



# Fostering Growth Mindset to Promote First-Year Student Success

This summary is part of the Charles A. Dana Center's "Notes from the Field" series, which highlights examples of innovative practices from colleges, universities, and systems.

## TAKEAWAYS

- *Students with a growth mindset understand that their abilities are not fixed and can be developed.*
- *One college analyzed student responses to a mindset survey and found that one of the largest predictors of student success, as measured by a student's first year GPA, was a growth mindset in mathematics.*
- *Efforts to incorporate growth mindset activities and assignments into math corequisite supports are helping first-year students to reflect on their learning processes. Students also gain confidence in their abilities to overcome obstacles and find success in math.*
- *The college is monitoring student success and persistence in first-year math and beyond.*

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## Introduction

The College of Coastal Georgia (CCGA) has been examining the relationship between academic mindset—the psychological and social attitudes or beliefs that students hold toward their academic work—and college success. Based on a schoolwide student survey, CCGA found that a growth mindset in mathematics was a significant predictor of first-year student GPA.

Findings suggest that by integrating targeted growth mindset supports into math corequisite courses, the college could help more students succeed. As a result, CCGA faculty and staff are experimenting with integrating math growth mindset activities and assignments into some sections of math corequisite courses to determine which activities have the greatest impact on student mindset. They plan to embed these high-impact activities within other courses across the campus.

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## Background

Until 10 years ago, the traditional approach to mathematics learning support (remediation) within the University System of Georgia had been to enroll underprepared students in standalone developmental math courses. These courses were designed to teach or reteach key prerequisite skills and concepts needed for success in college-level introductory courses. Despite the fact that non-STEM students are better served by a quantitative reasoning gateway course, these developmental classes included a wide variety of mathematical topics typically taught in middle and high school, which are prerequisite knowledge specifically for college algebra.

*How can the system's colleges significantly improve success rates in gateway mathematics courses without compromising the disciplinary integrity of those courses?*

CCGA faculty and staff observed many students struggling to move beyond these remedial math courses, which wasted students' time and money. Students often became discouraged and left the college before they could even access the credit-bearing college courses needed for their degrees.

In January 2013, the University System of Georgia (USG) established the Task Force on the Role of Mathematics and College Completion.<sup>1</sup> The purpose of the task force was to determine how the system's colleges could significantly improve success rates in gateway mathematics courses without compromising the disciplinary integrity of those courses. At the time, approximately one in five of all students in the USG institutions, and approximately two in five of all students in the system's open access colleges, began their studies in remedial math classes, which neither awarded college credit toward graduation nor required mastery of college-level course content. Less than one-sixth of those students earned a degree within six years.

In addition to the low success rates and increased time to completion from the remedial math classes, the task force also called out the high rates of failure in college algebra as a driver for redesigning the first two years of college mathematics.

The task force made a number of recommendations, including:

- Focusing on supporting success and college credit-bearing, gateway mathematics courses for all students.
- Aligning gateway mathematics course sequences with academic programs of study (in particular, college algebra should not be the default gateway math class for non-STEM majors).
- Implementing a corequisite approach to support student success in gateway mathematics courses.

The University System of Georgia then created an implementation plan to execute the recommendations.<sup>2</sup> The College of Coastal Georgia was one of the first institutions to pilot the corequisite model, which was eventually scaled systemwide. CCGA is a small, public four-year institution that serves just over 3,000 students. Most students receive some form of financial assistance and over one-third of students receive a Pell grant.

### Corequisite Strategies

CCGA offers four gateway introductory math courses. Each gateway course has its own corequisite support component.

**Table 1. CCGA's Gateway and Corequisite Course Offerings**

Gateway Mathematics Course	Corequisite Course Title
Elementary Statistics	Support for Elementary Statistics
Quantitative Skills and Reasoning	Support for Quantitative Reasoning
Introduction to Mathematical Modeling	Support for Mathematical Modeling
College Algebra	Support for College Algebra

Incoming first-year students are placed into the gateway course that aligns with their intended program of study. CCGA uses a multiple measures placement model to identify students who need additional support. Students who do not meet the college-ready standard enroll in both their gateway math course and the corequisite course that provides integrated, just-in-time support. The two courses are completed simultaneously in one semester so that students do not lose time in progressing towards a degree.

For the last five years, CCGA monitored the rate at which students enrolled in the gateway-corequisite course complete the math gateway course. As shown in Table 2, the completion rates were generally improving after corequisite implementation. The college saw an average gateway course completion rate of 54 percent in recent years<sup>3</sup> compared to 36 percent before the corequisite approach was adopted.

**Table 2. Comparisons of Gateway Course Credit Pre- and Post-Corequisite Implementation**

Corequisite Model	Recent Student Performance				
	2016–17	2017–18	2018–19	2019–20	2020–21
Math gateway course completion rate for first-time freshmen needing learning supports	50%	48%	55%	65%	52%
Remedial Model	Fall 2009 – Fall 2012 Cohort Student Performance				
Math gateway course completion rate for first-time freshmen needing learning supports	Average of 35.9% after 2 semesters				

## The Impact of Mindset

Although the corequisite supports proved to be effective in helping more students complete the math gateway course, a gap persisted between students needing learning support and students who placed out of learning support. Faculty and staff, therefore, continued to seek additional ways to help first-year students achieve momentum metrics toward college completion.

*Analysis of the survey results showed that one of the largest predictors of student success, as measured by a student's first year GPA, is a growth mindset, particularly in math.*

Since 2017, USG has conducted a survey to assess the academic mindsets of students at each state college. Academic mindsets—or individuals' belief about learning—shape how they interpret difficulty and are crucial for success in college. Developed with Motivate Labs at the University of Virginia, the survey was designed to understand dimensions of mindset, including students' motivation for attending college, sense of belonging on campus, academic preparedness, and whether they see their academic abilities as fixed or permeable.

