From the Classroom to the Community: Guiding Undergraduate Student Teams to Create OER-Based Online Courses for Inclusive and Equitable Learning

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Project Website

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Project Goals

Develop Set of Courses on Canvas
Precalculus, College Algebra, Multivariable Calculus, Statistics

Open
Available to the public

Strengthen Diversity
Support a wide range of students across campus.

Assess Impact
Site Analytics, Online Surveys

Disseminate
OER Repositories, Canvas Commons, Conferences

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Support

May 2023 to December 2024

- Georgia Tech Center for Promoting Inclusion and Equity in the Sciences
- Howard Hughes Medical Institute (HHMI) Inclusive Excellence Grant

May 2024 to December 2024

- Affordable Learning Georgia Continuous Improvement grant
- The Georgia Tech Distance Mathematics Program

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Timeline

May 2023	Funds available Curriculum development initiated; student assistants hired
Aug 2023	Georgia Tech community sites available
Oct 2023	Public sites available
Dec 2023	First Year Assessment Report for program sponsors
Aug 2024	All courses released Continuous improvement phase
Dec 2024	Second Year Assessment Report for program sponsors

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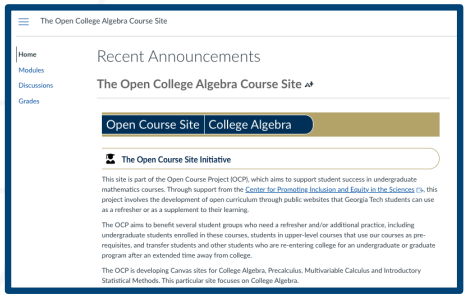
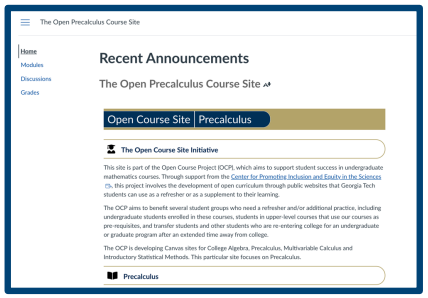
Open Course Features

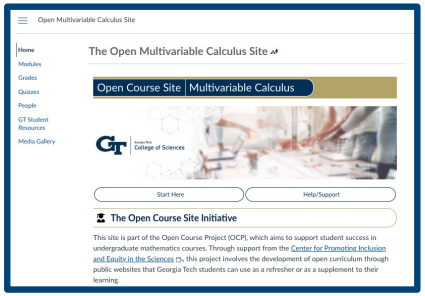
College Algebra



Precalculus



Multivariable Calculus



Statistics

- Canvas
- Canvas Quizzes
- Pre-recorded video
- Site content exported as QTI
- User tracking
- Surveys
- Conditional release: users must complete surveys to access content

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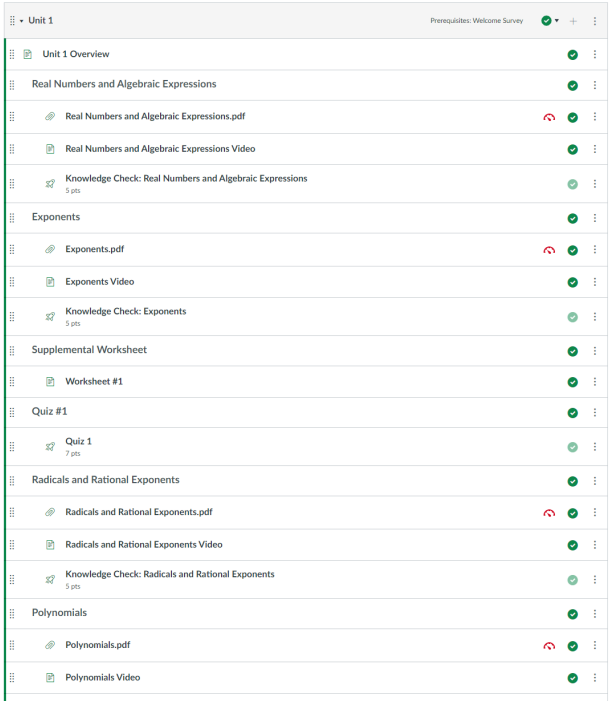
College Algebra and Precalculus

