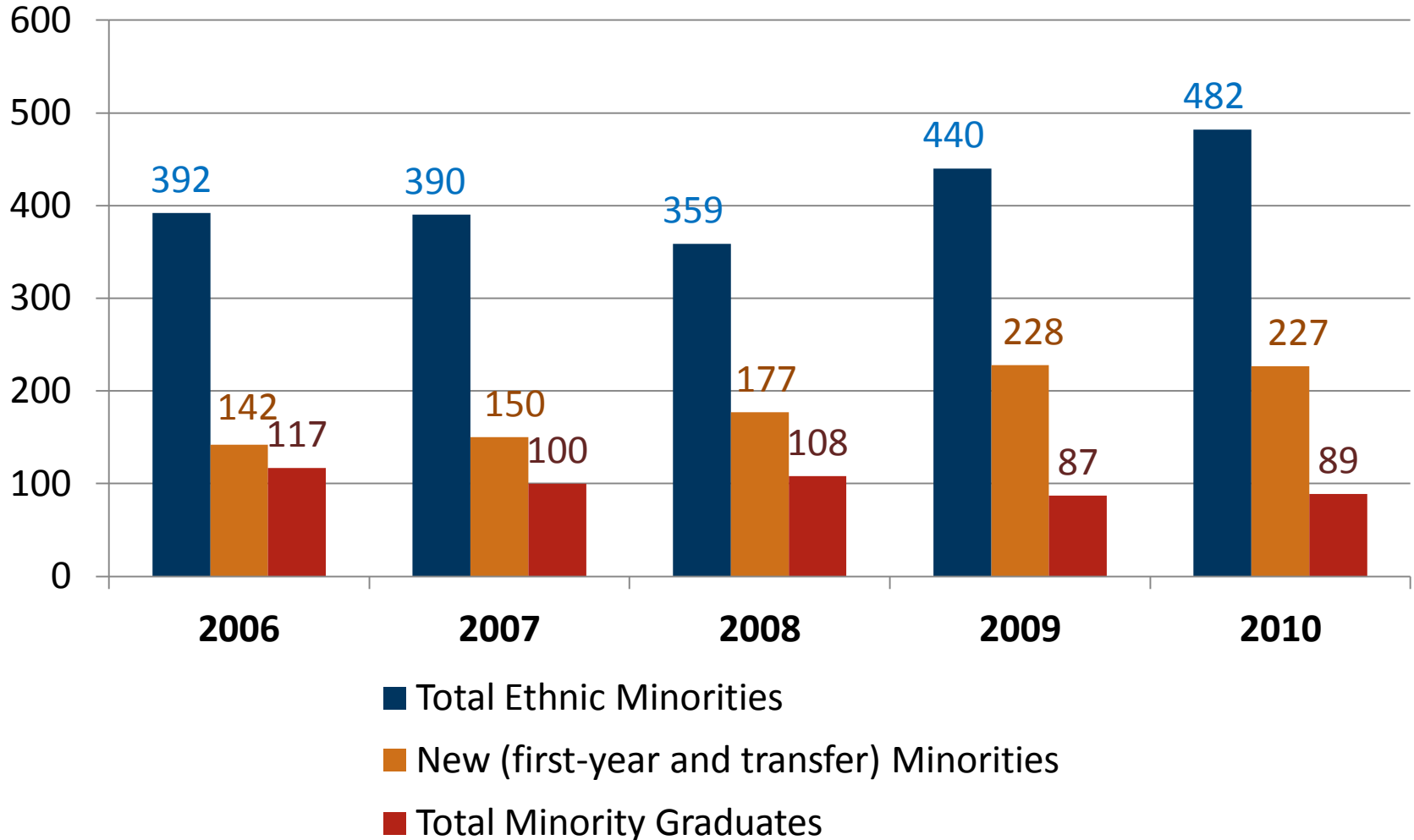
STEM Student Enrollment and Engagement through Connections

Engineering Undergraduate Enrollment (COE KPI)



