

Dana Center  
**Mathematics**  
PATHWAYS

## Emerging Issues in Mathematics Pathways

Connie Richardson  
Charles A Dana Center

National Numeracy Network October 14, 2018



The University of Texas at Austin  
Charles A. Dana Center [www.dcmathpathways.org](http://www.dcmathpathways.org)

## 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.



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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.

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[dcmathpathways.org](http://dcmathpathways.org)

## 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.

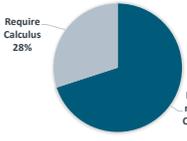
**Students engage in a high-quality learning experience in math pathways designed so that:**

- 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.

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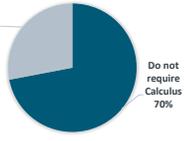
## Who takes Calculus?

**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

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## Emerging Texas Math Pathways

|                                  | Meta-Major  | Math Pathway  |
|----------------------------------|---|---|
| Non-Algebraically-Intensive Math | Liberal Arts, Fine Arts, and Humanities                               | Quantitative Reasoning Pathway—Math 1332 Contemporary Math  |
|                                  | Social Sciences and Social Services<br>Nursing and Health Professions | Statistical Reasoning Pathway—Math 1342 Elementary Statistical Methods  |
| Algebraically-Intensive          | Business and Accounting   | Business Pathway—Math 1324 Mathematics for Business   |
|                                  | Teaching and Education  | Teacher Pathway—Math 1350 Fundamentals of Math I (with Math 1314 College Algebra and 2112 Pre-Calculus II needed) |
|                                  | Science, Technology, Engineering, and Math                            | STEM Pathway—Math 2812 Calculus I (with Math 1314 College Algebra and 2112 Pre-Calculus II needed)                |

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## 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

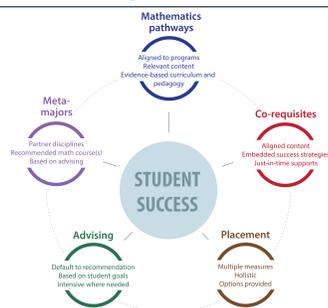
- Any Core Math (but Precalculus is not in the core!)

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.

## Comprehensive Redesign



## 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.

## Support your work

Dana Center Mathematics Pathways Resource Site:

<http://www.dcmathpathways.org/>

## Contact information

- General information about the Dana Center: [www.utdanacenter.org](http://www.utdanacenter.org)
- Dana Center Mathematics Pathways Resource Site: [www.dcmathpathways.org](http://www.dcmathpathways.org)
- To receive monthly updates about the DCM, contact us at: [dcmathpathways@austin.utexas.edu](mailto:dcmathpathways@austin.utexas.edu)
- Connie Richardson, Manager, higher education course programs [cjrichardson@austin.utexas.edu](mailto:cjrichardson@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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## DCMP Vision



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- **Prepared** to use mathematical and quantitative reasoning skills in their careers and personal lives,
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# Dana Center Principles for Pathways

