Annual Meeting of National Engineering Mathematics Consortium June 2013

Western Michigan University Project Team

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Presentation Overview

- Project implementation at WMU
- Findings
- Path Forward
- Conclusion

Implementation Timeline

- Fall 2007: Visit by Dr. Nathan W. Klingbeil to WMU
- 2008-09: Curriculum development; HSIRB approved
- 2009-11: Implemented ENGR 1990
  - Taught by a board-appointed faculty member
  - ENGR 1990 anchor class of STEP cohort for Precalculus MAE/ECE majors
  - ENGR 1990 students also enrolled in Precalculus and General Chemistry I
  - Presented findings to CEAS Executive Committee
- 2011-12: Revised ENGR 1990 into a "blended" course
  - Motivated by budget cut
  - Created modules using lecture-capture-in-studio
  - Built eLearning
- 2012-13: Implemented revised ENGR 1990
  - Students viewed modules prior to class
  - Class led by student assistant; focus on problem solving

Findings: 2009-11

Performance comparison - MATH 1180 and CHEM 1100/1110

- ENGR 1990 students have a statistically significant ($\alpha<0.05$) higher successful completion rate in MATH 1180 (grades =/> C)

Semester	No of Students	ENGR 1990	Comparison
Fall 2009	16	66.7%	28.0%
Fall 2010	25	80.0%	42.8%

- No statistically significant difference in CHEM 1100/1110
- Successful completion rate in CHEM 1100/1110
- 73.3% /66.7% (Fall 2009) for ENGR 1990 Cohort
- 81.8%/90.9% (Fall 2010) for ENGR 1990 Cohort
- No statistically significant different in 2nd year retention to CEAS
- 73.3% (ENGR 1990) vs. 67.9% (CEAS-Pre-Calculus) – Fall 09 Cohort

Findings: 2009-11

Statistically significant difference ($\alpha<0.05$) in pre-/post-survey

Fall 2009

- Increase in confidence about ability to use trigonometry, vectors, and simple differentiation to solve engineering problems

Fall 2010

- Increase in confidence about ability to use trigonometry to solve engineering problems
- Decrease in confidence about chances of success in Engineering

Findings: 2012-13

Performance comparison - MATH 1180 and CHEM 1100/1110

	Semester	No of ENGR 1990 Students	% Grade =/> C	
			ENGR 1990	Comparison
Precalculus	Fall 2012	17	82.3%	61.1%
	Spring 2013	10	100.0%	69.3%
General Chemistry I	Fall 2012	13	61.5%	76.5%
	Spring 2013	10	90.0%	65.2%

- ENGR 1990 students have a statistically significant ($\alpha<0.05$) higher successful completion rate in MATH 1180 (grades =/> C)
- No statistically significant difference in CHEM 1100

Path Forward

- Continue ENGR 1990 in 2013-14
- Present evaluation results to CEAS Executive Committee of dean, associate deans, and department chairs – Summer 2014

QUESTIONS?