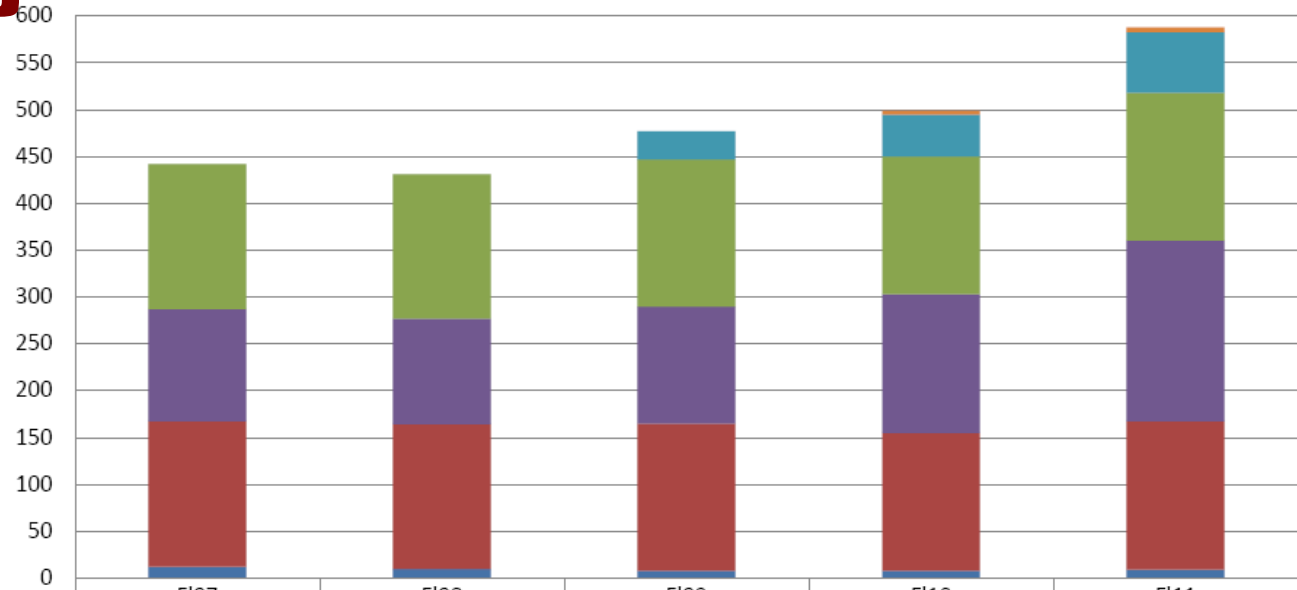
STEM Student Enrollment and Engagement through Connections

CoE Minority Student Enrollment and Graduates



STEM Student Enrollment and Engagement through Connections

Engineering Undergraduate Enrollment (COE KPI)

