

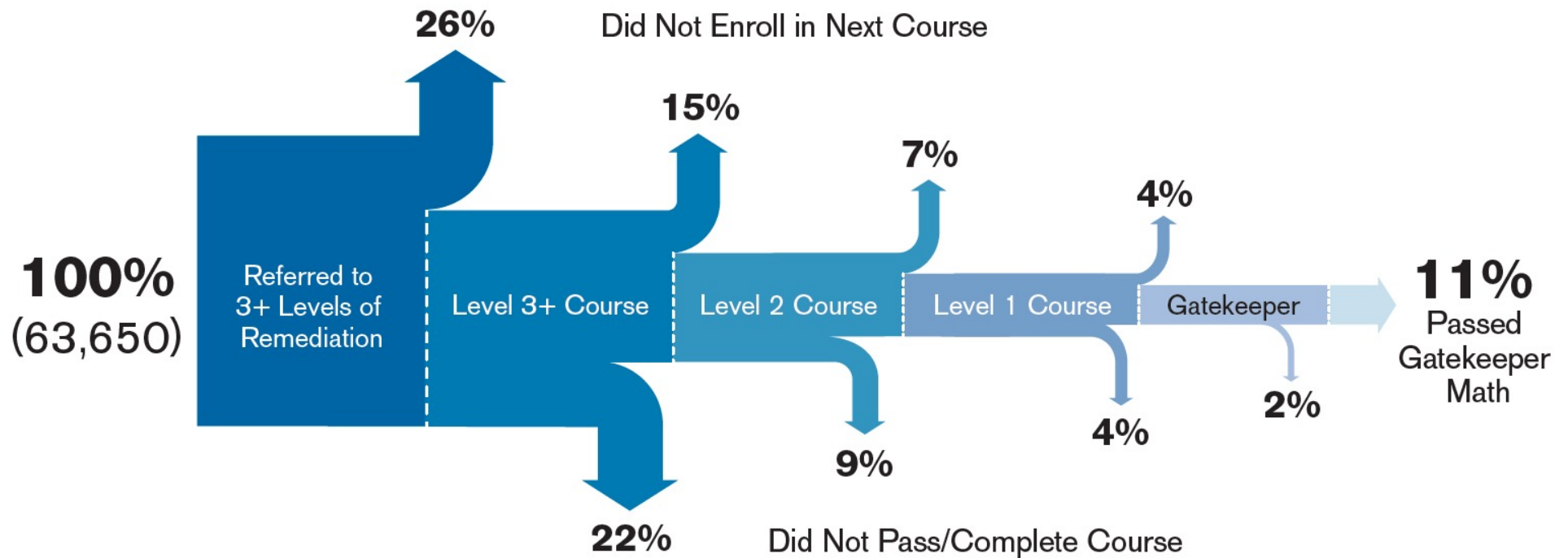
# Corequisite Models

*Creating successful concurrent developmental supports*

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— Equity — Access — Excellence —

## Student Progression through the Developmental Math Sequence



Jaggars, S. & Stacey, G. (2014), adapted from Bailey, Jeong, & Cho (2010).  
Community College Research Center, Teachers College, Columbia University, NY, NY.

## Student Outcomes – The “Why”

The most common student outcomes in U.S. across community colleges and universities:

- Accumulation of credit hours
- Accumulation of debt
- NO credential



Students assessed as underprepared



Students assessed as college-ready

# Corequisite Considerations, Models, and Case Studies

# Finding your models – Check all that apply

## Finding your models – Check all that apply

- Rural campus
- High % commuter
- High % FTIC traditional age
- Mostly adjunct faculty
- Assessment test placement
- Traditional semesters or quarters
- Designing for bubble students
- Many nearby transfer institutions
- Urban campus
- High % residential
- High % returning adults
- Mostly full-time faculty
- Multiple measures placement
- Variety of schedules
- Designing for all developmental
- Only institution in region

## Best Practices for Corequisites

### Adopt/Adapt:

- Require structured content.
- Align content so that students are truly getting just-in-time remediation.
- Provide a sufficient number of hours of support, based on student need.
- Run side-by-side or embedded remediation.
- Incorporate academic mindset and learner strategy instruction.
- Inspect data regularly.

### Avoid:

- Running an unstructured homework hour.
- Running a traditional Intermediate Algebra course side-by-side with the college-level course.
- Determining hours of support based on what is easiest to schedule.
- Focusing solely on individual course pass rates (rather, inspect throughput).
- 8-week developmental followed by 8-week college-level

## Recommendations

- Math faculty works together to reach consensus on each college-level course's topics and sequence (develop a common course calendar).
- Math faculty backmaps from that common calendar to achieve a common calendar for the support course.
- Math faculty collaborates to choose academic mindset and learner strategies on which to focus and provide instruction to students.



## Recommendations

- Department encourages faculty collaboration and communication.
- Department provides professional learning to faculty:
  - Academic mindsets and learner strategy instruction
  - Content instruction for faculty who have always taught developmental algebra but are now teaching statistics support or QR support.
- Department engages in continuous improvement processes, including;
  - Gathering qualitative and quantitative data from both students and faculty.
  - Collaboratively analyzing disaggregated data for inequitable outcomes
  - Collaboratively proposes and implements more equitable departmental- and classroom-level policies and practices.

