STUDENTS ARE …

- Taking too much time
- Taking too many credits
- Diverted into Remediation
- Not graduating
TOO MUCH TIME TO DEGREE

Of those who graduate...

2-year
Associate

Full-time students take
3.9 years

4-year
Bachelor's
(Non-Flagship)

Full-time students take
4.9 years
RATES OF REFERRAL TO DEVELOPMENTAL EDUCATION

51.7% of those entering a 2-year college enrolled in remediation

19.9% of those entering a 4-year college enrolled in remediation

Source: Fall 2006 cohorts
DEVELOPMENTAL STUDENTS STRUGGLE TO PROGRESS

<table>
<thead>
<tr>
<th>2-Year Colleges</th>
<th>4-Year Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>62.0%</strong></td>
<td><strong>74.4%</strong></td>
</tr>
<tr>
<td>Complete remediation</td>
<td>Complete remediation</td>
</tr>
<tr>
<td><img src="image3.png" alt="Image" /></td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>22.3%</strong></td>
<td><strong>36.8%</strong></td>
</tr>
<tr>
<td>Complete remediation and gateway courses in two years</td>
<td>Complete remediation and gateway courses in two years</td>
</tr>
<tr>
<td><img src="image5.png" alt="Image" /></td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>9.5%</strong></td>
<td><strong>35.1%</strong></td>
</tr>
<tr>
<td>Graduate within 6 years (projected)</td>
<td>Graduate within 6 years (projected)</td>
</tr>
</tbody>
</table>
Student attrition and long course sequences are at the heart of the matter.
Remediation: The effect of attrition.

Students assigned 3 or more semesters of math remediation.

- Completed 1st semester of remediation.
  - Enrolled and completed
  - Did not complete
  - Did not enroll or stopped enrolling
  - LOST

- Completed 2nd semester of remediation.
  - Enrolled and completed
  - Did not complete
  - Did not enroll or stopped enrolling
  - LOST

- Completed 3rd semester of remediation.
  - Enrolled and completed
  - Did not complete
  - Did not enroll or stopped enrolling
  - LOST

- Passed gateway course.
  - Enrolled and completed
  - Did not complete
  - Did not enroll or stopped enrolling
  - LOST

KNOW THIS: The remediation system is broken. More students quit than fail.

WHY IS IT THE “RIGHT TIME” FOR MATH PATHWAYS?

- Prioritization in the national mathematics community
- Development of structured programs of study
- Structural forces in K-12 education
- Completion agenda
- Sweeping dev ed policy reforms
WHAT IS THE “RIGHT MATH”? 

• College algebra and traditional developmental math sequences were designed in the 1950’s to prepare students for calculus.

• But the majority of students are in majors that do not require calculus.
WHAT IS THE “RIGHT MATH”? 

Estimations based on data from the Texas Higher Education Coordinating Board, 2013: Degrees Earned by CIP code
WHAT IS THE “RIGHT MATH”? 

• Based on a study of national enrollment flows, many students who begin on an algebra path never reach—or never intend to reach—calculus.
WHAT IS THE “RIGHT MATH”?  

Students Who Take College Algebra 

- 10% Ever Take Calculus 1 
- 90% Do Not Take Calculus 1 

WHAT IS THE “RIGHT MATH”? 

Students Who Take College Algebra

- 60% Do Not Take Any Form of Calculus
- 30% Take Business Calculus
- 10% Ever Take Calculus 1

WHAT IS THE “RIGHT MATH”? 

Students Who Take College Algebra

- 60% Do Not Take Any Form of Calculus
- 30% Take Business Calculus
- 10% Ever Take Calculus

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

COLLEGE ALGEBRA’S ONLY PURPOSE:
PREPARATION FOR CALCULUS
Alignment: Institutions should offer multiple pathways with relevant and challenging math content aligned to specific fields of study.
RECOMMENDATIONS FROM THE MATH COMMUNITY

“Unfortunately, there is often a serious mismatch between the original rationale for a college algebra requirement and the actual needs of students who take the course. A critically important task for mathematics sciences departments at institutions with college algebra requirements is to clarify the rational for requirements, determine the needs of students, and ensure that department’s courses are aligned with these findings.”

--Mathematics Association of America, Committee on the Undergraduate Program in Mathematics
RECOMMENDATIONS FROM THE MATH COMMUNITY

“The Steering Committee recommends developing high-quality entry-level courses and pathways connected to coherent programs of study for students majoring in (1) mathematics, (2) other mathematics-intensive majors, and (3) majors that are not mathematics intensive.”

--Ohio Mathematics Steering Committee
MATH IS ALIGNED WITH META-MAJORS

Health Sciences
Social Sciences
Liberal Arts
Education
Business

Quantitative Reasoning/Statistics

Degree
4-Year Transfer
Certificate
License

STEM

College Algebra/Precalculus

Degree
4-Year Transfer
Certificate
License
REMEDICATION IS DESIGNED FOR COLLEGE ALGEBRA

1) Compass and Accuplacer are designed to determine placement in College Algebra, not statistics or quantitative reasoning

2) Cut scores are set for College Algebra

3) Dev Ed courses are designed to prepare students for College Algebra, not statistics or quantitative reasoning
Acceleration: Institutions should offer accelerated pathways that allow students to complete a college-level math course in one year.
RECOMMENDATIONS FROM THE MATH COMMUNITY

• “Additional academic support should be integrated with gateway college-level course content — as a co-requisite, not a pre-requisite. The delivery of remedial content as a single semester co-requisite alongside college-level content, a one-year course pathway, or embedded remediation can take many forms. In all cases, the remedial instruction must be aligned and coordinated with the college-level course.”

