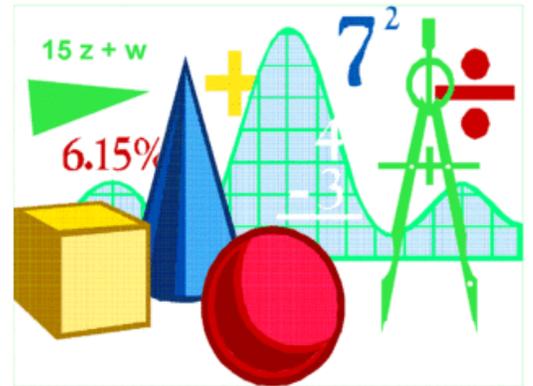




Colorado Math Pathways Task Force Recommendations





Math Pathways Task Force Members

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<http://completecollege.org/>

<http://www.utdanacenter.org/higher-education/new-mathways-project/>

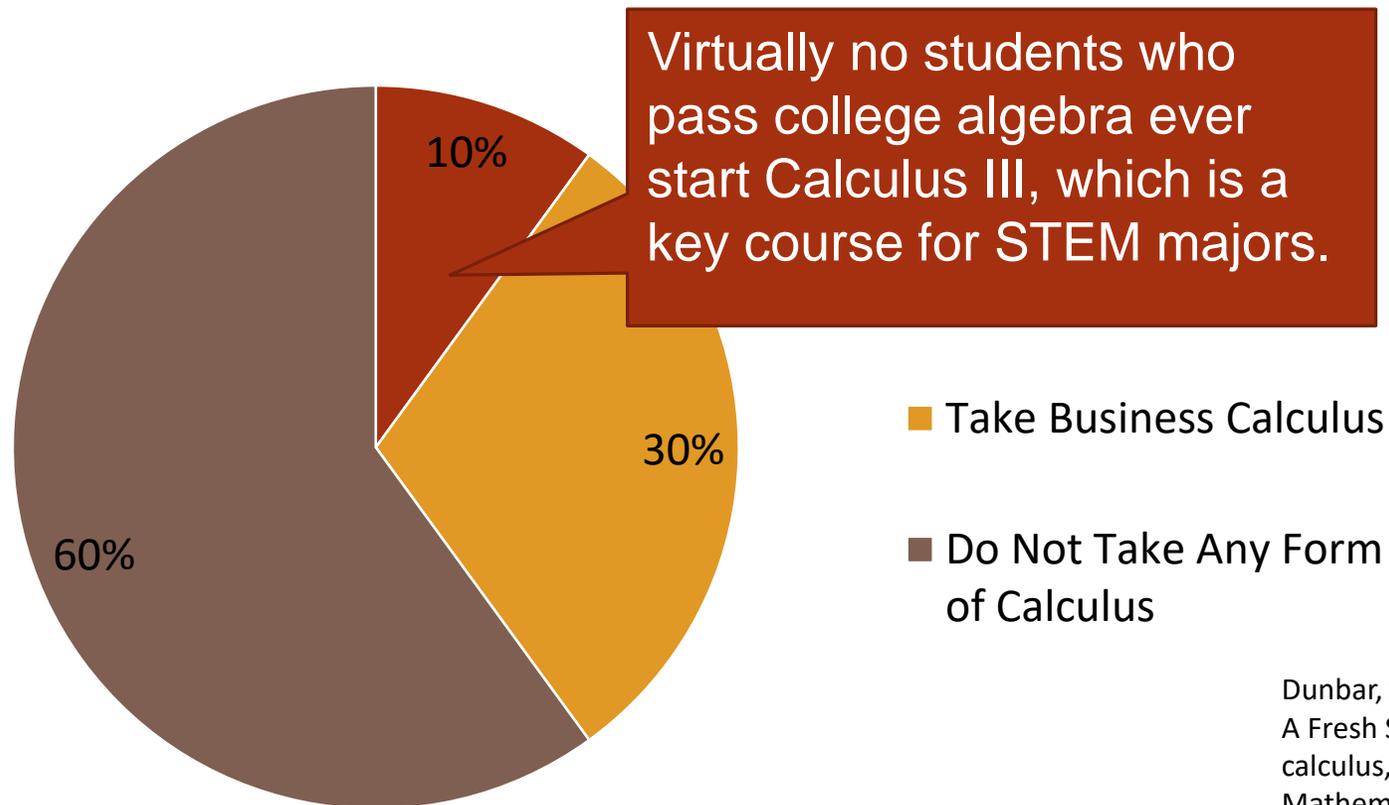


Mission

- Draft a public statement on the importance of better alignment of and advising into gateway math courses.
- Identify and suggest alternative gateway math courses, that are rigorous and of quality in content and competencies, and that are appropriately aligned with the math skills students need to succeed in their programs of study.
- Work with representatives from academic disciplines and advisors to review math requirements and consider alternative courses to college algebra for non-calculus based majors.

What is the “right” math course?

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.

