Math in the Activity-Based Classroom
Math Pathways
Cuyamaca College

2018 Strengthening Student Success Conference
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STRUCTURAL OVERVIEW
Cuyamaca College
Math Pathways Goals

• Annihilate the achievement gap
• Substantially increase the proportion of incoming students who complete a degree-level or transferable math course
• Substantially increase the proportion of students who transfer and/or earn a degree or certificate
One- or Two-course Sequences

- No math below Intermediate Algebra
- Pre-Statistics followed by transfer-level statistics
- Intermediate Algebra with or without corequisite support followed by a transfer-level course
- First-tier transfer course with or without corequisite support
  - Statistics; College Algebra; PreCalculus; Business Calculus
Cuyamaca Corequisite Model

- Multiple measures for placement
- Place students in the appropriate Math Pathway by Meta-Major or Area of Interest
  - (STEM; Business; General Education; CTE; Education Increases success and retention)
- Cohorting model
- Same teacher for both classes
- Credit Hours
  - 2-units for transfer corequisite
  - 3-units for Intermediate Algebra corequisite
MAKING THE CASE: ACTIVITY-BASED LEARNING
Developmental Math Students: Views of Math

• View math as rules/procedures to be memorized; can’t “figure it out”
• When students were asked, “What does it mean to be good at math?” 77% gave answers like these:
  • “Math is just all these steps.”
  • “In math, sometimes you have to just accept that that’s the way it is and there’s no reason behind it.”
  • “I don't think [being good at math] has anything to do with reasoning. It's all memorization.”

Types of Learning Opportunities Required for Deep Understanding

For deep learning, with understanding, students need recurring and sustained opportunities for:

• *Productive struggle* – with important mathematics

• *Explicit connections* – among concepts, procedures, problems, situations

• *Deliberate practice* – increasing variation and complexity over time

QUASAR

- Levels of Cognitive Demand
  - Memorization
  - Procedures without Connections
  - Procedures with Connections
  - Doing math or statistics
MAKING CHANGES
Paradigm Shift in Teaching & Learning

The activity-based math classroom

• Contextualized teaching and learning
• Just-in-time remediation
• Focus shifts from the teacher to the student
• Productive struggle with brains-on activities
• Teacher-guided discovery
• Low stakes, collaborative practice
• Intentional support for the affective domain
Cultural Shifts

• Collaborative Work
• Early referral
• Intentional Support for the Affective Domain
• Ongoing formative assessment
• Faculty Training
Creating Lesson Plans

• Backward Design
• Set Up
• Key Concept Activity
• Closure
• What essential concepts do students need to know?
TROUBLE SHOOTING
GROUP WORK
Think, Pair, Share

- Two categories to consider
  - Student behaviors
  - Logistics
- With a partner come up with two to five issues you might face when using groups in the classroom
Strategies for Group Work

• Motivating group work
  • Fortune 500 List
  • Discuss goals of college education
  • Article “When to Let Students Struggle” or “Brainology”

• Random assignment of groups
  • Group cards with class diagram
  • Frequently change groups

• Accountability
  • Include effort as part of grade
  • Establish expectation for board work & presentations
  • Ambassador Exchange
Think, Pair, Share

With your partner determine which strategy helps overcome each issue you identified

Report Out
A Typical Day ...
Statistics plus Support
Statistics plus Support
Intermediate Algebra plus Support
Intermediate Algebra plus Support
VOICES OF STUDENTS, FACULTY & COUNSELORS
Cuyamaca College  
Student Survey  

An electronic survey was sent to all students enrolled in a course with support and the same course in the traditional mode

• Students enrolled in concurrent support courses were significantly more likely to...

✓ feel more comfortable making mistakes in class  
✓ agree the course provided them with more opportunities to receive guidance from other students  
✓ believe the instructor did a good job of managing the classroom  
✓ feel the in-class activities helped them master the course material and complete homework
Cuyamaca College Students

• Karly Franz (PreCalculus w/support)
  • “I enjoyed the course’s intensity and, despite challenges outside the classroom, earned a B+. I’m now on my way to becoming a high school biology teacher.”

• Caleb Rendon-Guerrero (Statistics w/support)
  • “I like working in groups and switching groups because you get more perspectives. You might misunderstand something and then someone helps you see it another way. It’s kind of like having two teachers.”
Cuyamaca College Students

• Keith Fernandez (Intermediate Algebra w/support)
  • “This class helps students who might otherwise not succeed, who might stall out and never get a degree or transfer.”

• Lizbeth Bueno (Intermediate Algebra w/support)
  • “This class if very different from other math classes I have taken. We help each other. We share answers and approaches. It helps people who are shy and afraid to ask for help.”
Cuyamaca College Faculty & Counselors

• Scott Eckert (Intermediate Algebra w/support)
  • “In this kind of collaborative learning, I see my students thinking in deeper ways. They are articulating math in ways I never saw in traditional classes.”

• Vi Trang (Business Calculus w/support)
  • “I like teaching this course because the students are more engaged and motivated to learn. And it helps them get through the math pipeline faster.”
Cuyamaca College Faculty & Counselors

• Annalinda Arroyo (Statistics w/support)
  • “We shouldn’t limit students just because they have a label like ‘underprepared.’ Even without specific skills that we often think are necessary, students can contribute significantly to solving problems. They can use their reason to analyze situations and come up with solutions.”

• Melanie Davidson (Counselor)
  • “It gives me the chance to talk about what they want to do for a career and other opportunities that would get them there faster.”
Cuyamaca College Offers Case Study In Eliminating The ‘Math Pipeline Of Doom’

https://www.youtube.com/watch?time_continue=81&v=BlFid2z_rII
RESOURCES

https://app.box.com/s/vkpu5kutm8lz5ozm65flpjcbvug8vpfs
Questions?
Additional Workshop

Restructuring the Math Pipeline for Success
Thursday, 10/12
11:15 am – 12:15 pm
Grand Peninsula F

We will discuss the structure of the revised math program at Cuyamaca, provide evidence that we are closing the achievement gap in math, and review strategies for implementing similar structural changes at your own college.
Thank You!

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