Create Learning Communities to Enhance Success for Students with Diverse Academic Preparation Background

Edmund Tsang
College of Engineering & Applied Sciences

Cynthia Halderson
SAMPI

Western Michigan University

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Overview

- The Challenges
- Strategies in Creating Learning Communities
- Some Preliminary Results
- Impact on Institutional Policies

The Challenge

- Diverse academic preparation of 1st-time, 1st-year CEAS students

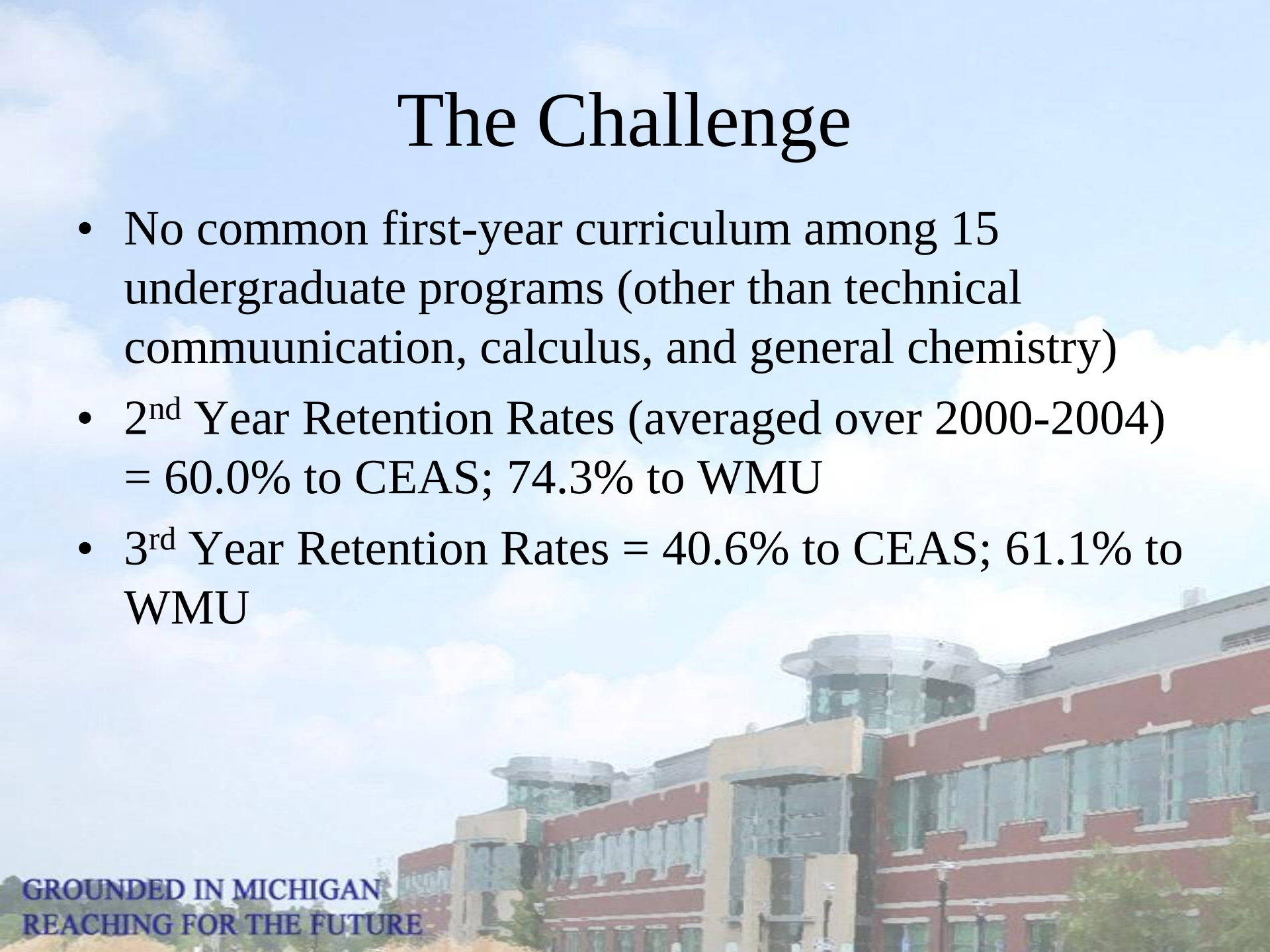
First-Semester Math Placement

