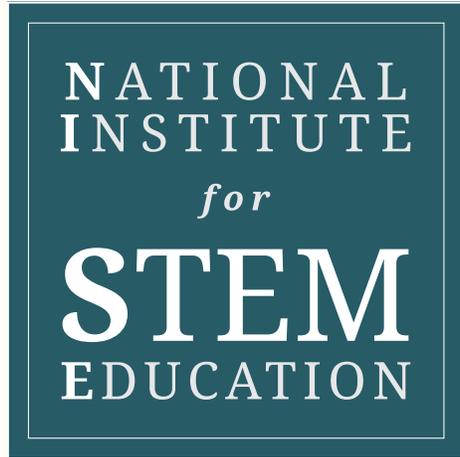


CASE STUDY



STEM-CERTIFIED SCHOOLS INCREASE STUDENT ENGAGEMENT AND ACHIEVEMENT ACROSS CONTENT AREAS

Carroll County Schools (CCS)

CCS's focus on standards-based instruction plus the four Cs improves student learning and college and career readiness

GEORGINA



District

23 SCHOOLS

PREK-12

15,720 STUDENTS

Students

18% AFRICAN AMERICAN

9% HISPANIC

7% MULTIRACIAL

66% WHITE

62% ECONOMICALLY DISADVANTAGED

4% ENGLISH LANGUAGE LEARNERS

15% SPECIAL EDUCATION

CCS's mission is to develop globally competitive college and career graduates. Science, technology, engineering, and math (STEM) integration is a key part of this mission.

Located 50 miles west of Atlanta, CCS is a rural district that enrolls 15,720 students. More than 60 percent of students are economically disadvantaged, yet the district consistently ranks in the top 20 percent of school systems in Georgia. CCS leaders attribute much of this success to an emphasis on literacy, math, and STEM education.

"It is a district-wide focus to promote a 21st-century learning environment and increase STEM opportunities for all students," said Marissa Ogando, EdD, director of middle school education and professional learning. "Through STEM, we are helping students develop communication, collaboration, creativity, and critical thinking skills—the four Cs critical to success in college and careers."

LAUNCHING THE JOURNEY TO IMPROVE STEM PRACTICES

Since 2018, Dr. Ogando has supported STEM growth and development for all Carroll County schools. Prior to her current position, she was the principal of Whitesburg Elementary in CCS. It was Ogando's STEM experience at the Title I elementary school that led her to spearhead STEM certification efforts district-wide.

"When I became the principal of Whitesburg Elementary in 2014, STEM was non-existent. While we had science and math classes, the subjects were taught separately. In grades K-2, there were also many days where science wasn't taught at all," she said. "We know that children in our community will have to compete with children who have very different experiences and levels of opportunity. We want to ensure that our students are college and career ready, and provide them with skills they need to be prepared for jobs that don't even exist yet. STEM is a key part of that," she said.

Like many schools, Whitesburg Elementary first ventured into STEM instruction through trial and error. "We wanted to engage students in project-based learning and hands-on activities, so our teachers participated in professional development courses where they learned how to implement STEM challenges and engineering projects. As time passed, however, we realized there wasn't much consistency or cohesiveness in our STEM program," said Ogando. "Another issue was that many of our teaching methods were stuck in the past, so we weren't providing students with 21st-century learning opportunities on a daily basis."

To create an effective STEM program, Ogando set out to improve STEM practices school-wide. "While researching STEM online, I found the National Institute for STEM Education," she said. "As I reviewed the institute's STEM certification programs, I saw that they were competency-based, which would allow us to expand upon our STEM learning without having to repeat anything we already knew. I also liked that they integrate research and best practices in STEM, 21st-century learning, and professional development, instead of just focusing on how to implement STEM activities."

PURSUING NATIONAL STEM CERTIFICATION

The National Institute for STEM Education (NISE) certifies teachers and campuses in STEM teaching, culminating in the National Certificate for STEM Teaching (NCST) and the National Certificate for STEM Excellence (NCSE)–Campus Certificate. The certification programs provide an evidence-based framework for defining and understanding STEM, and focus on high-impact STEM instructional strategies that work synergistically across content areas in preK-12 classrooms.

In 2017, Whitesburg Elementary registered for the NCSE and five teachers began working toward the NCST. With the support of a virtual STEM coach, the teachers developed digital portfolios demonstrating their understanding of 15 STEM Teacher Actions across three domains that are essential for effective STEM teaching: Creating an Environment for Learning, Building Scientific Understanding, and Engaging Students in Science and Engineering Prac-

tices. At the same time, the school completed its requirements for the NCSE–Campus Certificate, developing a digital portfolio demonstrating the application of the 15 STEM Teacher Actions.

“The campus certification process allowed all of us to learn together and immediately apply the strategies we were learning with our students. If a teacher struggled with a particular action, like implementing project-based learning, I could support them because I was learning alongside them,” said Ogando. “It also gave us a new way to look at how we were delivering instruction, so we could become better at facilitating learning and helping students become independent learners rather than relying on the ‘sage on the stage’ for everything.”