Distribution of students enrolled in three gateway courses by four year institution

INSTITUTION NAME	% ENROLLED COLLEGE ALGEBRA	% ENROLLED MATH FOR THE LIBERAL ARTS	% ENROLLED INTRO TO STATS
Adams State University	89	7	4
Colorado Mesa University	67	24	9
Colorado State University	73	27	0
Colorado State University - Pueblo	44	23	33
Fort Lewis College	45	12	43
Metropolitan State U. of Denver	25	43	32
University of Colorado Boulder	35	48	17
University of Colorado Denver	39	35	26
University of Northern Colorado	27	21	51
Western State Colorado University	85	15	0

Distribution of students enrolled in three gateway courses by institution – Community Colleges

INSTITUTION NAME	% ENROLLED COLLEGE ALGEBRA	% ENROLLED MATH FOR THE LIBERAL ARTS	% ENROLLED INTRO TO STATS
Aims Community College	66	12	22
Arapahoe Community College	66	12	22
Colorado Mountain College	74	9	17
Colorado Northwestern CC	65	20	15
Community College of Aurora	64	15	21
Community College of Denver	62	18	20
Front Range Community College	73	7	20
Lamar Community College	70	23	7
Morgan Community College	60	3	37
Northeastern Junior College	79	1	19
Otero Junior College	70	18	11
Pikes Peak Community College	75	12	12
Pueblo Community College	54	22	25
Red Rocks Community College	69	13	18
Trinidad State Junior College	75	7	18

Summary

- ❑ Four 4-year institutions have the majority of students in college algebra; the others have students distributed almost equally across the 3 gateway math courses.
- ❑ Nearly all of the community colleges have much larger enrollments in College Algebra

Recommendations for Today

- Curriculum
- Advising
- Support & Professional Development



Recommendation 1 - Curriculum

- Revise current math pathways into more well defined pathways
 - **CalcPath**
 - **StatPath**
 - **QuanThinkingPath**





Recommendation - CalcPath

■ CalcPath

○ Current course options:

1. Go right into Calculus I
2. Take Pre-Calculus and then Calculus I
3. Follow the current sequence of College Algebra, Trigonometry, and Calculus I

○ Potential support options to assist students in completing Calculus I in first year/first 30 credit hours

1. Co-requisite instruction/support
2. Stretch courses (the risk here is transferring before completing the entire course)
3. Online support modules
4. Compressed/accelerated modules



Recommendation - StatPath

■ StatPath

- Use the existing Intro to Statistics content
- Encouraging using modeling as an approach for the course
- Students should be able to take Intro to Stats without a credit-bearing pre-requisite
 - No college-level math pre-requisites are necessary, e.g., College Algebra
 - Enter the course when college ready (that is, have completed remedial if needed, like MAT 050: Quantitative Literacy)



Recommendation – QuanThinkingPath, I

- **QuanThinkingPath**

- MAT 050 as the developmental education path
- Meets the gtPathways/core Gen Ed requirement
- Generally is a terminal math course
- Recommendation is for courses to be rigorous, support problem solving, numerical and reasoning skills, and address the state competencies.
- Courses may include:
 - Revised Math for Liberal Arts course
 - New algebra-based modeling course



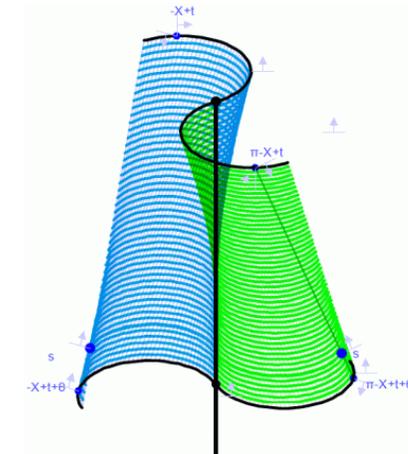
Recommendation – QuanThinkingPath, II

■ **QuanThinkingPath**

- Recommended revisions for existing Liberal Arts course
 - Consistency in key topics
 - ✓ Financial literacy, descriptive statistics, algebraic models and reasoning
 - ✓ Additional topics to include use CCCNS content/competencies
 - More depth, less breadth
 - Emphasis on modeling, problem solving, and quantitative reasoning
 - Less emphasis on appreciation of math topics

Recommendation – QuanThinkingPath, III

- Develop new algebraic modeling course for the CCCNS/4-year schools
 - Focus intended for majors that need Algebra skills but not Calculus
 - More conversation to come
 - Intended Learning Outcomes to be determined
 - Assessment Approaches
 - Content to be determined





Recommendation 2 – Advising, I

- **Gateway math course based on meta major (a group of programs with similar core requirements)**
 - Connect meta major to pathways and programs of study
 - CalcPath – STEM and majors that require Calculus
 - StatPath – often Social & Behavioral Sciences
 - QuanThinkingPath – often Arts & Humanities majors
 - Advisors help student select appropriate math for pathway
 - College Algebra should not be the default math course
 - Examine math requirements of major instead of using math to “weed” out students



Recommendation 2 – Advising, II

➤ **Multiple Measures of College Readiness**

- CDHE remedial policy should add HS GPA as an indicator of college readiness

➤ **Coordinate with partner disciplines**

- Revisit the math courses in some Degrees with Designation (DwD's)
 - Some DwD's probably require inappropriate math
- Ask client discipline to identify the top math competencies they want students to get for the major which will lead to choosing the best gateway math course
- Include as part of regular program review process for the client discipline

Support & Professional Development – 1

Expand instructor base

Currently there are not enough qualified instructors for Math for Liberal Arts and Statistics, leaving sections taught by part-time instructors who may have very little to no experience and/or time to prepare for teaching these courses. In particular, teaching statistics requires intuition that is developed over time.

Recommendations:

1. Have new instructors spend time with a “master” instructor.
2. Supply instructors with well-developed syllabi and materials
3. Have course leaders.



Support & Professional Development – 2

Provide system-wide resources

Introductory level math courses are populated by students who are not confident in their math skills. These courses are considered to be some of the most challenging to teach.

Recommendations:

1. Provide a repository of course specific information.
2. Expand faculty professional development opportunities to allow for discussion time about individual courses (i.e., Fac2Fac Conferences)
3. Provide resources to implement common assessments.