Year	Calc. II/ Higher	Calc. I	Pre-Calculus	Algebra II	Algebra I/ Lower	No MATH
2005	9.7	31.5	24.9	23.4	7.0	3.5
2006	5.4	35.3	31.0	17.7	10.3	0.3
2007	5.1	42.7	31.1	13.7	7.2	0.3
2008	5.1	39.2	29.8	18.9	5.9	1.0

	2005	2006	2007
First in Family to Attend College (%)	28	32	26
Work Part-Time (%)	35	30	29

The Challenge

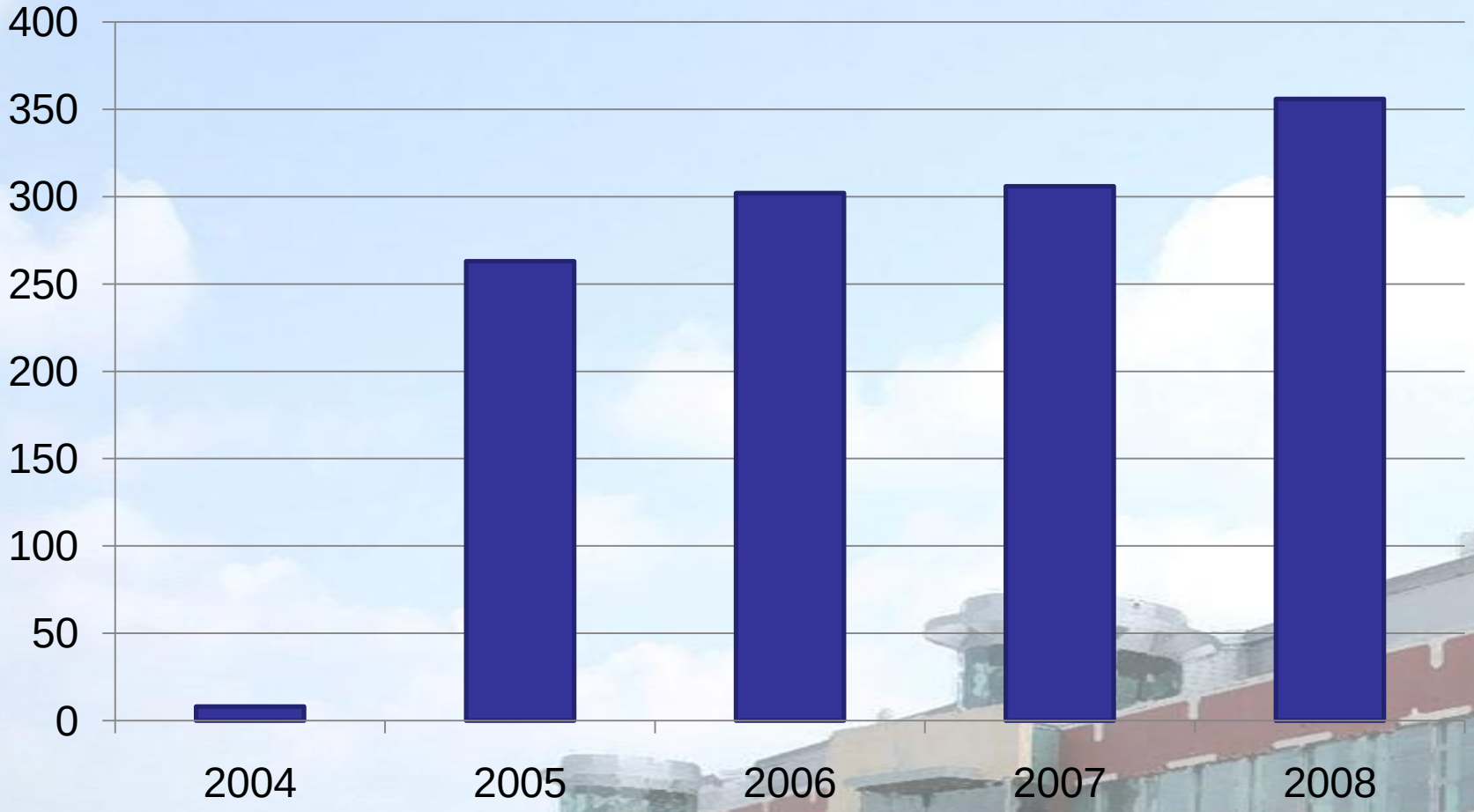
- No common first-year curriculum among 15 undergraduate programs (other than technical commuunication, calculus, and general chemistry)
- 2nd Year Retention Rates (averaged over 2000-2004) = 60.0% to CEAS; 74.3% to WMU
- 3rd Year Retention Rates = 40.6% to CEAS; 61.1% to WMU



