

GOALS and STRATEGIES

Goals

- ◆ Improve Student Success
- ◆ Improve Teaching and Learning for 1st year STEM Courses

Challenges

- ◆ No common first-year curriculum among 16 undergraduate programs (other than technical writing, calculus, and general chemistry)
- ◆ Low historical Retention Rates (average over 2000–04)
 - 2nd Year Retention Rates = 58.7% to STEM
 - 3rd Year Retention Rates = 40.5% to STEM
 - 4th Year Retention Rates = 32.6% to STEM
- ◆ Diverse academic background of entering 1st-time, 1st year CEAS students as demonstrated by 1st semester Math Placement



CEAS Dean Tony Vizzini with 2009-10 STEP students at reception before the 2010 Engineers Week Dinner

Strategies



CEAS faculty and 2008 STEP students in bowling outing in March 2009

- ◆ Placed 278 students into learning communities in 2005-06, 314 students in 2006-07, and 359 students in 2007-08, 457 in 2008-09, and 349 CEAS students in 2009-10
- ◆ Learning Communities: place ~20 students in the same 3-to-5 courses together to promote connection and study groups
- ◆ Learning Communities based on majors (Civil and Construction Engineering, Electrical and Computer Engineering, Chemical/Paper, Undecided) or math

◆ Examples of Learning Community Course Clusters:

- Civil and Construction Engineering: Tech. Communication, Engr. Graphics, Intro to Design, Geosciences, Math (Calculus, Pre-Calculus, Algebra II)
- Chemical Engineering: Tech. Communication, Chemistry I, Intro. to Chemical Engr., Math (Calculus, Pre-Calculus)
- Electrical and Computer Engineering: Tech. Communication, Digital Logic, Chemistry I, Math (Calculus, Pre-Calculus)
- Undecided: Tech. Communication, Intro to Design, Math (Calculus, Pre-Calculus, Algebra II), and Chemistry (Calc/Pre-Calc)
- Math: Tech. Communication, Engr. Graphics, Math (Calculus, Pre-Calculus, Algebra II), and Chemistry (Calc/Pre-Calc) or Intro to Engr. Design (Algebra II)

◆ Mentored by faculty – preferably in an anchor class

- ◆ Content tutoring during evenings and weekends that supplements tutoring provided by math, chemistry, and physics
- ◆ Faculty Learning Community meeting once a month to discuss reading, coordinate co-curricular activities, share and discuss mentoring strategies
- ◆ Created parent program in 2007-08 to engage parents

◆ Revision of 1st Year STEM Courses

- Chemistry I: move one chapter to Chemistry II; added seminar on study skills and math skills for chemistry
- Technical Communication: added career development as a theme for writing assignments
- Math/Chemistry collaboration to develop a set of 40 problems based on Chemistry I concepts for Algebra II



Students enrolled in ENGR 1001 in Fall 2009 designed and built test stand for Science Olympiad elevated-bridge competition

RESULTS

2nd, 3rd, 4th, and 5th Year Retention Rates

Students enrolled in ENGR 1001 in Fall 2009 competed in catapult and poster presentation



CSDRE ¹	WMU Baseline ²	Retention	2005 (262)	2006 (303)	2007 (306)	2008 (354)
69	57.4	2 nd Year (%)	68.0	70.1	66.3	67.5
53	42.3	3 rd Year (%)	54.3	52.8	52.0	
NA	32.7	4 th Year (%)	44.5	48.8 ⁵		
40.7 ³	32.0	5 th Year (%)	44.6 ⁵			

¹For all institutions, 2005-2006

²Averaged 2000-2004

³37.4% graduated in a STEM field in 6 years +3.3% continued in 7th year

⁴35.1% continued in 5th year

+9.5% graduated with CEAS degree

⁵48.8% returned to CEAS in Year 4 +2% graduated with CEAS degrees

Associate Dean Dr. Edmund Tsang worked with first-year students in composing e-mails during Academic Etiquette competition in Fall Welcome 2009



IMPACT and CHALLENGES

Institutional Policy

- ◆ Increased collaboration between academics and student life and Vice President of Student Affairs joined the STEP Advisory Board
- ◆ STEP In-semester Progress Report success has led to the adoption of University wide mid-term grade reporting policy
- ◆ Students allowing parental access to academic records allows STEP-PI to enlist the parents' assistance to support student success
- ◆ Tutoring Center changed to "Student Success Center" in 2008 to reduce stigma
- ◆ WMU is a partner of a multi-institutional effort to improve mathematics education for engineering students - funded by NSF-CCLI Phase 3 project
- ◆ WMU is a partner of Michigan-Louis Stokes Alliance for Minority Participation funded by NSF-LSAMP
- ◆ Engineering House created in 2006 and continues to grow



WMU President Dr. John Dunn joined CEAS faculty and students at Geek Game in April 2009

Continuing Work

- ◆ Faculty Protocol to engage Residence Life to check on students who miss successive classes revised based on feedback from pilot program in Fall 2008; revised protocol implemented in Fall 2009 in a course with large enrollment (80-125 per section)
- ◆ Build relations with departments to create customized learning communities
- ◆ Raise awareness among faculty about the Millennial students and faculty role in student success
- ◆ Address critical engineering science classes to improve 3rd year retention
- ◆ Active collaboration with Residence life to support student development in affective and cognitive domain
- ◆ Special Housing Option for returning Sophomores and Transfer students