## Cohort Model

Reserving certain sections of college-level courses exclusively for students assigned to developmental education.

The cohort model may consist of:

- one class with extended hours or
- two separate classes.

May have one instructor or separate instructors.

## Cohort Model

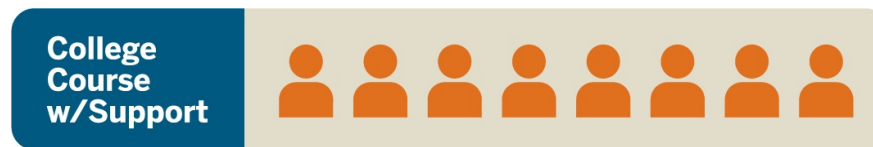


Students assessed as underprepared





Students assessed as college-ready

Reserving certain sections of college-level courses exclusively for students assigned to developmental education.

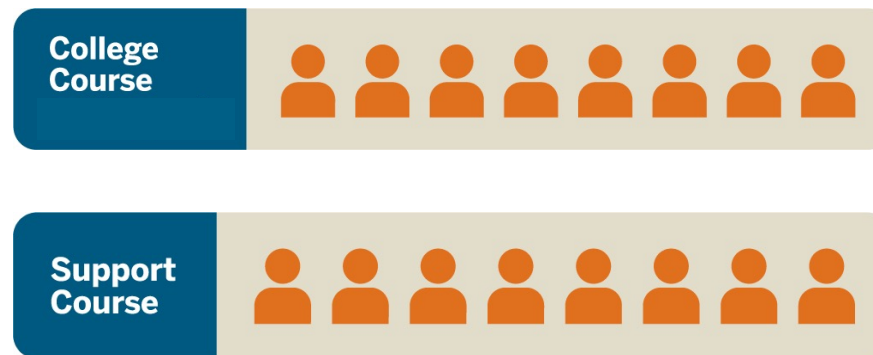


Students meet for extended hours each week;  
the instructor embeds just-in-time support as needed.

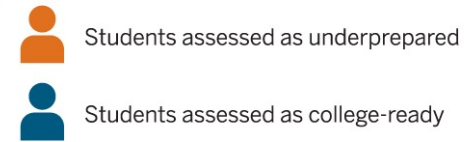
## Cohort Model

-  Students assessed as underprepared
-  Students assessed as college-ready

Reserving certain sections of college-level courses exclusively for students assigned to developmental education.

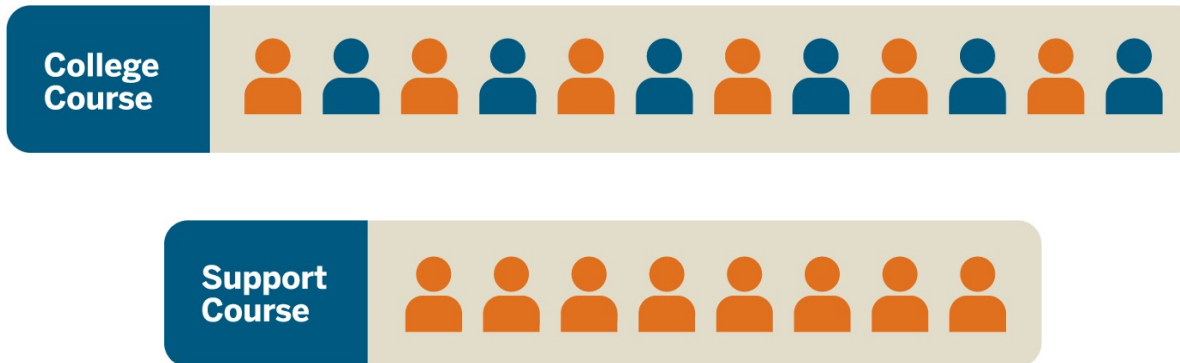


## Co-mingled Model



Mixing students designated as college-ready and as developmental in the same college-level class.



Developmental students are provided an additional support class.



# Instructor Assignment

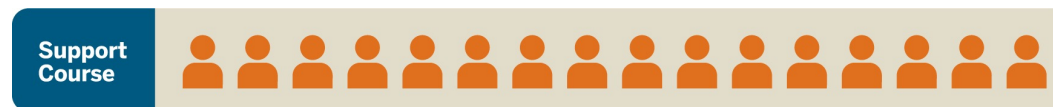
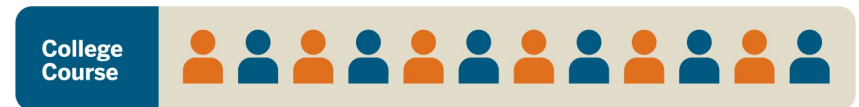
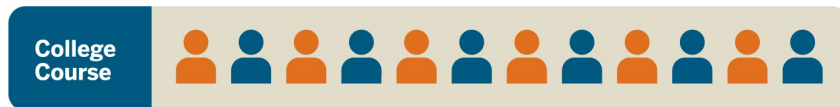
	<b>Co-mingling of prepared and underprepared students</b>	<b>Cohort of only students designated as underprepared</b>
<b>Embedded supports in extended hours</b> (e.g., 5 or 6 contact hours)	Not possible	Need one instructor for the full time
<b>Separate courses</b> (e.g., 3 credits + 3 credits)	Can be same instructor or different instructors	Can be same instructor or different instructors

## Co-mingled Model

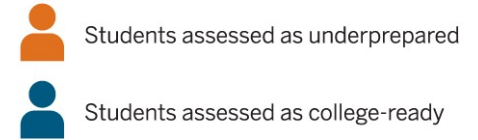
-  Students assessed as underprepared
-  Students assessed as college-ready

Mixing students designated as college-ready and as developmental in the same college-level class.