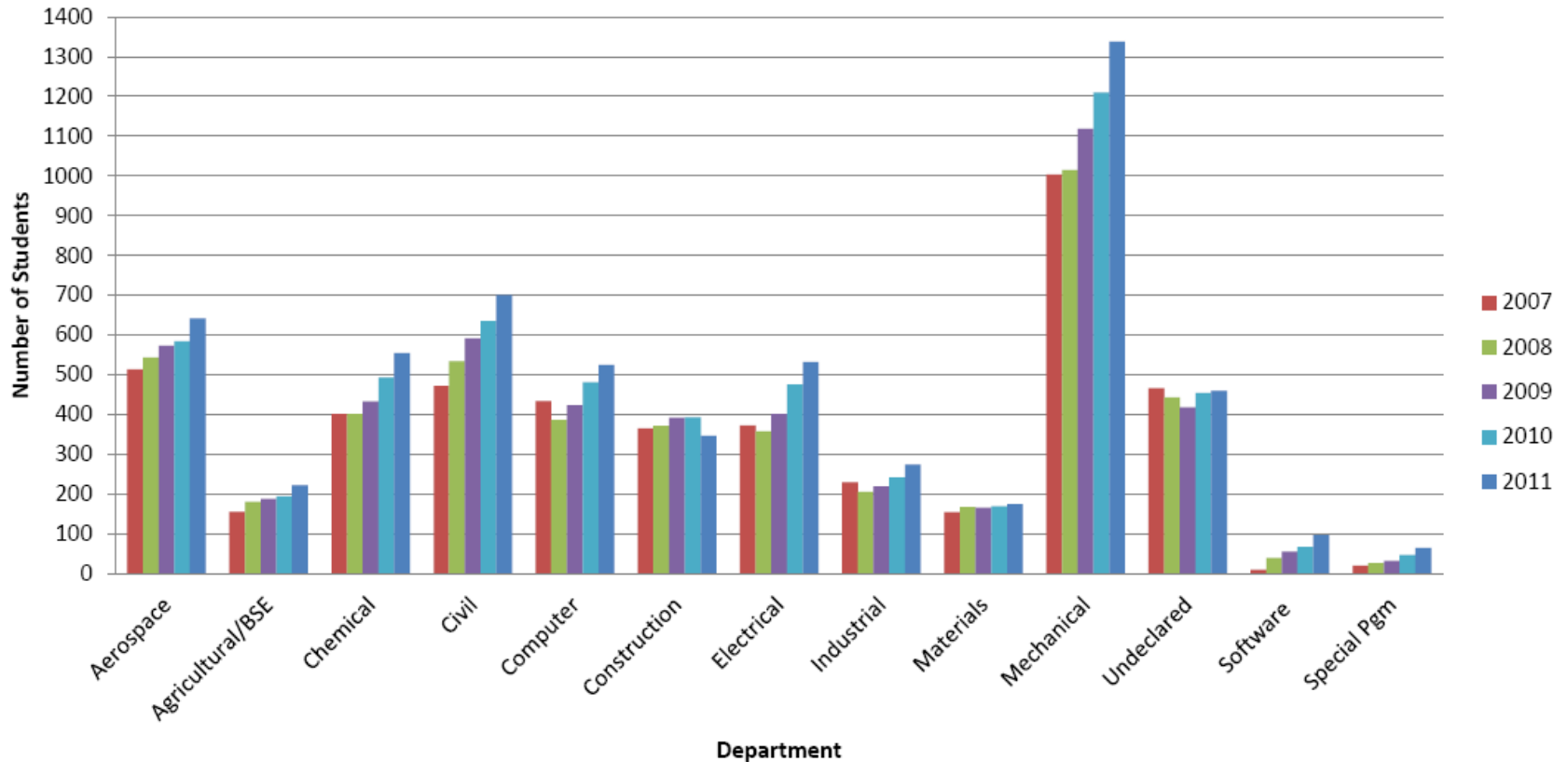


	F'07	F'08	F'09	F'10	F'11
Native Hawaiian			0	4	5
Multiracial			30	45	65
Asian American	155	154	157	147	158
Hispanic/Latino	120	113	125	148	193
African American	155	154	157	147	158
Am Indian/Alaskan Native	12	10	8	8	9

STEM Student Enrollment and Engagement through Connections

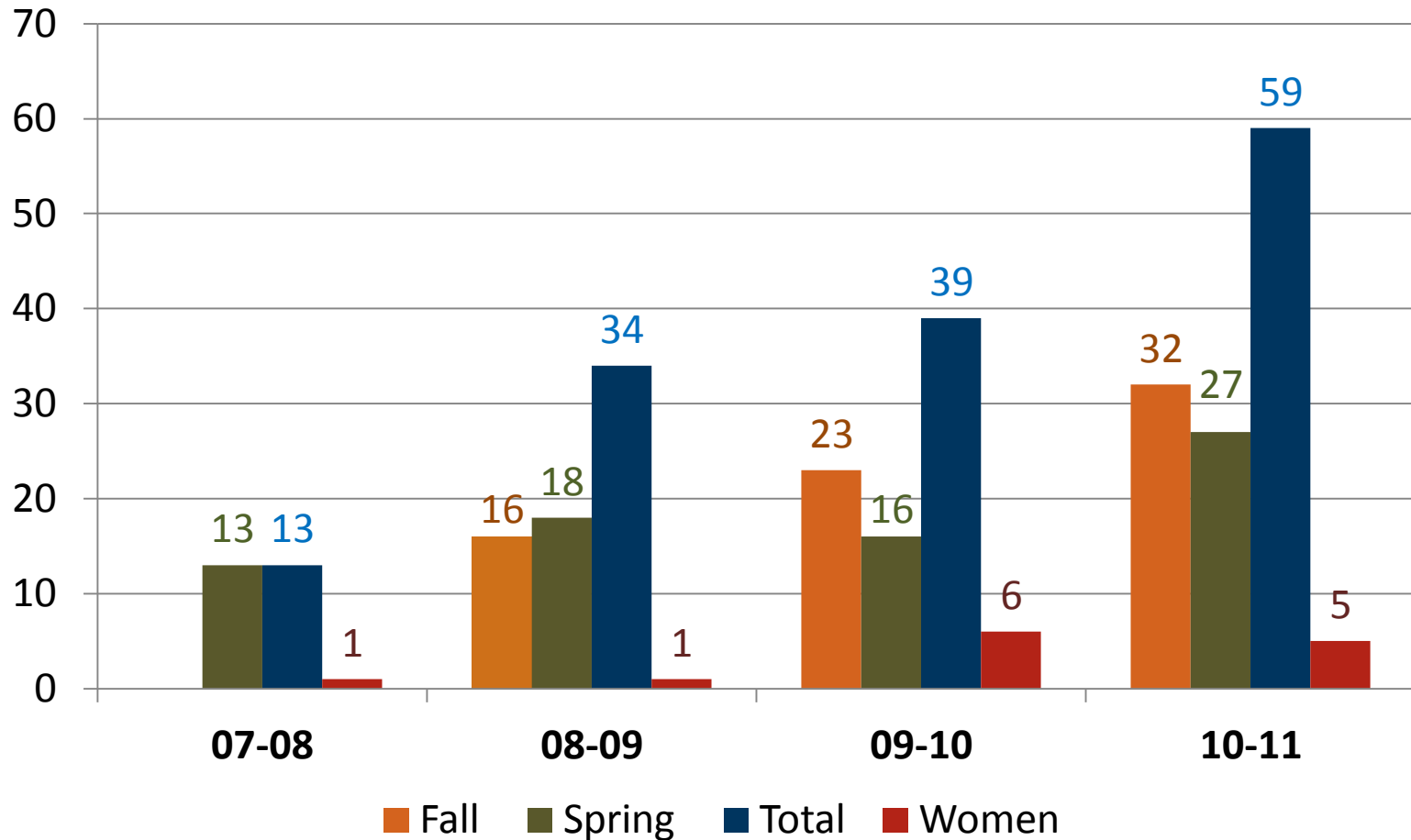
Engineering Undergraduate Enrollment (COE KPI)

