

Ohio's Gateway Mathematics Courses

Bridges to Success Workshop
April 20 and April 21, 2016

Communication, Outreach and Engagement Co-leads

Jim Fowler
The Ohio State University
fowler.291@osu.edu

Michelle Younker
Owens Community College
michelle_younker@owens.edu



Presentation Overview

- The Ohio Mathematics Initiative
- Steering Committee and recommendations
- Data
- Highlights of work to date
- Ohio's gateway mathematics courses



Where did the Ohio Mathematics Initiative start?

- Call for change from institutions

Concerns about . . .

- success rates in mathematics courses,
 - transferability and innovation, and
 - student success.
-
- Statewide Mathematics Summit May 2013
 - Formation of Steering Committee July 2013



Steering Committee Charge

To develop expectations and processes that result in each campus offering pathways that result in mathematics that yield

- ① increased success for students in the study of mathematics,
- ② a higher percentage of students completing degree programs, and
- ③ effective transferability of credits for students moving from one institution to another.



Essential Components

- 1 Develop high-quality entry-level courses and pathways
- 2 Develop transfer policies and processes that foster transfer and encourage innovation
- 3 Support constructive engagement of mathematics chairpersons and faculty
- 4 Collect, analyze, and share relevant data
- 5 Improve student success in college-level mathematics by aligning postsecondary expectations and high school practice

[Rethinking Postsecondary Mathematics. Final Report of the Ohio Mathematics Steering Committee, March 2014.](#)



“The status quo is unacceptable.”

—A COMMON VISION for Undergraduate Mathematical Sciences Programs in 2025, Karen Saxe and Linda Braddy, Mathematical Association of America, 2015.



What do we know?

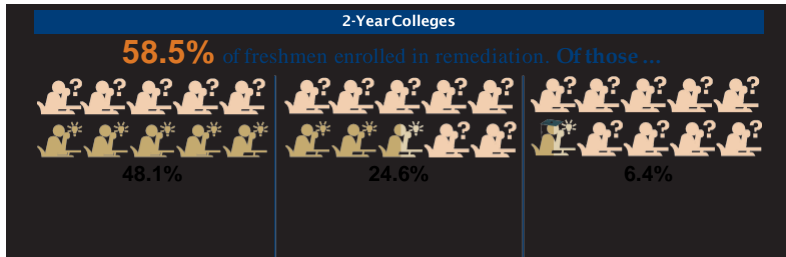
Too many entering first-years need remediation.



African-American, Hispanic, and low-income students are more likely to be headed toward remediation.

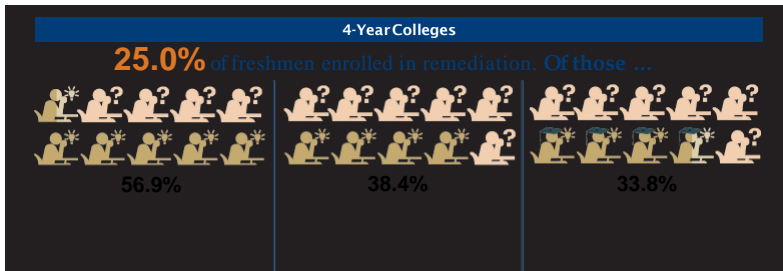
What do we know?

Very few make it to graduation day

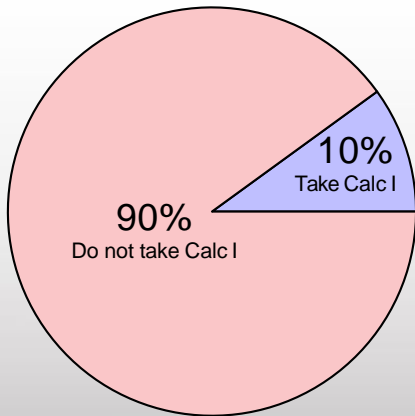


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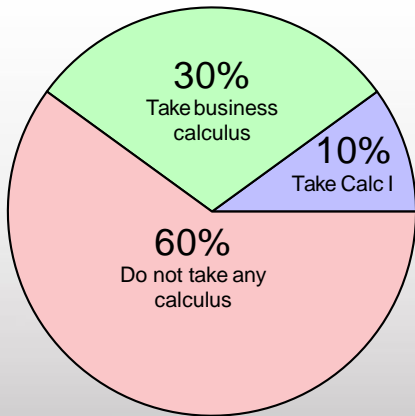
Students who take College Algebra...



Dunbar, S. 2005. Enrollment flow to and from courses below calculus . In *A Fresh State for Collegiate mathematics: Rethinking the Courses below calculus*, N.B. Hastings et al. (Eds.). Washington DC: MAA Notes, Mathematical Association of America.



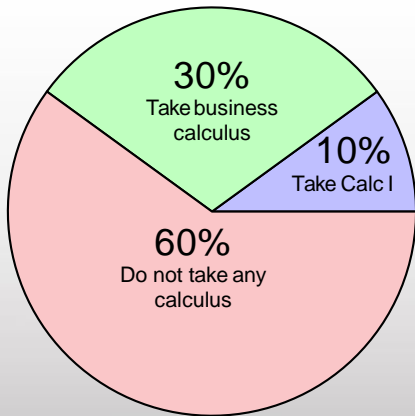
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Students who take College Algebra...



