TWO-YEAR COLLEGE MATHEMATICS AND STUDENT PROGRESSION IN STEM PROGRAMS OF STUDY
KEY POINTS

- Perspectives – past, present, and future
- Contemporary two-year college mathematics
- Reform and innovation in two-year college mathematics
- Recommendations
NORMATIVE MATH COURSE SEQUENCE

Arithmetic → Algebra → Geometry → Trigonometry → Calculus

Cullinane & Treisman (2010)
NORMATIVE MATH = STEM

Arithmetic → Algebra → Geometry → Trigonometry → Calculus

STEM PIPELINE

Cullinane & Treisman (2010)
ENROLLMENTS IN MATH AND STATISTICS COURSES IN TWO-YEAR MATH PROGRAMS

Conference Board of Mathematical Sciences (2005, 2010)
ENROLLMENTS IN MATH AND STATISTICS COURSES IN TWO-YEAR MATH PROGRAMS

Conference Board of Mathematical Sciences (2005, 2010)
PRE-COLLEGE VS. COLLEGE LEVEL MATHEMATICS

Conference Board of Mathematical Sciences (2005, 2010)
INSTRUCTIONAL APPROACHES

- Special programs-women: 6% (Fall 2010) vs. 7% (Fall 2005)
- Special programs-minorities: 11% (Fall 2010) vs. 15% (Fall 2005)
- Undergrad research: 9% (Fall 2010) vs. 14% (Fall 2005)
- Honors sections: 20% (Fall 2010) vs. 24% (Fall 2005)
- K-12 outreach: 32% (Fall 2010) vs. 25% (Fall 2005)
- Diagnostic or placement testing: 90% (Fall 2010) vs. 97% (Fall 2005)
INSTRUCTIONAL APPROACHES

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Reforms:
- Crossroads in Mathematics (AMATYC)
- Beyond Crossroads (AMATYC)
- CRAFTY (College Renewal Across the First Two Years)

Innovations:
- Numerical literacy and numerical reasoning
- Content: Quantway & Statway (Carnegie Foundation)
- Pedagogy: Contextualization, modularization, acceleration
“[Two-year college] liberal arts were captives of the disciplines; the disciplines dictated the structure of the courses; [and] the courses encompassed the collegiate function.” (Cohen & Brawer, 1982, p. 284)

“The junior college forfeits its identity and its opportunity to experiment in the development of a program most appropriate for it.” (Medsker, 1960, p. 53)
RECOMMENDATIONS

Education = future
RECOMMENDATIONS

1. Take a P-20 approach to reforming mathematics curriculum

“Without a strategic, collaborative endeavor, it will be difficult for two-year colleges that are caught between K-12 education and universities to implement and sustain reform, except in isolated ways.”
2. Conduct research on teaching and learning in two-year college mathematics, especially college-level.

“Numerous pedagogical strategies are emerging that offer promise to change the way two-year college mathematics is taught, but the CBMS data confirm the prevalence of lecture-led, teacher-centered instruction.”
3. Investigate the characteristics, experiences and aspirations of students who enroll in two-year college mathematics.

“More research is needed to understand how students “develop the ‘habits of the mathematical mind’ that is required to be successful in mathematics and science and engineering and technology courses.” (R. Blair, personal communications, December 8, 2011)
Engage practitioners in action research on mathematics education to facilitate adoption and scale-up.

“Two-year faculty would appreciate and benefit from opportunities to engage in action research that encourages them to try out new pedagogical strategies in the classroom and determine how they impact student learning.”
Debra Bragg, Professor, University of Illinois

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