Undergraduate Enrollment by Dept

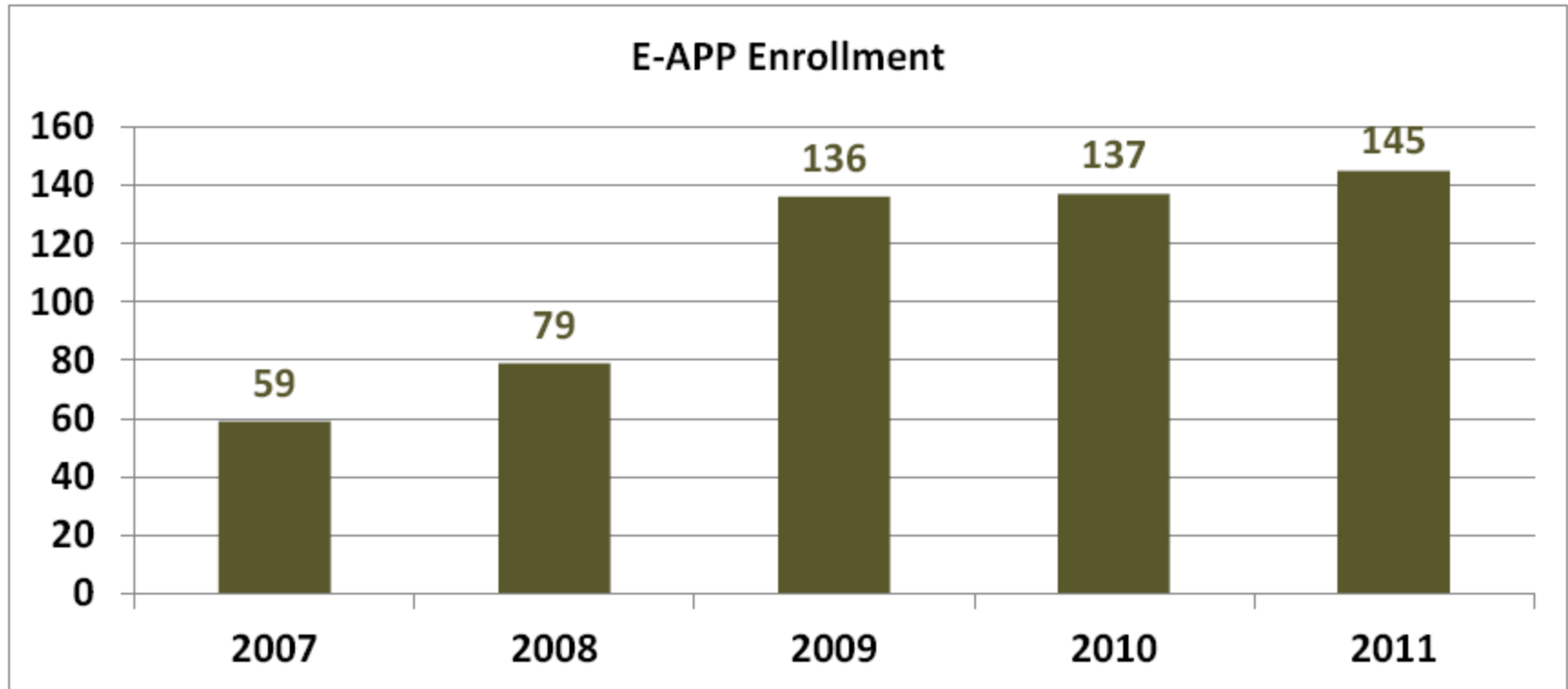


STEM Student Enrollment and Engagement through Connections

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



STEM Student Enrollment and Engagement through Connections



STEM Student Enrollment and Engagement through Connections

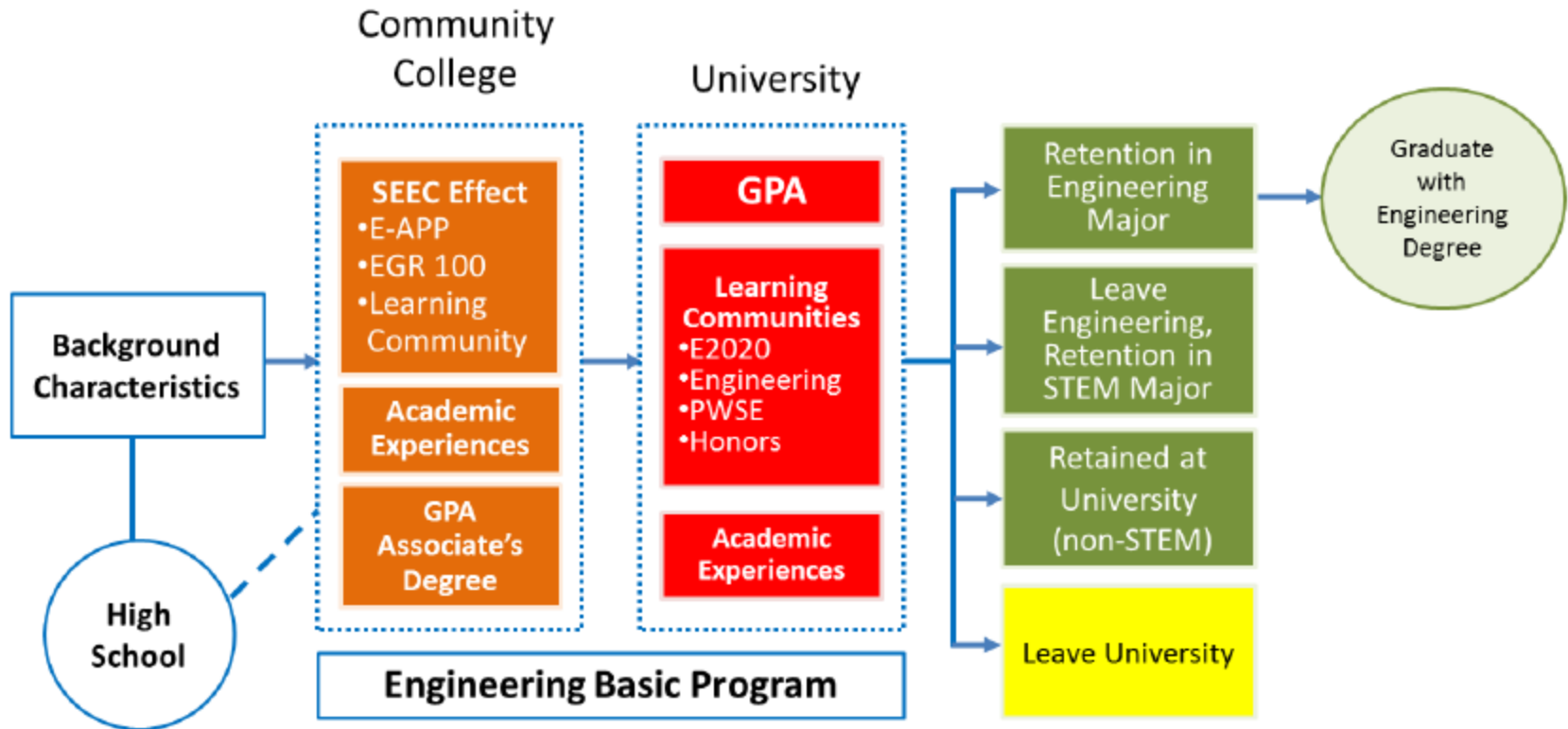
Highlights of Recent Activities

- a. DMACC Pre-engineering and Precollege Programs
- b. Transfer Student Data Analysis
- c. CySTEM (with ISU Extension)*
- d. E2020 Curriculum*
- e. “Changing the Conversation” about Engineering*
- f. Dissemination

* Informed by NAE research

STEM Student Enrollment and Engagement through Connections

The SEEC Effect on Transfer Student Success



Source: Laanan, F., Rover, D., Bruning, M., Mickelson, S., Shelley, M., & Darrow, M. (2011). Iowa State University. www.eng.iastate.edu/seec

STEM Student Enrollment and Engagement through Connections

Transfer Student Data Collection & Analysis

- E-APP participation and retention
- DMACC's EGR 100 enrollment
- 1-,2-, and 3-year retention in engineering at ISU
- Learning communities participation and retention
- Engineering Basic Program credits, course grades, and GPA at DMACC and ISU vs. retention
- ISU engineering graduation and placement data for transfer students

STEM Student Enrollment and Engagement through Connections