“We recommend that many more students be advised to begin their programs of study in college-level, credit-bearing gateway courses. Underprepared students should also study college-level material with integrated, just-in-time support either in a single semester or over one year.”

--University System of Georgia Mathematics Task Force
STATISTICS PATHWAY is designed for students seeking a college-level statistics course as part of their general education requirement for majors in fields including:
- Nursing
- Social Work
- Criminal Justice

QUANTITATIVE REASONING PATHWAY is designed for students pursuing a field of study in which general education math is a requirement. These fields include majors in:
- Communications
- Graphic Design
- Paralegal

STEM-PREP PATHWAY is designed for students seeking a STEM or mathematics-intensive major in fields including:
- Petroleum Engineering
- Computer Science
- Chemistry
IN MATH PATHWAYS DIFFERENTIATED GATEWAY COURSES ARE:

• Articulated to Program of Study Requirements

• Transferable into Programs of Study at Receiving Institutions

• Designed to be delivered with a Corequisite for Underprepared Students

• A Key Component of Pre-Major Advising
  • Part of a Meta-Major of like Academic Programs
  • Outlined in Academic Degree Maps
  • Part of a First Semester Default Schedule
A MODEL PATHWAY

Advise and Assess

Pre-Major Advising

Choose Meta-major

Social Sciences

STEM

Humanities

Gateway Math in 1st year

Coreq

Stats

College Algebra

QR

Choose Major

Major

Major

Major
BUILDING MATHEMATICS PATHWAYS TO PROGRAMS OF STUDY PROJECT

• Project Overview
  • A two-year initiative to dramatically increase the percentage of students who pass gateway math courses and enter programs of study in one academic year by building math pathways.
  • Modernization of undergraduate mathematics is a key lever for improving college completion.
  • Faculty must be at the forefront of this reform effort, working in coordination at the system level. Making changes to well-established programs cannot be carried out locally--a statewide effort is needed.
BUILDING MATHEMATICS PATHWAYS TO PROGRAMS OF STUDY PROJECT

• Charge

1. Convene math faculty leaders to develop recommendations about improvement of postsecondary mathematics, specifically addressing the misalignment of college algebra for non-Calculus based programs of study

2. Design alternative gateway math course pathways that are aligned with the math skills students need to succeed in their programs of study

3. Work with client disciplines to review math requirements and adopt courses suitable for Calculus based and non-Calculus based programs
WHAT KINDS OF TOPICS MIGHT YOUR TASK FORCE ADDRESS?

• Math courses and supports
  • Which entry-level math courses will meet the needs of your students?
  • Are there new courses to develop?
  • Are there improvements to the quality or consistency of existing courses needed?
  • Are underprepared students well-served?

• Policy obstacles
  • Will math courses transfer across institutions and sectors?
  • Is there an operating definition of college readiness? Is it associated with algebra-based prerequisite coursework?
  • How do placement instruments and policies align to pathways?
WHAT KINDS OF TOPICS MIGHT YOUR TASK FORCE ADDRESS?

• Alignment
  • Are gateway course requirements clearly and consistently aligned to programs of study?
  • How might advising systems and protocols need to be revised?
  • How do postsecondary pathways align to K-12 mathematics?

• Improvement
  • How will you know if you are improving student success?
  • How will you engage the math community in your state in the task force process and subsequent implementation?
  • What structures are in place for regular communication?
GENERAL TIMELINE AND KEY OUTCOMES

Phase 1: Prepare for a successful task force

Phase 2: Task Force creates vision for the state

Phase 3: Address policy barriers

Phase 3: Align math requirements with programs of study

Phase 3: Plan for engagement of colleges

Phase 4: Colleges implement with students
1. Issue a Public Statement from Math Faculty Leaders on Math Pathways
   Goal: March, 2015

2. Design Alternative Gateway Math Courses
   Goal: Fall, 2015

3. Articulate Gateway Math Courses to Programs of Study
   Goal: Fall, 2016
SUBGROUP 3: COMMUNICATION AND OUTREACH (AND ENGAGEMENT)

• Improve communication among mathematics faculty and stakeholders across institutions

• Encourage and promote mathematics faculty participation in meetings of professional groups

• Engage the larger (mathematics) community with disseminations from the various subgroups of the Ohio Mathematics Initiative
QUESTIONS TO CONSIDER

• Who is in that larger (mathematics) community and how can our communications influence their perspectives/decisions?

• Communication needs to be both inward and outward? How do we forge those outward connections?

• How do we encourage the sharing of ideas, resources and information amongst the subgroups and consumers of the Math Initiative?
QUESTIONS TO CONSIDER

• Who are the groups who have not heard about the initiative? How do we reach them?

• Who needs early access and opportunity for feedback? Through what vehicle(s)?

• How do we promote and maintain engagement and interest?

• What interests and expertise do we have?