



Combining Our Strengths:

Improving STEM Interest and Participation in the Middle Schools through Creative Collaborations between College Faculty and Middle School Teachers

Dr. Tanya Cofer, Director of STEM Initiatives

A USG STEM Initiative at The College of Coastal Georgia

May 17, 2017

STEM Initiative Goals Addressed

- **Goal 1:** Increase the number of K-12 students who prepare for and are interested in majoring in science, technology, engineering, and mathematics (STEM) in college.

- **Goal 3: Goal 3:** Prepare and support P-12 STEM teachers in Georgias classrooms.

Brief Description of Activities

We paired college faculty with experienced lead teachers in the Glynn County middle schools, thus bringing together expertise in middle grades curricula, pedagogy, and content expertise. Together they have created unique lessons for middle grades students aimed at increasing their interest and participation in STEM as well as providing and fostering the development of “science capital” (science-related aspirations, experiences, sense of the utility, self-efficacy, e.g.).

Teams and Activities

- **Thomas Hippchen (CCGA) and Carol Denis (Jane Macon Middle School):** “Fun Math Fridays”: *Co-taught a series of innovative, discovery learning activities on rates of change and slope concepts as well as the Pythagorean Theorem using online educational games and technology such as Desmos.*
- **Holly Nance (CCGA) and Jennifer Brashear (Risley Middle School)** Ocean Acidification and “STEM Day”: *Co-developed and taught lessons that tied into an existing unit on global warming.*
- **Isidor Ruderfer (CCGA) and Kimberly Sapp (Needwood Middle School):** “Mythbusting Combustion Concepts”: *Co-developed and taught lessons that let students make conjectures about and test what happens when a lit candle in a bowl of water is covered with a glass jar.*

Results

In our (redesigned) proposal, we stated:

Pairing faculty with teacher leaders that have recognized expertise in middle grades STEM pedagogy allows for the development of truly novel STEM lessons that capitalize on the strengths of both the CCGA faculty and the lead teachers. Moreover, allowing a select group of faculty to work at great depth with the teachers and the schools provides faculty, teachers and students with a richer experience and deepens the connections between the two communities.

Given the initial feedback from the participants, we feel that the project has surpassed our expectations in this regard. In fact, all three of this years teams have indicated a strong desire to continue their work on this initiative next year and the intention to continue their partnerships over the long term.

Dr. Nance is awesome and I have loved working with her...Dr. Nance's strengths were her strong content knowledge and approachability...I enjoyed our planning times together and feel that the college has been opened up to me as a resource to support what I want to do in class.

-Jennifer Brashear, 8th Grade Science Teacher, Risley MS



Ruderfer brought in not only exceptional enthusiasm for the project, but special understanding of the common misconceptions that students have as they enter the college environment and how they can be dispelled. [I came away with a] new outlook, innovative ideas, and a flexibility of thinking when looking at commonly accepted science practices.

-Kim Sapp, 8th Grade Science Teacher, Needwood MS



[Carol Dennis] gave me great ideas for teaching our learning support students. I liked seeing the way concepts are taught and ordered in K-12. You really have to be a much better educator to be a K-12 teacher!

-Thomas Hippchen, Lecturer of Mathematics, CCGA

Our ocean acidification lesson went well today at Risley MS! It was actually a lot of fun, and I think the kids learned something. Jenn and I were a good team!

-Dr. Holly Nance, Assistant Professor of Biology, CCGA



Kim is very insightful. We have a lot of fun experimenting with ideas and she has become a real colleague. She helps me see how the science can really work in the classroom.

-Isidor Ruderfer, Lecturer of Biology, CCGA



Challenges and Lessons Learned

Moving from plan to project. Creating a feasible and sustainable implementation plan from our initial proposal took many cross-institutional meetings and an entire semester. As such, the pace of implementation was a bit rushed towards the end of the school year. Additionally, unexpected problems, such as the loss of one of our faculty teams mid-way through implementation, will necessitate the development of contingency plans for the future.

Structure. Many of the participants actually requested more deadlines and a stricter timeline.

Pilot-Year Hiccups. Though participants characterized this year as a “sink or swim” or “get this figured out” kind of year, we feel that the students, teachers and CCGA faculty learned a lot and developed deep and productive collaborations.

Plans for the Future

- Complete faculty and teacher interviews.
- Decide whether or not to continue existing teams.
- Create a plan to involve Glynn Middle School.
- Develop our online resource repository.
- Create new ways to record experiences and promote even richer collaboration and reflection. (Team blogs?)
- Create a calendar of expectations and deadlines for participant teams. (Make this collaborative with all teams giving input.)
- Discuss next steps on leveraging the connections we have established with the lead teachers to expand the impact of our initiative to more teachers and students in our partner schools.

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A USG STEM Initiative at CCGA

Dr. Tanya Cofer, Director

May 17th, 2017

The Initiative

COLLEGE FACULTY AND experienced lead teachers in the Glynn County middle schools co-created and co-taught unique lessons for middle grades students aimed at increasing their interest and participation in STEM.

Goals Addressed

Goal 1: Increase the number of K-12 students who prepare for and are interested in majoring in science, technology, engineering, and mathematics (STEM) in college.

Goal 3: Prepare and support P-12 STEM teachers in Georgia's classrooms.

The Idea

PAIRING FACULTY WITH teacher leaders that have recognized expertise in middle grades STEM pedagogy allows for the development of truly novel STEM lessons that capitalize on the strengths of both the CCGA faculty and the lead teachers. Moreover, allowing a select group of faculty to work at great depth with the teachers and the schools provides faculty, teachers and students with a richer experience and deepens the connections between the two communities.

Challenges and Lessons Learned

Moving from plan to project. Creating a sustainable implementation plan from our initial proposal took an entire semester. As such, the pace of implementation was uneven. Additionally, unexpected problems arose that will necessitate the development of contingency plans for the future.

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- Create a calendar of expectations and deadlines for participant teams.
- Next steps on expanding the impact of our initiative.

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