Outcomes by Admit Type

Admit Status	Fall 2002 - Fall 2009 data					
	First Fall GPA	First Year GPA	Transfer GPA	ENGR Retention after 1 year	ISU Retention after 1 year	N
Iowa CC transfer	2.31	2.42	3.06	66%	81%	1,011
Non-Iowa CC transfer	2.66	2.70	3.05	73%	82%	271
Four-year College transfer	2.75	2.86	3.04	70%	80%	714
High School Admit	2.72	2.78	3.46	74%	89%	9,065

STEM Student Enrollment and Engagement through Connections

Fall 2002 – Fall 2010 Engineering Admits

Admission Type	N	ISU Basic Program Grades			Math ACT Scores			High School GPA		
		Mean	SD	n	Mean	SD	n	Mean	SD	n
Iowa CC transfer	1,191	2.32	1.09	830	25.0	4.1	650	3.24	0.55	585
Non-IA CC transfer	355	2.72	0.99	254	25.3	4.5	89	3.34	0.48	122
Non-CC transfer	825	2.85	1.02	603	27.1	3.9	314	3.54	0.43	326
High School Admit	10,511	2.71	0.91	8,997	28.0	4.0	9,849	3.63	0.38	10,441

STEM Student Enrollment and Engagement through Connections

The Importance of Calculus

Iowa Community College Engineering Transfer Students, 2002-2005 ISU Entry Cohorts

Community College classes taken and transferred to ISU	ENGR Retention after 1 year	Earned ENGR Degree	ISU Retention after 1 year	Earned ISU Degree	n
Calculus I, Calculus II, & Physics I	77%	69%	88%	79%	166
Calculus I & Calculus II	75%	66%	87%	76%	248
Calculus I, but not Calculus II	61%	34%	80%	63%	70
Neither Calculus I nor Calculus II	45%	25%	69%	49%	136
AVERAGE	64%	49%	80%	65%	472