Components of FYEE -LC

- Learning Communities: place ~20 students in the same 3-to-5 courses together to promote connection and study groups
- Learning Communities based on majors (CCE, ECE, Chemical/Paper, Undecided) or math placement (calculus, pre-calculus, algebra)
- Mentored by faculty – preferably in an anchor class
- Influenced by UTEP's Circles of Learning for Entering Students (CircLES) program

No. of Students Involved



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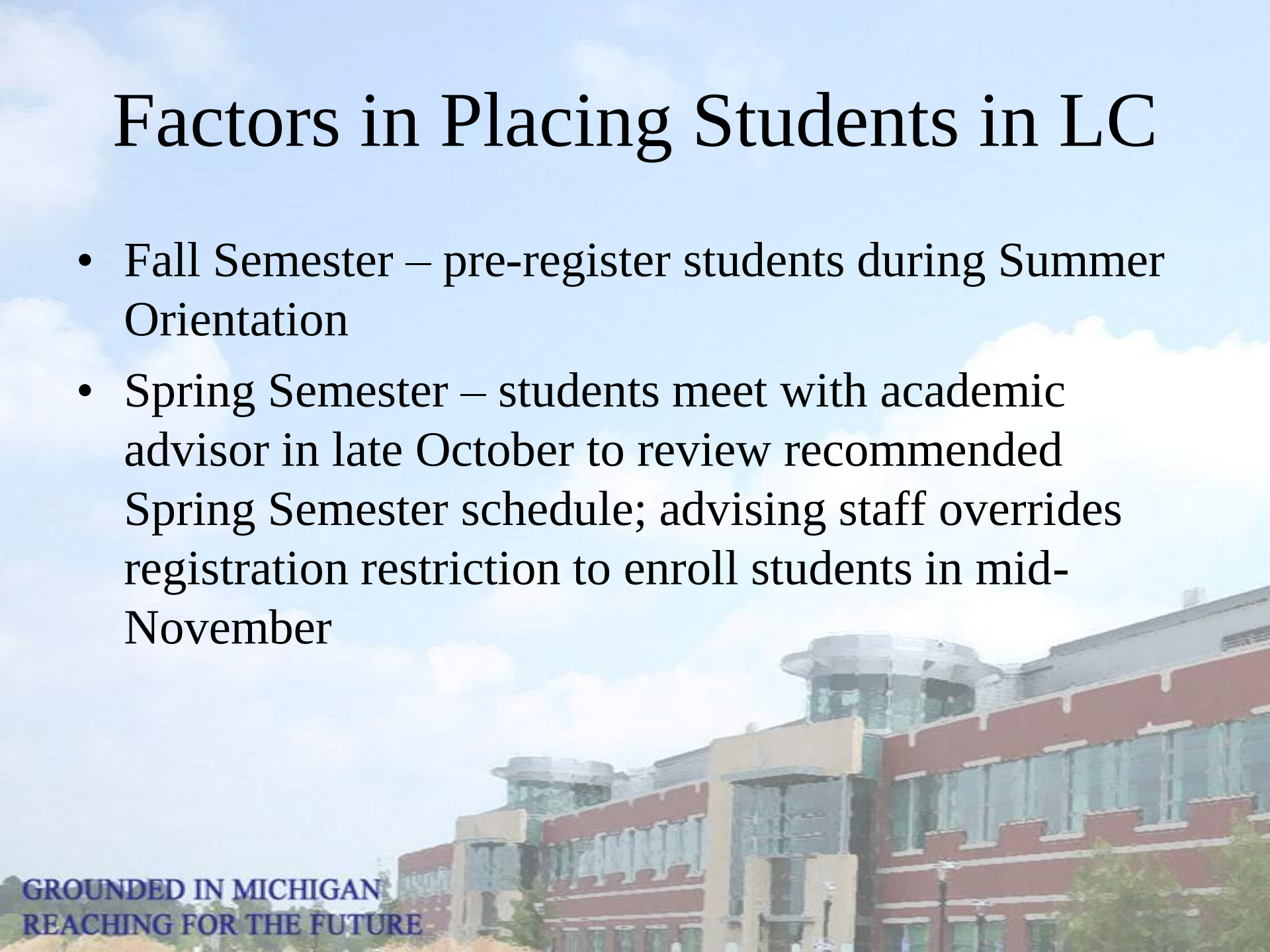
Factors in Creating LC