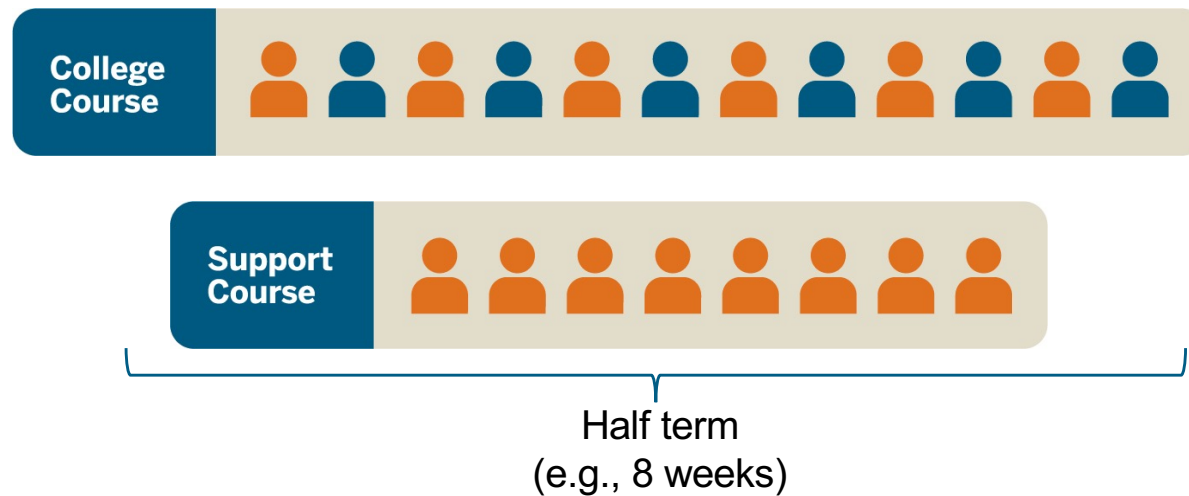
Two or more sections of students assigned to developmental are combined in one additional support class.



## Compressed Model





Students complete the college-level and support course in a half-term, 10-12 hours per week.