STEM Student Enrollment and Engagement through Connections

E-APP and Retention

SEEC EFFECT	All IA CC Admit Years 2008, 2009, 2010 Combined				
	Ret Engr, n	% Ret Engr	Ret ISU, n	% Ret ISU	Total, n
E-APP	62	73.8%	77	91.7%	84
Non E-APP	258	66.8%	313	81.1%	386

All IA CC % Participation in E-APP	
17.9%	E-APP
82.1%	Not E-APP

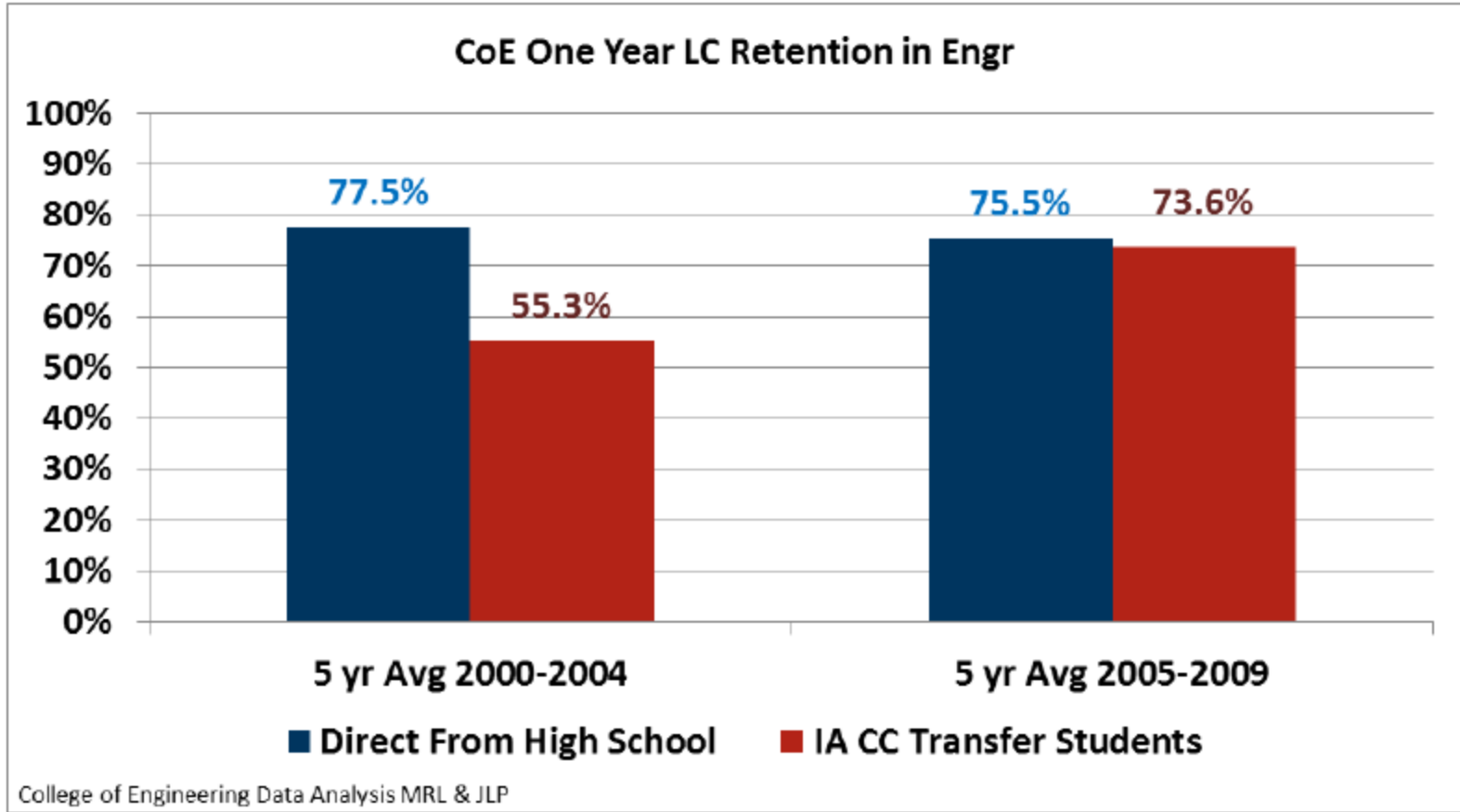
Significant Differences in Bold
One-Year Retention Rates 470

SEEC EFFECT	DMACC Admit Years 2008, 2009, 2010 Combined				
	Ret Engr, n	% Ret Engr	Ret ISU, n	% Ret ISU	Total
E-APP	40	76.9%	47	90.4%	52
Non E-APP	62	58.5%	81	76.4%	106

DMACC % Participation in E-APP	
32.9%	E-APP
67.1%	Not E-APP

Significant Differences in Bold
One-Year Retention Rates 158

STEM Student Enrollment and Engagement through Connections



STEM Student Enrollment and Engagement through Connections

Messaging/Advising

Targeted messaging to students based on student success data

- Focus on the Engineering Basic Program while at the community college.
- Join E-APP/APP.
- Meet with academic adviser(s).
- Set goals for grades and GPA.
- Visit Iowa State.
- Use transfer websites and plan ahead.
- Participate in a LC.
- Live on/near campus when at ISU.
- Make a transition during the first semester.