- Course divided into units by topics
- Roughly 75 pre-recorded lecture videos
- Notes and worksheets posted with additional exercises
- Knowledge Checks, Quizzes and Exams posted as "Canvas Quizzes”
- Open-source tool to turn text files with LaTeX into Canvas Quizzes
  - https://github.com/gpoore/text2qti



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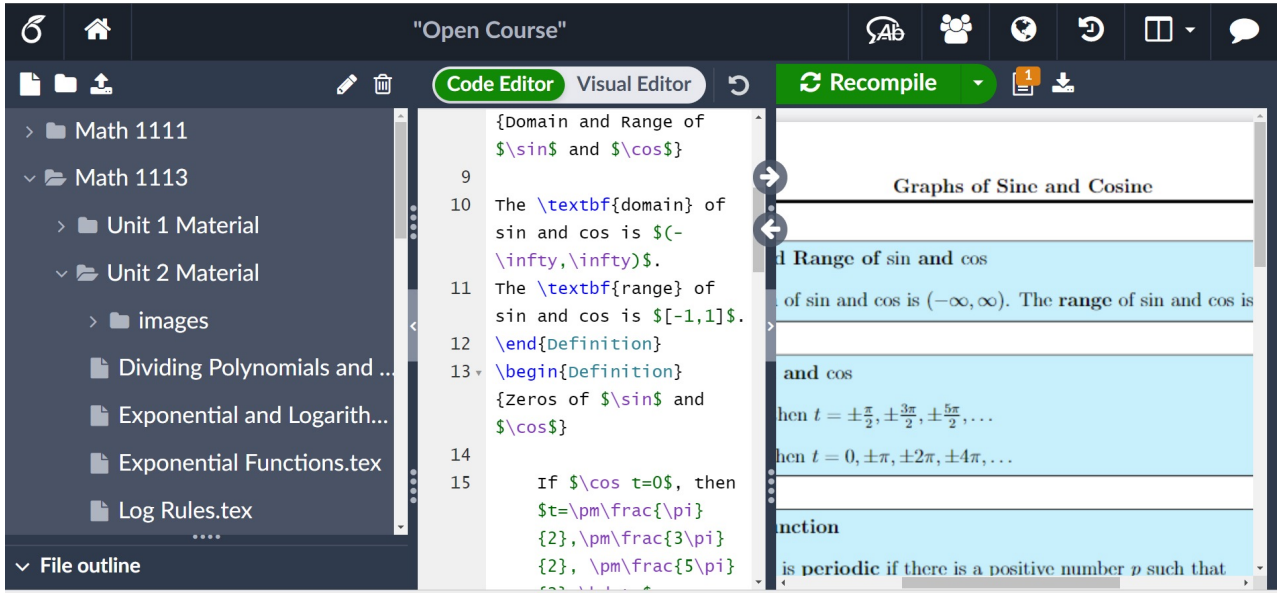
Creating Course Notes with Overleaf

- Overleaf is an online LaTeX editor
- Real-time collaboration and version control make it easy for large teams to work together



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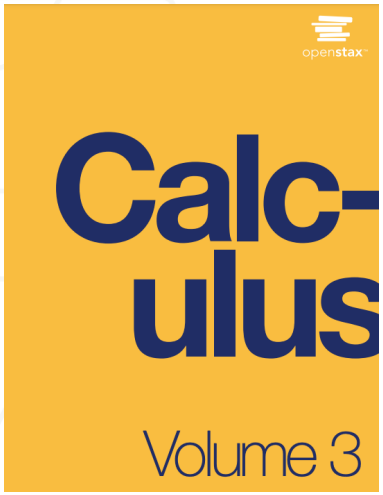
Multivariable Calculus



Question 3 1 pts

Determine the range of $f(x, y) = \sqrt{16 - x^2 - y^2}$.