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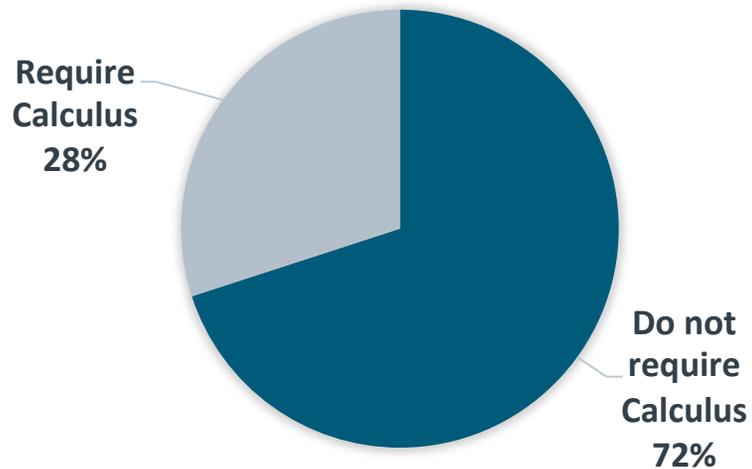
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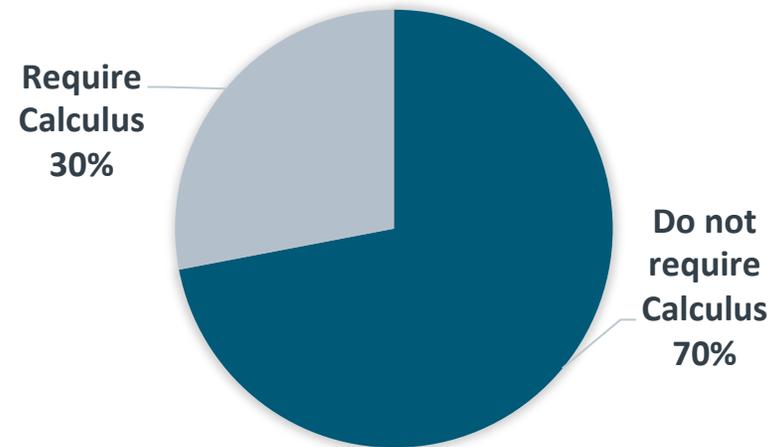
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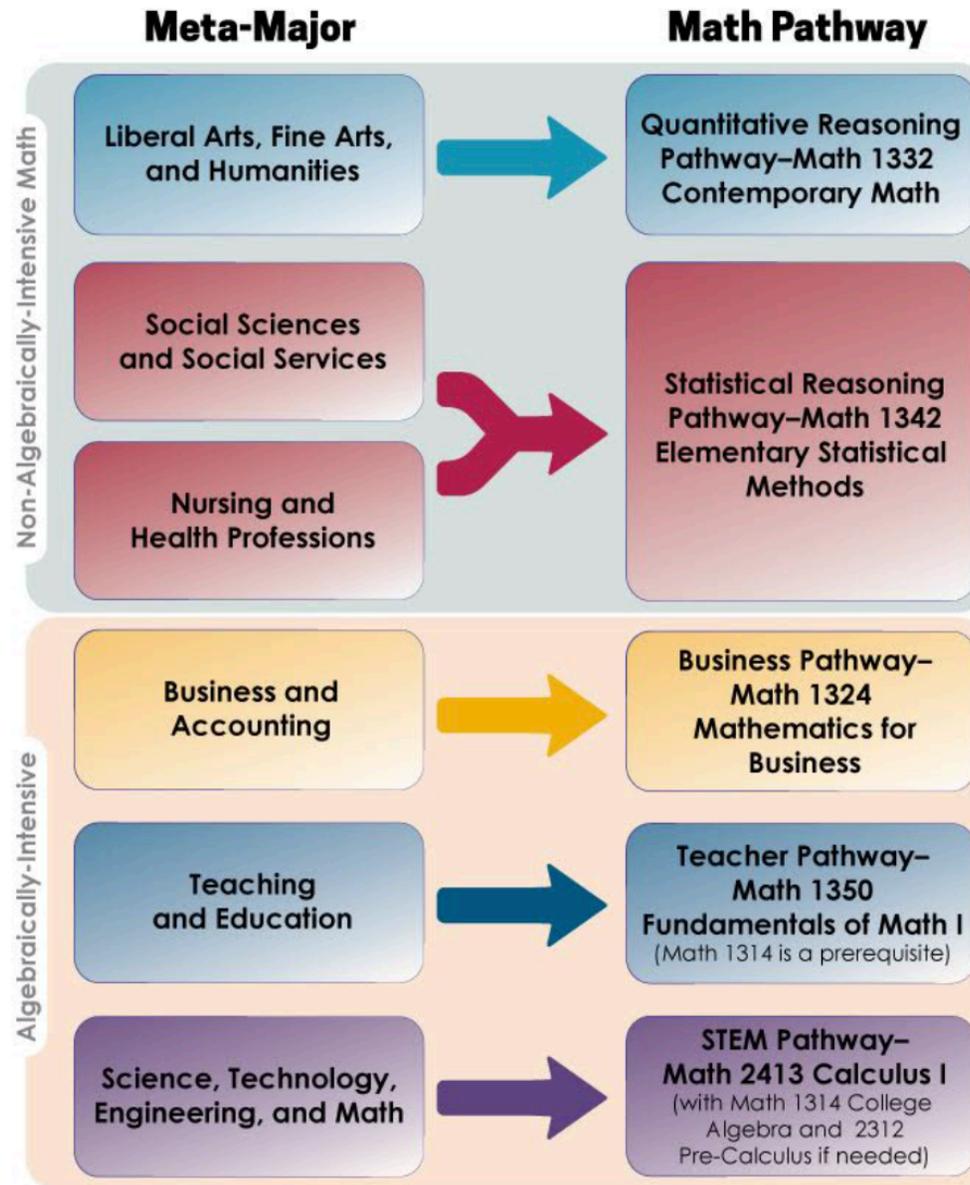