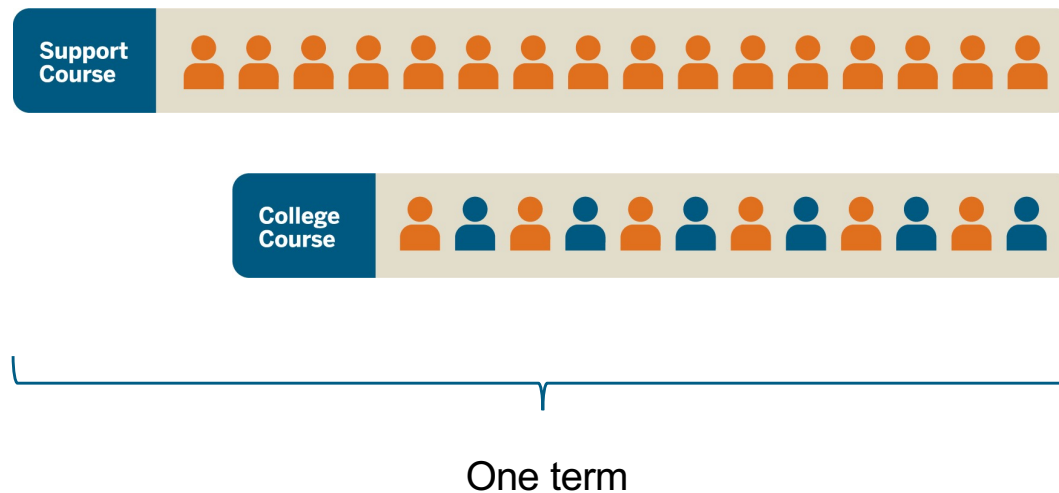


# Additional options – calendar structures

-  Students assessed as underprepared
-  Students assessed as college-ready

## Hybrid Boot Camp/Support Course –

16-week support course,  
Late start 12-week college course



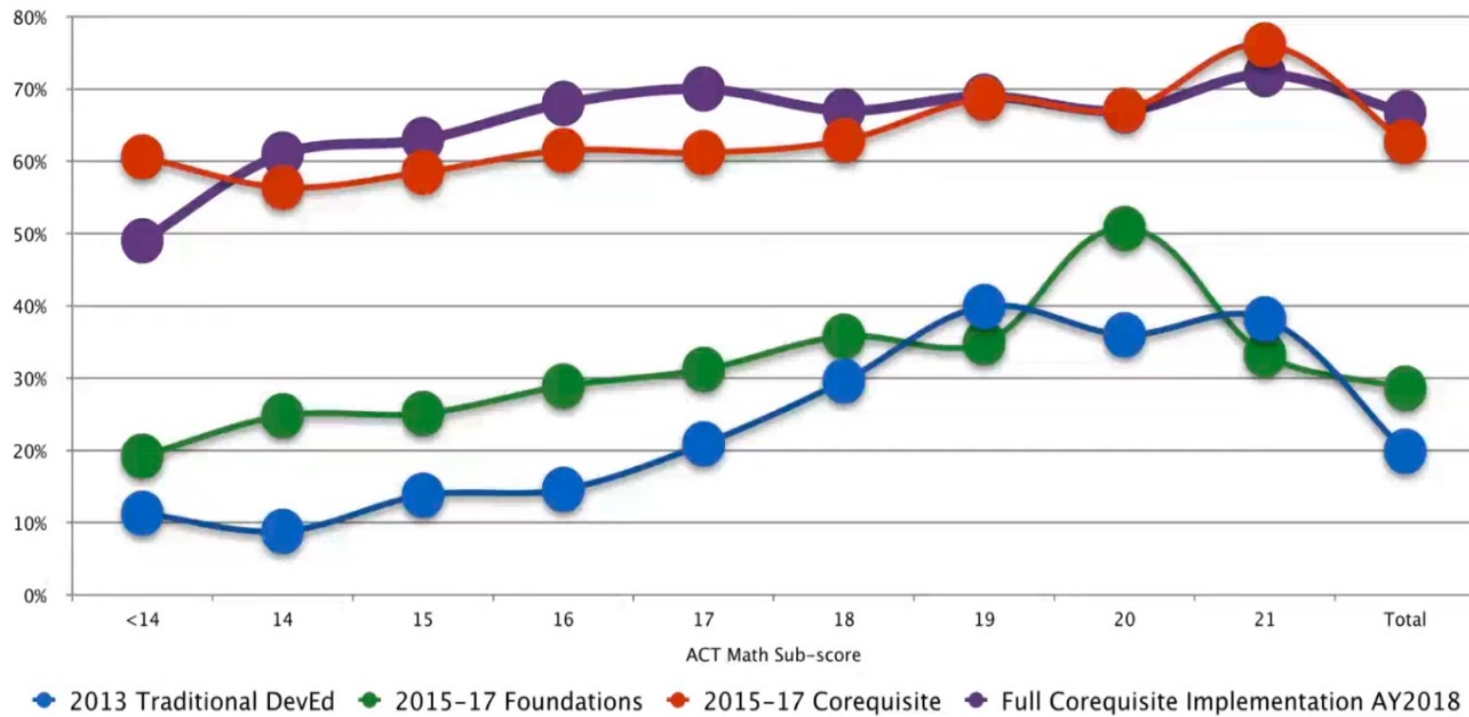


# Case Studies



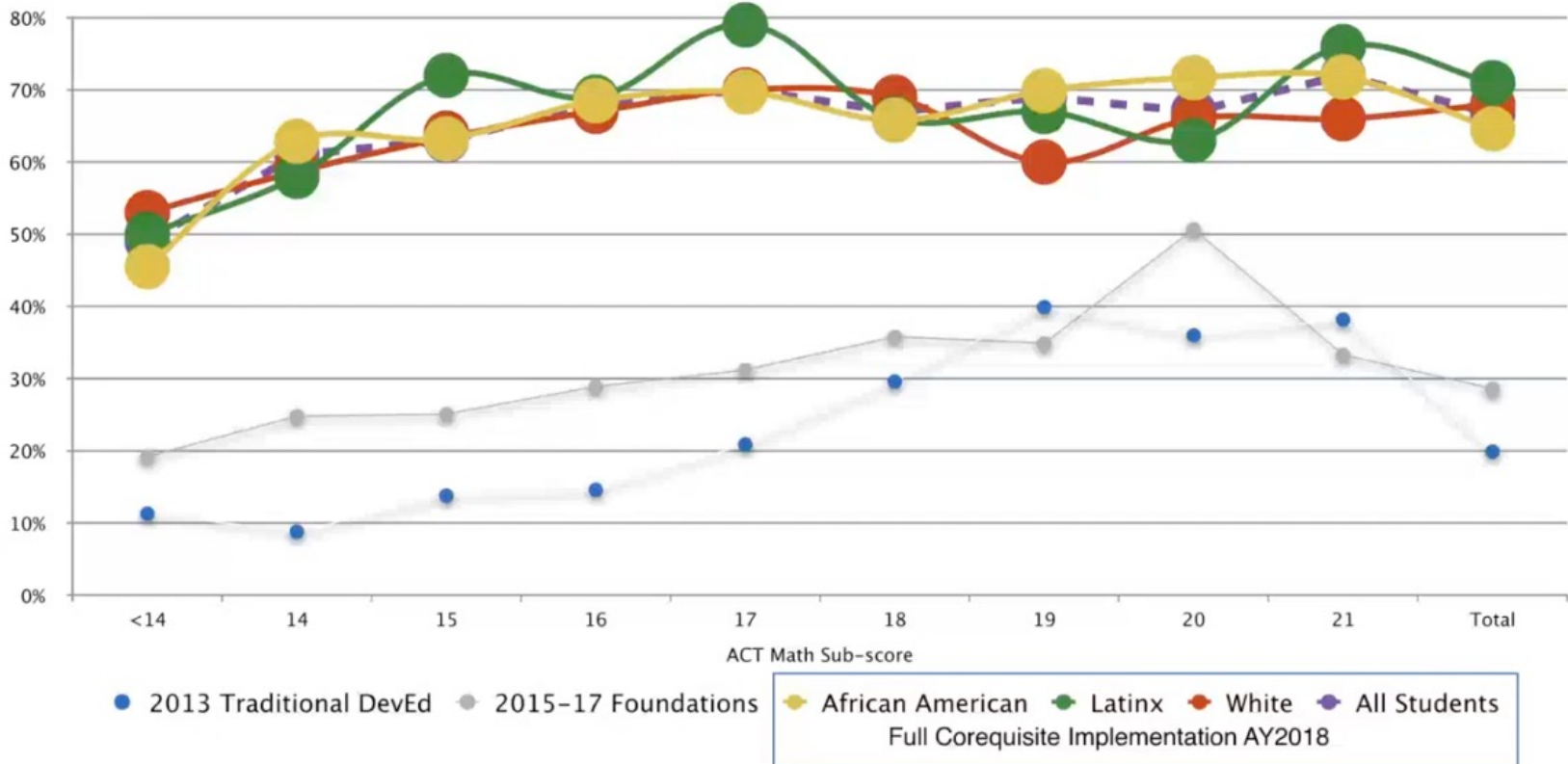
# University System of Georgia

## USG System-wide Comparison of Success in Gateway Math Classes

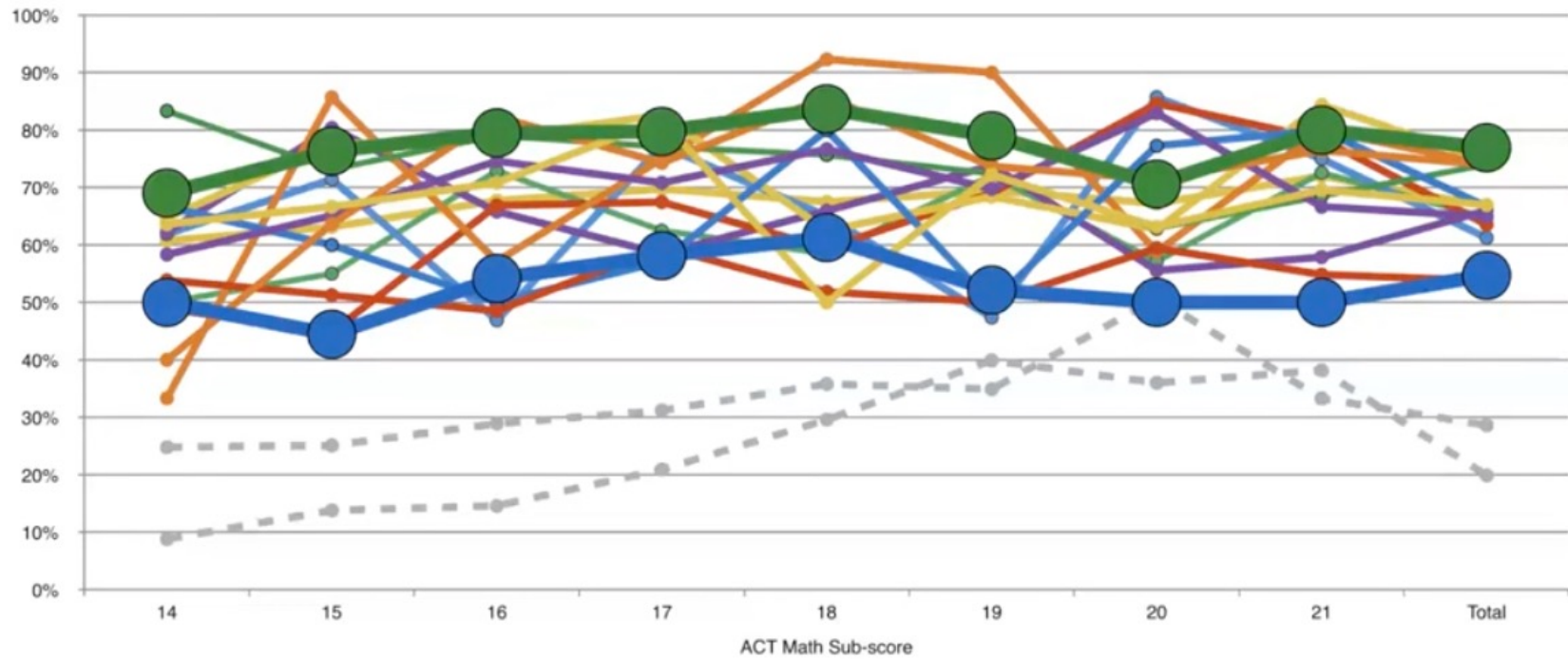


<https://completega.org/usg-corequisite-virtual-workshop-reviewing-progress>

## USG System-wide Comparison of Success in Gateway Math Classes Disaggregated by Race



## USG System-wide Comparison of Success in Gateway Math Classes Disaggregated by Institution



Full Corequisite Implementation AY2018

## Distinguishing Factors of Success

- Regardless of race/ethnicity, gender, math pathway, preparation level, etc.:
- 2 or 3 hours of support are better than 1 hour
- Cohort model has better results, likely due to alignment issues in the co-mingled models
- Academic mindsets