TIPS FOR TRANSFERRING

CHOOSING TO TRANSFER? Here are some tips to help ensure your transition from DMACC to ISU's College of Engineering goes as smoothly as possible.***

While at DMACC:

Join the FREE Engineering Admissions Partnership Program (E-APP) learning community. This pre-engineering community is designed to enrich your transition to Iowa State. Research has shown that students who participate in E-APP are retained at a significantly higher level compared to those who don't. Find out more at www.eng.iastate.edu/transfer/app and talk to your advisor about signing up.

GPA matters! Entrance into ISU's College of Engineering requires completion of the basic program – with a grade point average of 2.00 or better in the basic program courses.

Grades do, too! It's been shown that the Engineering Basic Program GPA and transfer GPA are the best indicators for retention in the engineering program. These minimum grades indicate future success:

- ⊗ in Calculus Coursework
- ⊗ in Physics
- ⊗ in Engineering Problem Solving

Take advantage of the Engineering Transfer Student Webpage. Found at www.eng.iastate.edu/transfer, this page features many useful links for students looking to join the engineering program at Iowa State.

Use TRANSIT. This is an ISU computer tool that will tell you how the courses you take at DMACC will transfer to Iowa State. Find it at <https://transit.iastate.edu>.

Visit Iowa State's campus. And while you're there, stop by your advisor's office.

Meet regularly with DMACC and ISU advisors. Connect early and often!

While at Iowa State:

Participate in a learning community (LC). Students who participate in a learning community at ISU are retained at a significantly higher level than those who don't. Multiple LC participation increases retention even more.

Live in Ames. Research has shown that engineering students who live in Ames have a much higher level of success than commuters.

Get into a study routine. And stick with it.

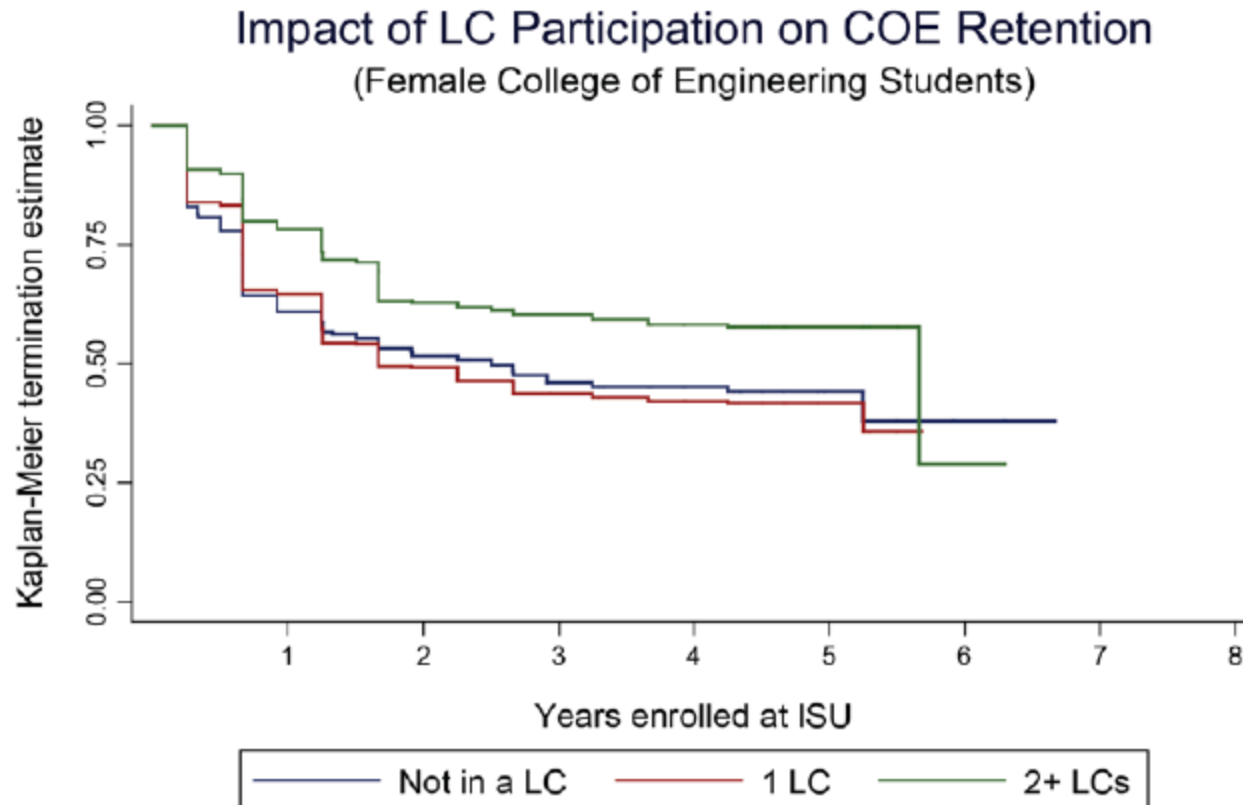
Prepare for your adjustment to Iowa State's College of Engineering:

- Take 12-15 credits your first semester at ISU.
- Get to know engineering faculty, staff and students. Don't be afraid to reach out to them!
- Access the academic, social and professional resources available to you.