**4-YEAR COLLEGE  
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Source: Burdman, 2015; Chen & Soldner, 2013

## Emerging Texas Math Pathways



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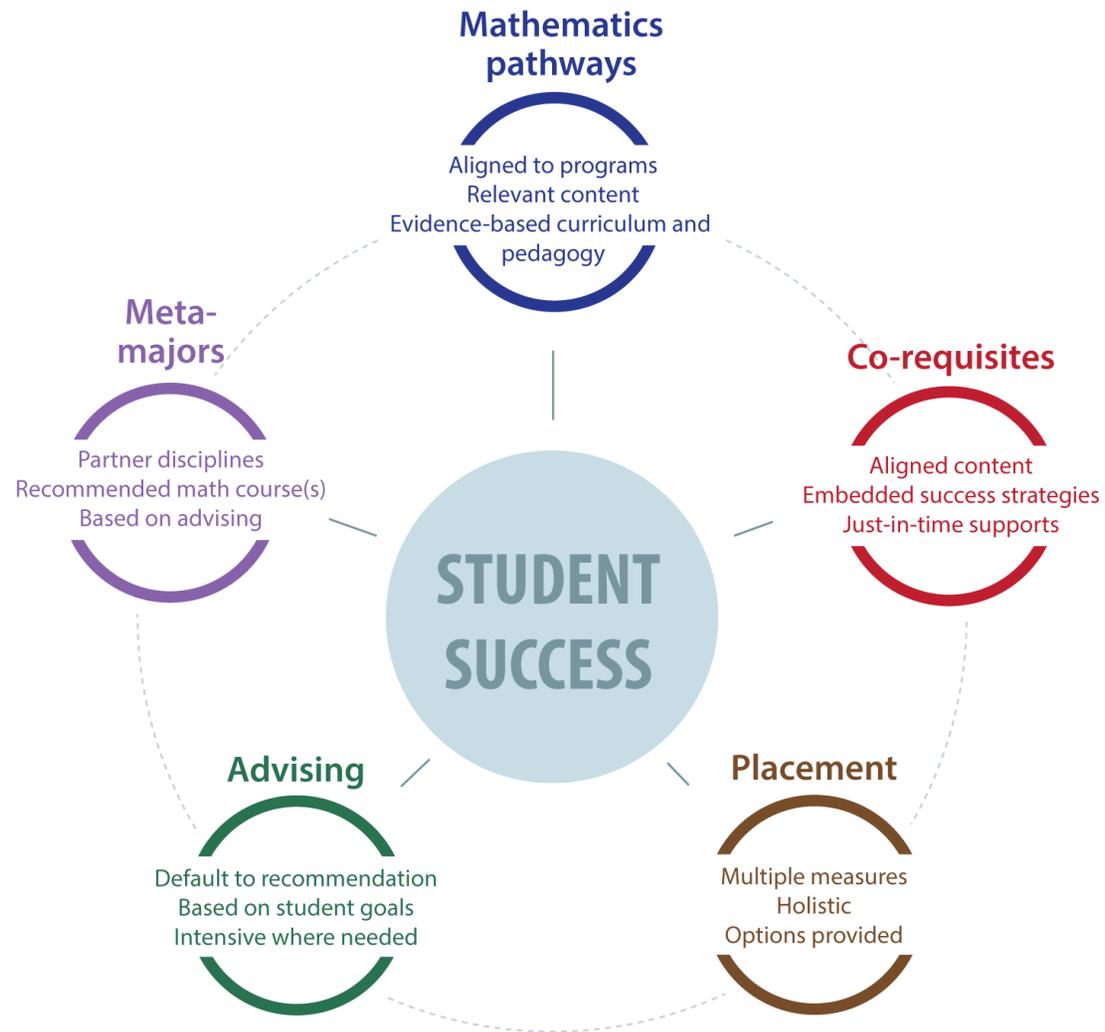
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# Comprehensive Redesign



# Types of Quantitative Reasoning

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- 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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The DCMP    Learn About    Take Action    Where We Work    Resources

## The Right Math for the Right Student at the Right Time

The Dana Center Mathematics Pathways 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
- **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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