<https://complettega.org/usg-corequisite-virtual-workshop-reviewing-progress>

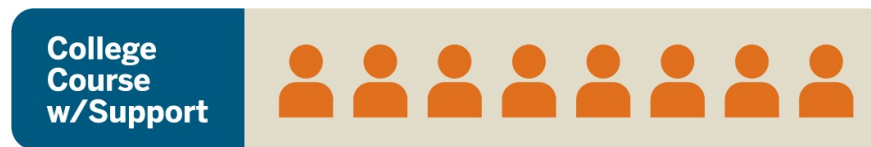
# Cuyamaca College

Tammi Marshall: [Tammi.Marshall@gcccd.edu](mailto:Tammi.Marshall@gcccd.edu)



## Cuyamaca College - Cohort Model

Reserving certain sections of college-level courses exclusively for students assigned to developmental education.



Students meet for extended hours each week;  
the instructor embeds just-in-time support as needed.

## Cuyamaca College - Cohort Model

### **MATH 176 PreCalculus** **MATH 076 support content**

- Support course
  - 2 credit hours (non-degree applicable)
  - Grading: pass/no pass
- Transfer credit-bearing course
  - 6 college level credits
- Eight contact hours
- Same instructor
- Meets two or four times a week

## Cuyamaca College - Cohort Model

### **MATH 160 Elementary Statistics** **MATH 060 support content**

- Support course
  - 2 credit hours (non-degree applicable)
  - Grading: pass/no pass
- Transfer credit-bearing course
  - 4 college level credits
- Six contact hours
- Same instructor
- Meets twice a week

## Cuyamaca College – 100% Scale

Redesign uses student-centered learning environment in all courses with corequisite support.

CAP Design Principles are used:

- Backward design
- Relevant, thinking-oriented curriculum
- Just-in-time remediation
- Low-stakes, collaborative practice
- Intentional support for students' affective needs

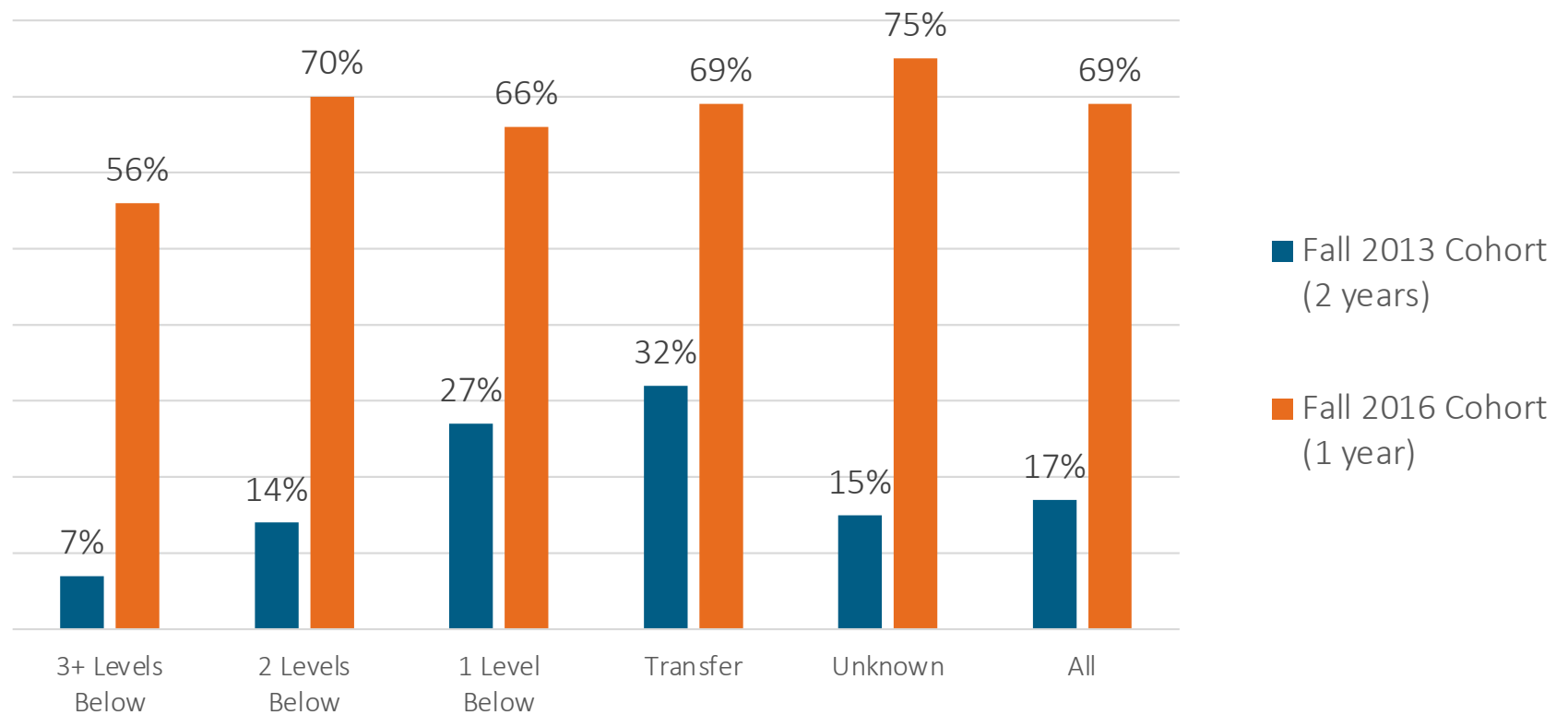
“Cuyamaca College Offers Case Study In Eliminating The ‘Math Pipeline Of Doom’”  
<http://www.kpbs.org/news/2017/aug/31/cuyamaca-college-offers-case-study-eliminating-mat/>