- ○ $\{z \mid 0 \leq z \leq 4\}$
- ○ $\{z \mid z \leq 4\}$
- ○ $\{z \mid z \geq 0\}$
- ○ $\{z \mid z \leq 0, z \geq 4\}$

- Modules and lessons align with OpenStax Textbook
- Roughly 100 pre-recorded lecture videos
- 418 quiz questions (and counting!)
- Some questions developed with help of AI

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Preliminary Data

- GT Community sites can track user engagement.
- Enrollment dependent on demand and how long our courses have been available

Course	Current Enrollment
College Algebra	179
Precalculus	10
Multivariable Calculus	409
Open Statistics	11

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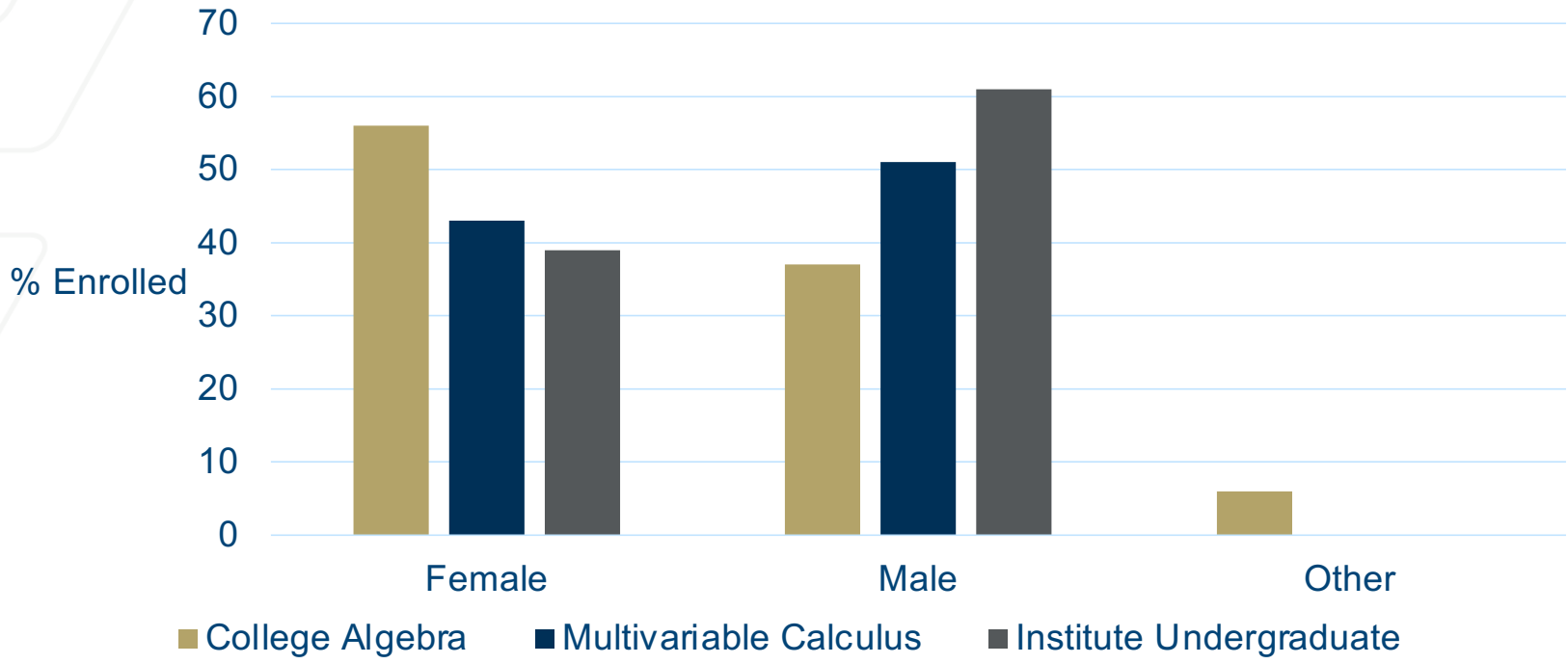
Preliminary Data: Gender