***These tips are conclusions based on ongoing research from Iowa State University, National Science Foundation, SEEC Grant, Statistical Data 2011.

STEM Student Enrollment and Engagement through Connections

Multiple Learning Community Effect



Estimates from the longitudinal data show that female students in the College of Engineering who participate in two or more learning communities are retained at a much higher rate.

Source: 2011 SEEC Grant College of Engineering Retention Analysis
College of Engineering Data Analysis MRL & JLP

STEM Student Enrollment and Engagement through Connections

Transfer Student Diversity

New Transfer Students to the College of Engineering (Iowa State University)											
Summer/Fall 2007	Female	Male	American Indian	African American	Asian American	Caucasian	Hispanic	Multi-racial*	International	Unknown	Total
Des Moines Area Community College		31		2	2	23		-		4	31
Other Iowa Two-Year Transfer	4	72		2		70		-	2	2	76
Out of State Two-Year Transfer	4	22		1	1	12		-	11	1	26
Four-Year Transfers	8	65		1	1	40		-	27	4	73
Total	16	190		6	4	145		-	40	11	206
Summer/Fall 2008	Female	Male	American Indian	African American	Asian American	Caucasian	Hispanic	Multi-racial*	International	Unknown	Total
Des Moines Area Community College	7	35	1	2	2	34		-	1	2	42
Other Iowa Two-Year Transfer	3	76		1	1	71		-	1	5	79
Out of State Two-Year Transfer	4	21		1	1	10	1	-	11	1	25
Four-Year Transfers	12	57			2	37	2	-	25	3	69
Total	26	189	1	4	6	152	3	-	38	11	215
Summer/Fall 2009	Female	Male	American Indian	African American	Asian American	Caucasian	Hispanic	Multi-racial*	International	Unknown	Total
Des Moines Area Community College	3	44	1	5	2	34	1	1	2	1	47
Other Iowa Two-Year Transfer	4	84		1	1	80		1		5	88
Out of State Two-Year Transfer	5	21		4	1	14			7		26
Four-Year Transfers	20	71		3	2	35	1	1	45	4	91
Total	32	220	1	13	6	163	2	3	54	10	252
Summer/Fall 2010	Female	Male	American Indian	African American	Asian American	Caucasian	Hispanic	Multi-racial*	International	Unknown	Total
Des Moines Area Community College	3	44	1	3	3	35			4	1	47
Other Iowa Two Year Transfer	11	96	1		3	94	1	1	1	6	107
Out of State Two-Year Transfer	19	49		1	3	15	1	1	45	2	68
Four-Year Transfers	17	70		1	2	42	2		35	5	87
Total	50	259	2	5	11	186	4	2	85	14	309
Summer/Fall 2011	Female	Male	American Indian	African American	Asian American	Caucasian	Hispanic	Multi-racial*	International	Unknown	Total
Des Moines Area Community College	8	38		3	3	34	3		1	2	46
Other Iowa Two Year Transfer	9	90		3	3	82	3	1		7	99
Out of State Two-Year Transfer	12	38		1	2	18	1		27	1	50
Four-Year Transfers	16	92			4	50	3	1	47	3	108
Total	45	258		7	12	184	10	2	75	13	303

*Note: Multi-racial was not a category prior to Fall 09

Source: Registrar's Office, Iowa State University, Jonathan Compton, jcompton@iastate.edu, 515-294-4168

STEM Student Enrollment and Engagement through Connections

Transfer Student Diversity

Summer/Fall 2007	Female	Male	Total	
Des Moines Area Community College		31	31	0%
Other Iowa Two-Year Transfer	4	72	76	5.3%
Out of State Two-Year Transfer	4	22	26	15.4%
Four-Year Transfers	8	65	73	11%
Total	16	190	206	7.8%

Summer/Fall 2011	Female	Male	Total	
Des Moines Area Community College	8	38	46	17.4%
Other Iowa Two Year Transfer	9	90	99	9.1%
Out of State Two-Year Transfer	12	38	50	24%
Four-Year Transfers	16	92	108	14.8%
Total	45	258	303	14.9%

STEM Student Enrollment and Engagement through Connections

Year 5 and Beyond

- ISU-DMACC workshop to review data and best practices (advising, curriculum, etc.)
- Data analysis and data-driven actions/decisions
- Strategic planning and transition planning with campus partners
- Continued collaboration
 - Annual workshop between DMACC pre-engineering programs and ISU College of Engineering and Basic Program departments
 - Regular data sharing and reporting
 - NSF proposals and mutual programming

STEM Student Enrollment and Engagement through Connections

Discussion and Feedback

Relative to your background, experiences, and observations:

- a. What suggestions do you have to sustain successful project activities and outcomes?
- b. To what extent are SEEC project results transferrable to other 2-year and 4-year institutions?