# Cuyamaca College - Placement

Uses HSGPA and course-taking only; no testing. HSGPA is self-reported.

Path	Measures	Placement
Algebraic	Grade of C in High School Algebra II and GPA $\geq 3.3$	Transfer-level
	A or B in Algebra II and GPA $\geq 3.0$	Transfer-level
	A or B in PreCalculus and GPA $\geq 3.0$	Calculus I
	C in PreCalculus and GPA $\geq 3.0$	Calculus I
	All others (including NO Algebra II)	Transfer-level with support
Stats & QR	GPA $\geq 2.8$	Transfer-level
	GPA $< 2.8$	Transfer-level with support

## Math Throughput – Transfer-level w/ support



# Southeast Missouri State University

Tammy Randolph: [trandolph@semo.edu](mailto:trandolph@semo.edu)

## Southeast Missouri State - SEMO

**MA128: Number and Operations for Educators** (childcare, early childhood, elementary ed)  
+MA018: Number and Operations for Educators lab



**MA123: Survey of Mathematics** (liberal arts majors)  
+MA023: Survey of Mathematics lab

**MA155: Statistical Reasoning** (nurses, communication disorders, criminal justice)  
+MA055: Statistical Reasoning lab

**MA115: Precalculus A with Integrated Review**

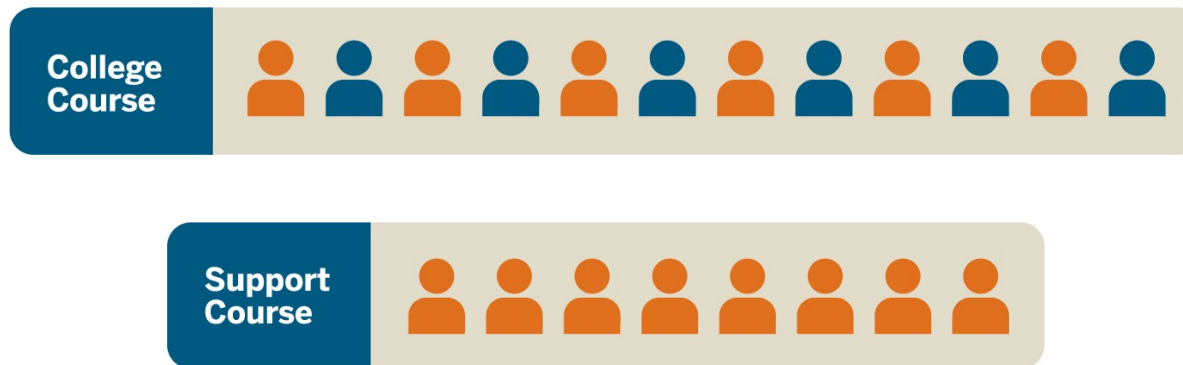


# SEMO Models

-  Students assessed as underprepared
-  Students assessed as college-ready

Math Education, Survey of Math, and Statistical Reasoning courses use the co-mingled model:

Mixing students designated as college-ready and as developmental in the same college-level class.



## SEMO Models

### Gateway and developmental math are:

- Co-mingled
- Both co-taught by instructor and GA
- Approximately 60 students
- ~35 on-level and ~25 developmental
- Taught in computer classrooms
- Separate course registrations
- Separate grades
- Using one platform for all courses in the redesign

# SEMO Models

## Gateway Mathematics Course Component:

- 3 credits
- Mini lectures with time for homework
- Daily quizzes from homework

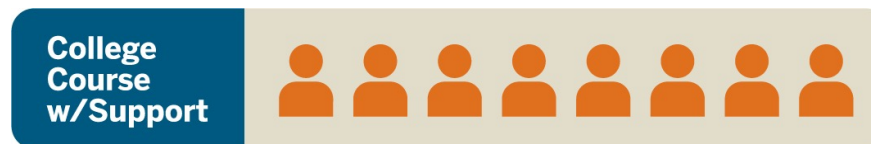
## Developmental Math component:

- 1 credit hour, 2 contact hours
- Counts as 2 hours in faculty load
- Mini lectures with time for homework in class
- “Just-in-time” support
- Time for 1-1 help
- Study skills integrated into the class

## SEMO Models

Precalculus A with Integrated Review uses cohort model:

Certain sections of college-level courses reserved exclusively for students assigned to developmental education. Students meet for five hours per week.