- Section size for Technical Communication, Engineering Graphics, Chemistry I Lab – 24; Math section size -- 40
- Select seats from multiple sections spread across meeting times
- Good communication between CEAS, Math, Chemistry, and Physics
- For Fall Semester → request seats in early February
- For Spring Semester → request seats in early October

Factors in Placing Students in LC

- Fall Semester – pre-register students during Summer Orientation
- Spring Semester – students meet with academic advisor in late October to review recommended Spring Semester schedule; advising staff overrides registration restriction to enroll students in mid-November



Examples of LC Course Clusters

Learning Community	Fall Semester	Spring Semester
Civil & Construction Engineering	• Technical Comm. • Engineering Graphics • Geoscience • Intro. to Engr. Design • Math (Calculus I, Pre-Calculus, Algebra)	• Chemistry I & Lab • Intro. to Engr. Analysis • Calculus II + Physics + Programming, or • Calculus I + Programming , or + General Education • Pre-Calculus + 2 General Education
Chemical Engineering	• Technical Comm. • Chemistry I & Lab • Intro. to Chem. Engr. • Math (Calculus I, Pre-Calculus) • General Education	• Chemistry II & Lab • Intro. to Chem. Engr. Computation • Calculus II + Physics I, or • Calculus I + General Ed

Examples of LC Course Clusters

Learning Community	Fall Semester	Spring Semester
Electrical & Computer Engineering	• Technical Comm. • Digital Logic • Chemistry I & Lab • Math (Calculus I, Pre-Calculus, Algebra) • General Education	• Computer Science I • Calculus II + Physics + General Education, or • Calculus I + 2 General Education • Engr Graphics (EE only)
Computer Science	• Technical Comm. • Computer Science I • Math (Calculus I, Pre-Calculus) • General Education	• Computer Science II • Digital Logic • Calculus II + General Education, or • Calculus I + General Ed
Aeronautical Engineering	• Technical Comm. • Chemistry I & Lab • Math (Calculus I/Pre-Calc) • Computer Programming • General Education	• Intro. to Aero. Engr. • Calculus II + Physics I + General Education, or • Calculus I + 2 General Education