Institute Undergraduate data from: https://irp.gatech.edu/disclosures/student-demographics

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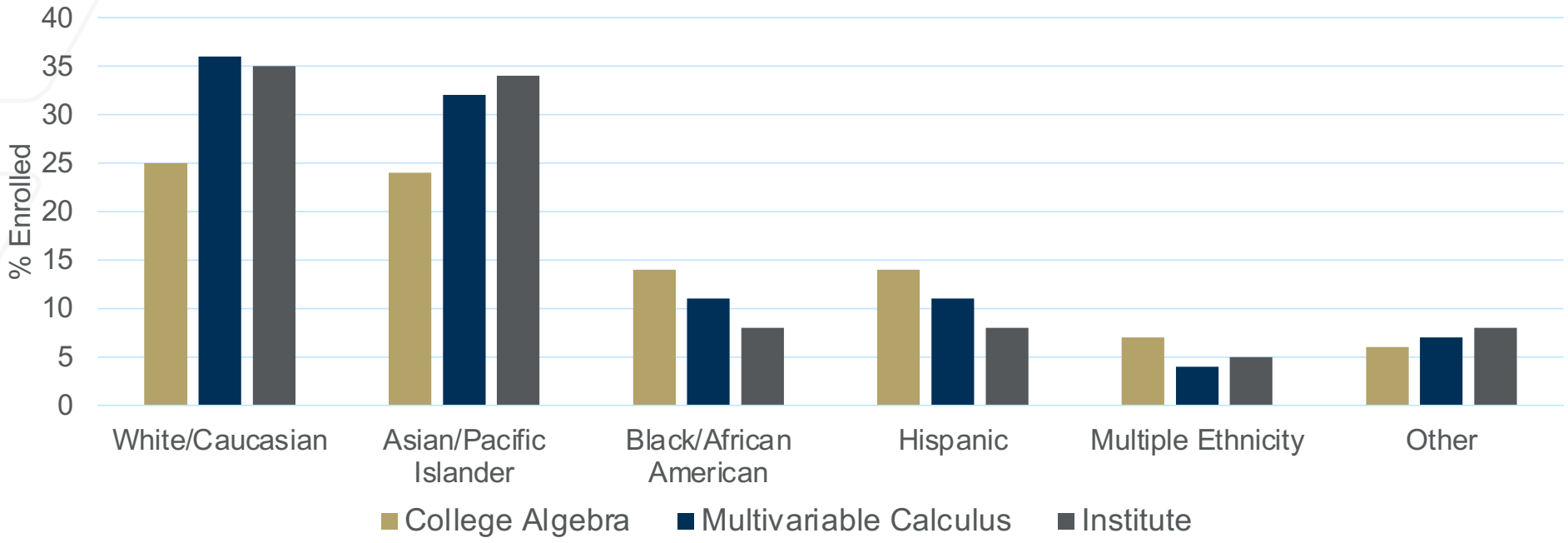
Preliminary Data: Ethnicity



Challenges

- Cannot track users on public sites
- Need two copies of each site:
  - GT Community site – requires completion of Welcome Survey to access content
  - Public site – does not collect user data
- Student assistant hiring and training
- Time required to create curriculum

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Benefits

- Supplementary resources for students across campus and beyond
- Helping transition away from publisher materials to free open access
- Statistics curriculum used as placement test
- Greater awareness of OER at our institute
- Our team of assistants are also
  - more involved in the teaching and learning of mathematics
  - career development
  - part of an open access initiative

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Where to Find Our Work

- Curriculum development still underway.
- GT Websites (for GT students only for user tracking)
  - College Algebra
  - Precalculus
  - Multivariable Calculus
  - Statistics
- Public Websites
  - College Algebra
  - Precalculus
  - Multivariable Calculus
- OER Repositories
  - Multivariable Calculus Quizzes: OER Commons, MERLOT

Questions

- We would be happy to answer any questions that you might have about our work!
- Contact information:
  - Stephanie Reikes, sreikes7@gatech.edu
  - Greg Mayer, greg.mayer@gatech.edu

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