

Open Inquiry-based Precalculus, Pre-pandemic and Now



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Spring 2019: Affordable Learning Georgia Textbook Transformation Grant

- Switching from Pearson textbook to OpenStax
- Switching from MyMathLab to low-cost online homework
- Redesigning course with small groups, worksheet-led IBL
- Worksheets based on material in OpenStax Precalculus and Active Prelude to Calculus by Matthew Boelkins

Pre-pandemic implementation

- Fall 2019 and part of Spring 2020
- Sections capped at 30 or lower
- Traditionally graded: frequent quizzes, 2 midterms, 1 final, Edfinity and written homework, some reflections, study skills assignments
- Mostly group work in class
- Professor and Supplemental Instructor circulated

Rotating group roles

- Board Scribe – writes on mini white board
- Paper Scribe – writes on group worksheet that gets turned in at the end of class
- Reader/Spokesperson – reads everything aloud and reports out
- Facilitator – manages the discussion



Then the pandemic happened

Changes made during the pandemic

- Less group work/IBL – more flipped classroom
- More flexible policies
- Standards-based grading (a.k.a. mastery grading)
 - Multiple opportunities to meet content-based standards
 - Many “Learning Checkpoints” instead of 3 exams
- More reflections

Reintroducing group work

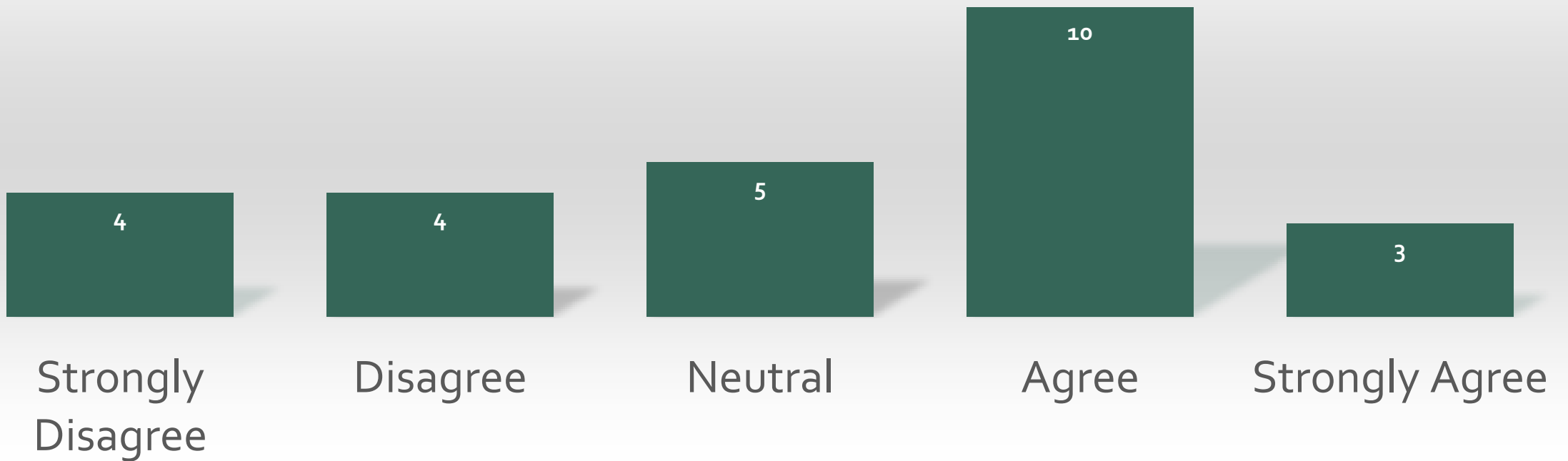
- Spring 2023 for me, gradually for Marcela
- Keeping standards-based grading
- Modified worksheets again
- Less time to cover material, so slightly reduced content

My course structure – Spring '23

- Worksheet structure:
 - Standard(s) stated with description
 - Problems to work on in class
 - Problems to finish as homework (graded on completion)
- Standards-based grading with 10 Learning Checkpoints
- Lots of reflections