Examples of LC Course Clusters

Learning Community	Fall Semester	Spring Semester
Calculus I (mostly ME and Engineering Technology students)	• Technical Comm. • Chemistry I & Lab • Calculus I • Engineering Graphics • General Education	<u>Mechanical Engineering</u> • Calculus II • Physics I (Calculus) • Materials Science • Computer Programming • General Education
		<u>Engr. Technology</u> • Intro. to Manufacturing • Physics I (Algebra) • Automotive in Society • Computer Programming • General Education

Examples of LC Course Clusters

Learning Community	Fall Semester	Spring Semester
Pre-Calculus (mostly ME and Engineering Technology students)	• Technical Comm. • Chemistry I & Lab • Pre-Calculus • Engineering Graphics • General Education	<u>Mechanical Engineering</u> • Calculus I • Process & Materials in Manufacturing • Computer Programming • General Education
		<u>Engr. Technology</u> • Intro. to Manufacturing • Physics I (Algebra) • Automotive in Society • Computer Programming • General Education

Examples of LC Course Clusters

Learning Community	Fall Semester	Spring Semester
Algebra II	• Technical Comm. • Algebra II • Intro. to Engr. Design • Engineering Graphics if AE, ME, EE, ET • General Education	• Pre-Calculus • Chemistry I & Lab <u>Mechanical Engineering</u> • Process & Materials in Manufacturing • General Education <u>Engr. Technology</u> • Intro. to Manufacturing • Physics I (Algebra) • Automotive in Society • General Education <u>Electrical Engineering</u> • Digital Logic • General Education

Other Components of FYEE-LC

- Content tutoring on evenings and weekends that supplement tutoring provided by math, chemistry, and physics
- Co-curricular activities (academic/professional and social) to explore career, CEAS, WMU, and self
- Created new learning community for students placed into Algebra I and lower in 2006-07, 2007-08, 2008-09
- Revision of 1st Year STEM Courses (Chemistry I, Technical Communication, Algebra II)

Other Components of FYEE-LC

- 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 the helicopter parents
- Created resources on student success in Podcasting format
- Created pilot engineering residence program in 2006-07 with 41 students;118 students in 2007-08; 178 students in 2008-09
- http://www.wmich.edu/step

Some Preliminary Results

- % of Positive Responses to FYEE Components (Agree or Strongly Agree)

Item	2005	2006	2007
I know at least 6 other LC students	87	78	79
I have studies with other LC students	74	63	73
I check my WMU email account daily	79	77	79
I know where to get tutoring for core classes	54	54	70
I have used a tutor for one or more core classes	32	44	31

Some Preliminary Results

- 2nd, 3rd, and 4thYear Retention Rates

		2nd Year (%)		3rd Year (%)[1]		4th Year (%)[2]	
		FYEE	Comparison	FYEE	Comparison	FYEE	Comparison
Retention to CEAS	2005	**68.0**	60.0	**54.3**	40.6	**44.5**	32.6
	2006	**70.1**	60.0	**53.0**	40.6		
	2007	66.3	60.0				
Retention to WMU	2005	76.2	74.3	**69.5**	61.1	**63.1**	55.1
	2006	77.9	74.3	66.2	61.1		
	2007	75.2	74.3				

Bold: Significant at the α=0.05 level

[1]The comparison is CEAS 5-year average (2000-2004) retention rate

[2]The comparison is CSRDE-WMU STEM Survey (2000-2003)

Impact on Institutional Policies

- In-semester progress reports from instructors → mid-term grade reporting in 2006
- Student release form → software that allows students to grant access to registration and grade records to parents in 2007
- Increased collaboration between academics and student life → V.P. of Student Life on Advisory Board in 2007

Concluding Remarks

- Have built relations with departments to create customized learning communities
- Have built relations with Residence Life to create protocol to intervene when students missed classes
- Raised awareness among faculty about the Millennial students and faculty role in student success
- “High Touch” led to student success and improved retention
- Need to address critical engineering science classes to improve 3rd year retention

Acknowledgment

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