Emerging Issues in Mathematics Pathways

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Charles A Dana Center
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DCMP Vision

The DCMP seeks to ensure that ALL students in higher education will be:
• Prepared to use mathematical and quantitative reasoning skills in their careers and personal lives,
• Enabled to make timely progress towards completion of a certificate or degree, and
• Supported and Empowered as mathematical learners.

Dana Center Principles for Pathways

Mathematics pathways are structured so that:
1) All students, regardless of college readiness, enter directly into mathematics pathways aligned to their programs of study,
2) Students complete their first college-level math requirement in their first year of college.
Students engage in a high-quality learning experience in math pathways designed so that:
3) Strategies to support students as learners are integrated into courses and are aligned across the institution.
4) Instruction incorporates evidence-based curriculum and pedagogy.

Who takes Calculus?

Source: Burtnes, 2015; Chen & Soldner, 2013

Partner Chat

Please discuss one or both of the following:
• What you know (or want to know) about mathematics pathways.
• The current state of math pathways at your institution.
The Problem and Two Solutions

Example of the problem:
Criminal Justice Majors at Sam Houston State University have options:
- Any Core Math (Core list starts with Precalculus)
- Students tend to choose the first course in the list (lowest number)

Examples of two solutions:
Criminal Justice Majors at University of North Texas
- Any Core Math (but Precalculus is not in the core)
University of Texas at Arlington
- Math 1301 (Quantitative Reasoning) or higher
- Give QR the lowest course number so that students will choose it.

Third solution: List QR as the Required or Recommended course.

Monograph: Emerging Issues in Math Pathways

- Faculty and Classroom Issues:
  - QR, Statistics, the path to Calculus, co-requisites
- Leadership at Campus, System, and State Levels:
  - Successes and challenges, state case studies, HS to college transition
- Policy:
  - Major state and institutional level considerations
  - Equity issues
  - Coming soon! Watch for the release of the monograph.

Contact information

- General information about the Dana Center: www.utdanacenter.org
- Dana Center Mathematics Pathways Resource Site: www.dcmathpathways.org
- To receive monthly updates about the DCMP, contact us at: dcmathpathways@austin.utexas.edu
- Connie Richardson, Manager, higher education course programs crichardson@austin.utexas.edu

About the Dana Center

The Charles A. Dana Center at The University of Texas at Austin works with our nation’s education systems to ensure that every student leaves school prepared for success in postsecondary education and the contemporary workplace.

Our work, based on research and two decades of experience, focuses on K–16 mathematics and science education with an emphasis on strategies for improving student engagement, motivation, persistence, and achievement.

We develop innovative curricula, tools, protocols, and instructional supports and deliver powerful instructional and leadership development.
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Who takes Calculus?

2-YEAR COLLEGE STUDENT ENROLLMENT INTO PROGRAMS OF STUDY

- Require Calculus: 28%
- Do not require Calculus: 72%

4-YEAR COLLEGE STUDENT ENROLLMENT INTO PROGRAMS OF STUDY

- Require Calculus: 30%
- Do not require Calculus: 70%

Source: Burdman, 2015; Chen & Soldner, 2013
Emerging Texas Math Pathways

Meta-Major

- Liberal Arts, Fine Arts, and Humanities
- Social Sciences and Social Services
- Nursing and Health Professions

Math Pathway

- Quantitative Reasoning Pathway—Math 1332
  Contemporary Math
- Statistical Reasoning Pathway—Math 1342
  Elementary Statistical Methods

Non-Algebraically-Intensive Math

- Business and Accounting
- Teaching and Education
- Science, Technology, Engineering, and Math

Algebraically-Intensive Math

- Business Pathway—Math 1324
  Mathematics for Business
- Teacher Pathway—Math 1350
  Fundamentals of Math I
  (Math 1314 is a prerequisite)
- STEM Pathway—Math 2413 Calculus I
  (with Math 1314 College Algebra and 2312
  Pre-Calculus if needed)
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Comprehensive Redesign

Mathematics pathways
- Aligned to programs
- Relevant content
- Evidence-based curriculum and pedagogy

Co-requisites
- Aligned content
- Embedded success strategies
- Just-in-time supports

STUDENT SUCCESS

Advising
- Default to recommendation
- Based on student goals
- Intensive where needed

Placement
- Multiple measures
- Holistic
- Options provided

Meta-majors
- Partner disciplines
- Recommended math course(s)
- Based on advising

Dana Center Mathematics Pathways
Types of Quantitative Reasoning

- Campus-wide initiatives to improve students’ quantitative reasoning skills.
- Individual instructor efforts to improve course success by improving students’ quantitative reasoning skills.
- Required capstone/gen ed course or assessment for all students.
- Freshmen-level course for math credit, for programs that don’t have specific algebraic or statistical needs.
Monograph: *Emerging Issues in Math Pathways*

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Support your work

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- Enabled to make timely progress towards completion of a certificate or degree; and
- Empowered as mathematical learners.

It takes coordinated action across all:
- Levels of the system (national, state, institution, classroom)
- Sectors of education (universities, colleges, K-12)
- Roles (policy, administrators, faculty, student services)

In order to:
- Redesign course and institutional structures that deter success;
- Modernize mathematics content and instruction;
- Eliminate policy barriers in placement, transfer, and applicability.
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