Mixed opinions

I liked working in groups

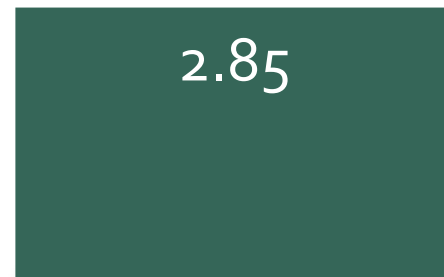


I feel comfortable explaining math by speaking

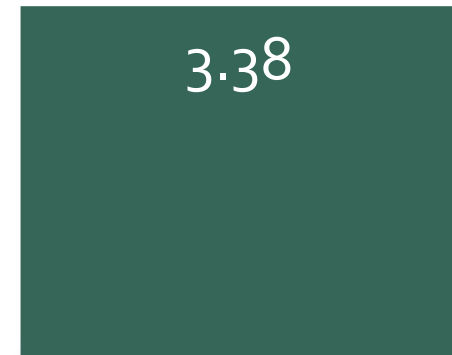
1=Strongly Disagree to
5=Strongly Agree

5
4
3
2
1

Beginning of semester



End of semester



Likert average (n=26)

Possible benefits of using IBL with SBG

- 11 out of 26 students reported that their group members helped them better understand the grading system
- Worksheets clearly indicate standards
- Able to think more deeply in class about topics than just listening to lecture
- IBL gives them practice explaining
- Some worked with group members outside of class

Some challenges

- Forming groups
 - Absences, especially in 8am class
 - Some groups didn't work
 - Not everyone on board with group work
 - Group roles not taken seriously
- Covering material
 - Less class time due to more assessments with Standards-Based Grading
 - Students have seen less material
 - Need more time to discuss as a class
- Students want more lecture

Attempting to address the challenges

- Adding a little more lecture/class discussion
- Checkboxes on worksheets to indicate places students should check their work with the professor or SI
- Guide to Success
- Giving them access to old videos from flipped-classroom days

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Starting Fall 2024 – an extra hour of class time!
3 credit hours to 4 credit hours

OpenStax Precalculus Ancillary Materials

by Rachel Epstein, Marcela Chiorescu

This collection of worksheets, homework assignments, and study skills exercises was created through a [Round 14 Textbook Transformation Grant](#). The worksheets supplement the following topics as covered in [OpenStax Precalculus](#): Functions, domain and range, rates of change, inverse functions, exponential functions, logarithmic functions, exponential growth modeling, angles, sine and cosine, right triangles, sum identities, and difference identities. Study skills exercises include growth mindset and metacognition activities.

↓ DOWNLOAD ANCILLARY MATERIALS

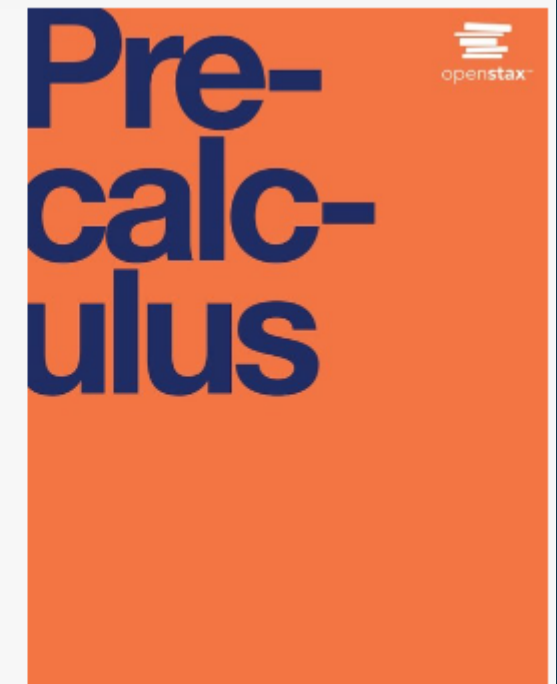
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Our project



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