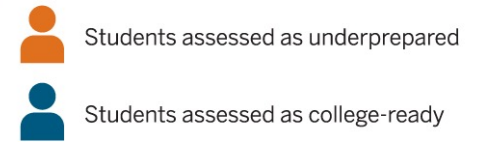
## SEMO Results

- 78% of all students enrolled in both courses (dev & gateway) were successful in one semester
- 88% success in dev math labs
- Freshmen – Sophomore retention increased to 74%
- Students are spending less TIME and less MONEY in dev math classes
- Dev students are more engaged with instructors
- Using ONE platform (Lumen) for all dev math and gateway courses
- Happier students!

# Roane State Community College

Markus Pomper: [mpomper@iu.edu](mailto:mpomper@iu.edu)

## Roane State Statistics Pathway



Mixing students designated as college-ready and as developmental in the same college-level class.

Developmental students are provided an additional support class.



## Roane Scheduling – Choose one from each column

MATH  
1530

MW	8:00a-9:20a
MW	9:30a-10:50a
MW	11:00a-12:20p
MW	3:30p-4:50p
MW	5:00p-6:20p
TR	8:00a-9:20a
TR	11:00a-12:20p
TR	12:30p-1:50p
TR	2:00p-3:20p
TR	5:00p-6:20p
M	6:00p-9:00p
T	6:00p-9:00p
R	6:00p-9:00p
F	9:00a-12:00p

MATH  
0530

MW	9:30a-10:50a
MW	3:30p-4:50p
TR	9:30a-10:50a
TR	11:00a-12:20p
TR	12:30p-1:50p
TR	6:30p-7:50p
S	8:30a-11:30a

**No Online or Accelerated courses.**

Subject to availability of open seats



## Roane Structures

### MATH 1530 Probability and Statistics

- 3 credit hours
- The same course for students with or without learning support needs
- Blended class of students with and without learning support needs
- Sequence of topics is prescribed

### MATH 0530 Statistical Principles

- 3 credit hours
- May contain students from several different sections of MATH 1530

## Roane Grades

### MATH 1530 Probability and Statistics

- Grade is based on assignments in MATH 1530
- Common Final Exam; 4 tests; other assignments are at discretion of instructor

### MATH 0530 Statistical Principles

- Grade is based on assignments in MATH 0530
- Common quizzes, homework assignments, and notebook exercises; other assignments at discretion of instructor

## Sample Grading Scheme

		Parent Course	
Support Course		Pass	Fail
Pass	Gen Ed requirement is satisfied. Unless other math courses are needed, remediation is satisfied.	Student repeats parent course. Repetition of support is optional.	
Fail	Gen Ed requirement is satisfied. Unless other math courses are needed, remediation is waived.	Student repeats both courses. Student is likely to lose Tennessee Promise Scholarship.	

*What questions or comments do you have?*  
*What are your next steps?*



## Equity Implications of Limited Corequisites

- Students are much more likely to stop out of a prerequisite sequence than they are to fail a college-level course plus corequisite.
- The impact is worse for students of color and students from low-income communities.

For example, see Belfield, Jenkins, & Lahr (2016) and Denley (2021)

## A Cautionary Tale from College of the Canyons

- In 2016, **71% of students were eligible to enroll directly** in college Statistics through multiple measures.
- The college gave students two placement options and let them choose between Statistics and a below-transfer algebra course.
- Students who chose statistics passed at a rate of 66%.
- But **80% of the eligible students placed themselves into remedial algebra**, even though the vast majority didn't need it for their major.
- Just **13% of these students completed transfer-level math that year** – 188 out of 1,438 students.
- If you offer developmental courses, they will come, and “instead of a field of dreams, it's a field of nightmares.”

- Sab Matsumoto,  
- long-time chair of mathematics and current AB 705 coordinator

## 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.

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



## Promoting Student Success in College-Level Courses: *Designing and improving equitable and effective corequisite courses*

Highly interactive synchronous sessions, two hours each for six sessions.



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Connie Richardson

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UTDanaCenter.org

 Facebook.com/utdanacenter

DCMathPathways.org

 Twitter.com/DCMathPathways/

## Resources

Dana Center Math Pathways Implementation Guide

<https://dcmathpathways.org/implementation-guide>

Dana Center Corequisite Toolkit

(Coming Soon! Many individual tools currently available)

DCMP Curriculum Design Standards

<https://dcmathpathways.org/sites/default/files/resources/2020-10/Revised%20Curriculum%20Design%20Standards-FINAL.pdf>

Dana Center Transition to College Mathematics Course Framework – esp. pp. 9-14

[https://www.utdanacenter.org/sites/default/files/2021-01/transition\\_to\\_college\\_mathematics\\_course\\_framework.pdf](https://www.utdanacenter.org/sites/default/files/2021-01/transition_to_college_mathematics_course_framework.pdf)