CCGA sends the survey to all first-time freshmen in the beginning of the academic year, asking students to complete it during the first three weeks of fall semester, and to complete the survey again during the last three weeks of fall semester. The two data points provide insight into whether student mindset perceptions have changed over their first semester, either positively or negatively.

Analysis of the survey results showed that one of the largest predictors of student success, as measured by a student's first year GPA, is a growth mindset, particularly in math. Growth mindset is a concept promoted by psychologist and author Dr. Carol S. Dweck, who suggests that people's abilities are not fixed but can be developed.<sup>4</sup> Those with a growth mindset who believe in their own personal ability to improve are more likely to be successful.

For many students struggling in math, their challenges are partly due to having low self-esteem and a sense that they just are “not good at it”—as if abilities in math were a natural talent. These feelings can negatively affect students' willingness to persevere in math when they struggle. A growth mindset in math helps students understand that their abilities in math can improve over time with effort and the right supports.

According to CCGA's analysis, a growth mindset in math only accounted for three percent of the variance in college GPA after the first semester. However, a combination of growth mindset in math, perceived academic preparedness, and a student's desire to “bring honor to their family” accounted for 10 percent of the variance in GPA. Consequently, faculty and staff devised interventions to address growth mindset in math and perceived academic preparedness.

### Mindset Strategies

CCGA faculty and staff considered how the math corequisite courses might be adapted to focus not only on core math skills, but also on building confidence in students and helping them see themselves as belonging to a community of learners. One of their strategies was to incorporate a series of mindset activities and assignments in several sections of corequisite math courses. This approach was intended to help students improve their academic mindsets and motivation for learning mathematics.

Lynch and Noble use quotes from famous people to remind students that failure is part of learning and that learning takes hard work and persistence.

I've missed more than 9,000 shots in my career. . . . I've failed over and over and over again in my life. And that is why I succeed.

– Michael Jordan

If people knew how hard I had to work..., it would not seem so wonderful at all.

– Michaelangelo

It's not that I'm so smart. It's just that I stay with problems longer.

– Albert Einstein

Dr. Laura Lynch, assistant vice president for faculty affairs and professor of mathematics, and Cailin Noble, lecturer of mathematics, saw an opportunity to engage students in their corequisite math classes in new ways that provided more than just-in-time support for the gateway math course. The two instructors restructured their classes, which typically enrolled a maximum of 15 students, to allow more time for self-reflection, peer feedback, and group discussions, and for the development of critical skills in time management and study habits. Generating discussion among students was a priority for both instructors. Lynch shared that “a class focusing on supporting learning would be sorely lacking if there was not an opportunity for students to support each other.”



Dr. Laura Lynch



Cailin Noble

This collaboration and exchange of ideas can take place both in person and online. Each week, students are given discussion prompts and asked to share their responses with their classmates. Prompts might ask students to share their personal learning goals, any learning resources they found most helpful, time management

strategies and tips, and their biggest challenge in learning mathematics. Lynch and Noble report that these reflections help students to see that other students likely have similar goals and challenges and that they can support one another as a learning community.

## Initial Impact and Lessons Learned

Thus far, incorporating growth mindset activities into the math corequisite courses has been effective in reminding students that intelligence is not fixed. With the right supports and perseverance, students can succeed as math learners. Lynch shifted her instruction to “focus less on the missed or forgotten mathematics content and much more on academic mindset to build up students’ sense of self-efficacy and social belonging in college-level math classes. If students see themselves as effective learners, the math will come.”

Noble had previously taught traditional remedial math courses and was initially reluctant to move into a corequisite model. However, like Lynch, Noble immediately saw the importance of helping students with other core needs such as “study skills, how to manage their time, and to have a self-awareness about where they struggle and strategies they can use to help them succeed.” While Lynch and Noble are still collecting data and testing which activities have the most impact on student mindset and success, they have begun to share their findings and strategies with the CCGA math department.

Lynch and Noble are also planning to examine student success beyond the first year of college at CCGA. After completing the gateway math course associated with their majors, students are required to take a second college-level math class to graduate. The majority of CCGA students who are not STEM-intending take statistics. Lynch and Noble will monitor how students who completed these modified corequisite courses perform in their statistics courses to determine if in fact students retain their sense of self-efficacy, have success in college-level math, and continue to make progress towards a degree.

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## Conclusion

The College of Coastal Georgia has evidence that students with a growth mindset in math are more likely to persevere and succeed academically. The college is working to activate that mindset for first-year students to set them on the right track.

CCGA's work to date offers an approach for conveying messages to students that they can grow their abilities, they belong and are valued at school, and what they are doing in school matters. This approach has implications for other college-level faculty and staff to do similar work at their own institutions to intentionally address mindset and perceived academic preparedness for students enrolled in corequisite supports.

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## Endnotes

<sup>1</sup> <https://www.usg.edu/curriculum/assets/curriculum/documents/TaskForceMath.pdf>

<sup>2</sup> <https://www.usg.edu/curriculum/assets/curriculum/documents/AdHocFinalMath061314.pdf>

<sup>3</sup> <https://www.CCGA.edu/accreditation/student-achievement>

<sup>4</sup> <https://dweck.socialpsychology.org/publications>

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## About the Dana Center

The Charles A. Dana Center at The University of Texas at Austin develops effective mathematics and science innovations that support educators, administrators, and policymakers in creating equity-minded improvements at scale for students throughout K–12 and postsecondary education, especially those who are underserved.

The Center is known for its success in developing and implementing equity-minded innovations in STEM education policy and practice that lead to student success in education and career.

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