Virtually no students who pass college algebra ever start Calculus III, a key course for STEM.

Dunbar, S. 2005. Enrollment flow to and from courses below calculus . In *A Fresh State for Collegiate mathematics: Rethinking the Courses below calculus*, N.B. Hastings et al. (Eds.). Washington DC: MAA Notes, Mathematical Association of America.



What are we doing?



Some of the Work to Date
*Increasing departmental flexibility regarding
pre-requisites and credit hours*

Removed the prescribed pre-requisite requirements from gateway courses for acceptance into the transfer module.

Endorsed late January/early February 2015



Some of the Work to Date

Creating a college-level mathematics course definition

A credit-bearing, college-level course in Mathematics must use the standards required for high school graduation by the State of Ohio as a basis and must do at least one of the following:

- 1 broaden, or
- 2 deepen, or
- 3 extend the student's learning.

Endorsed late January/early February 2014



Some of the Work to Date

Redesigning Ohio Transfer Module course criteria

Revised learning outcomes for . . .

- College Algebra ([TMM001](#))
- Introductory Statistics ([TMM010](#))
- Quantitative Literacy ([TMM011](#))

Endorsed Fall 2015



Original

Functions

1.1 Represent functions verbally, numerically, graphically, and algebraically, including linear, quadratic, polynomial, rational, root/radical/power, exponential, logarithmic and piecewise-defined functions.



Original

Functions

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Revised

1. Functions: Successful College Algebra students demonstrate a deep understanding of functions whether they are described verbally, numerically, graphically, or algebraically (both explicitly and implicitly). Students should be proficient working with...



TMM001 College Algebra

1. Functions: Successful College Algebra students demonstrate a deep understanding of functions whether they are described verbally, numerically, graphically, or algebraically (both explicitly and implicitly). Students should be proficient working with the following families of functions: linear, quadratic, higher-order polynomial, rational, exponential, logarithmic, radical, and piecewise-defined functions (including absolute value).

The successful College Algebra student can:

1a. Analyze functions. Routine analysis includes discussion of domain, range, zeros, general function behavior (increasing, decreasing, extrema, etc.). In addition to performing rote processes, the student can articulate reasons for choosing a particular process, recognize function families and anticipate behavior, and explain the implementation of a process (e.g., why certain real numbers are excluded from the domain of a given function).



Some of the Work to Date

Developing mathematics pathways

- Aligned with specific groups of majors
- Comprised of challenging mathematics content
- Relevant to the groups of majors

Formalized Fall 2015



What is a math pathway?

A **mathematics pathway**

is a math course or sequence of courses taken by both college-ready and underprepared students to meet the requirements of their program of study.

A pathway allows students to actively engage with mathematical concepts, access prior knowledge, and reflect on new learning.

A pathway aligns with specific fields of study.

The New Mathways Project, Charles A. Dana Center, The University of Texas at Austin, 2015.



Ohio's Mathematics Pathways

Developed in response to the recommendations of the Steering Committee to:

- develop high-quality entry-level courses and pathways;
- increase student success;
- make mathematics more relevant to all students;
- provide students with the appropriate mathematics to successfully support them in their chosen field of study.



1 Statistics Pathway

College-level introductory statistics courses designed for students without a Calculus background and who do not require College Algebra or Calculus.

Part of the general education requirement for majors in fields that may include the following:

Nursing	Social Work
Nutrition	Associates in Business



2 Quantitative Reasoning Pathway

College-level courses designed to emphasize quantitative thinking and problem solving using quantitative methods.

Part of the general education requirement for majors in fields that may include the following:

Communication
Criminal Justice
Fine arts

Education
(Elementary, History,
Social Studies, etc.)



3 STEM Preparation Pathway

College-level courses designed for students in mathematics-intensive majors.

Examples: College Algebra, Pre-Calculus, Trigonometry, Business Calculus, and Calculus.

Part of the general education requirement for majors in fields that may include the following:

Business
Engineering
Physics

Chemistry
Education
(Math, Science,
Technology, etc.)



Thank You!



Contact Information

Communication, Outreach, & Engagement Subgroup

Jim Fowler, Co-lead
The Ohio State University
fowler.291@osu.edu
773.809.5659

Michelle Younker, Co-lead
Owens Community College
michelle younker@owens.edu
567.661.2640



Contact Information

Ohio Department of Higher Education

Dr. Paula Compton

Associate Vice Chancellor, Articulation and Transfer

pcompton@highered.ohio.gov

Hideo Tsuchida

Director of Articulation and Transfer Policy

htsuchida@highered.ohio.gov



Resources and References

- [Rethinking Postsecondary Mathematics: Final Report of the Ohio Mathematics Steering Committee](#)
- [OMI Website](#)
- [OTM Guidelines and Learning Outcomes](#)
- [OMI Newsletter, Fact Sheets, and Reading List](#)
- [OMI Speaker Request Form](#)
- [Complete College America Remediation](#)





Bridges to Success