In May 2018, Whitesburg Elementary became the first school in Georgia to earn the NCSE–Campus Certificate.

“NISE provides a clear, consistent professional learning path. It not only supported our vision, but it integrated perfectly with what we’re already doing, so it wasn’t just ‘one more thing to do.’ It gave us new strategies, tools, and modalities to meet the Common Core standards and deliver our content in a more effective way across all content areas,” said Ogando. “By focusing on STEM, we improved our effectiveness, increased student learning, and transformed an underperforming school into a top performer.”

INCREASING STUDENT ACHIEVEMENT AT WHITESBURG ELEMENTARY

From 2014 to 2018, Whitesburg Elementary improved student performance in every subject area on the state assessment, the Georgia Milestones Assessment System. “On the College and Career Ready Performance Index (CCRPI), our school’s score rose from 71.9 in 2015 to 90.3 in 2017—which meant we moved from a ‘C’ to an ‘A’ in only two years. In 2018, our overall school score rose again, to 92.2,” said Ogando.

IMPROVING STUDENT BEHAVIOR

During this time, Whitesburg Elementary saw a dramatic decrease in discipline referrals, too. “When I first arrived at the school, there were more than 170 discipline referrals during the school year. In 2017-18, there were only 19. That’s because students are engaged in what they’re doing, and they’ve taken ownership of their learning,” she said.

PURSuing NATIONAL STEM CERTIFICATION AT OTHER CAMPUSES

In 2018 and 2019, three additional CCS campuses—Providence Elementary, Roopville Elementary, and Sand Hill Elementary—earned the NCSE–Campus Certificate, and 20 teachers at those campuses earned the NCST.

In fall 2019, two more elementary schools and two high schools will begin the NCSE campus certification process.

TRANSFORMING TEACHING AND LEARNING

“Through the certification process with NISE, teachers and leaders have changed the way they think about STEM. Before, they thought that STEM was four separate areas. Now they understand that it is about teaching students the skills they need to successfully navigate their way through any subject. They see that it’s about integrating 21st-century skills with the standards to provide highly engaging, challenging learning experiences for students,” said Ogando.

“As a result of the certification process, a lot has changed in our schools. Teachers are more confident. The amount of time spent on STEM has increased substantially. Teachers are designing instructional practices using the four Cs, so students are highly engaged. Students have a more goal-oriented mindset. They are more resourceful, reflective, resilient, and responsible, because they are taking ownership of their learning,” she said.

IMPROVING STUDENT ACHIEVEMENT IN STEM-CERTIFIED SCHOOLS

Student achievement has improved as well. “By focusing on STEM, we have improved our effectiveness and increased student learning,” said Ogando. “On common district assessments, standardized assessments like the STAR, and state assessments, our STEM-certified schools consistently outperform other schools because of the way they’ve transformed their instruction.”

2018-19 Georgia Milestones Assessment

Percentage of students at the proficient and distinguished levels

	Non-NISE Certified Schools (Elementary)	NISE Certified Schools (Elementary)	Difference
English Language Arts	43	52	+9
Math	50	61	+11
Social Studies	37	45	+8
Science	49	64	+15

“Other teachers and leaders in our district see the way students are responding and the results produced by that level of learning, and they want to be part of it, too,” said Ogando.

CREATING A DISTRICT STEM CERTIFICATION PROCESS

To create a solid foundation for STEM district-wide, CCS has created its own district STEM certification process for its schools. “Every school that hasn’t yet earned its national STEM certification has requested to enroll in our district certification process because they see the way STEM is transforming our schools. After a school earns district certification, then the next step would be national certification through NISE,” said Ogando.

Through CCS’s district certification process, school leaders and teachers learn that STEM is about educating students in an interdisciplinary and applied approach. They see that, rather

than teaching separate and discrete subjects, STEM integrates content material into a cohesive learning paradigm based on real-world applications.

“The district certification process demystifies STEM for principals and teachers,” said Ogando. “They learn that STEM is not a project. STEM occurs in the mind and is complemented by hands, not the other way around. STEM is a culture, not a class. All of this provides a strong foundation for the national certification process.”

SUPPORTING HANDS-ON, INQUIRY-BASED STEM LEARNING

As part of their efforts to enhance STEM instruction, all four schools that have earned the NCSE–Campus Certificate and one additional elementary school have begun using the STEMscopes™ Georgia digital STEM curriculum as their core science curriculum. STEMscopes is built from the ground up to address today’s state standards and the Next Generation Science Standards. It combines a comprehensive digital STEM curriculum, supplemental print materials, and hands-on exploration kits with embedded professional development to support student and teacher success.

“STEMscopes provides everything we need in one place,” said Ogando. “It provides the rigor and engagement that students need to be successful, and it gives teachers the structure and tools they need to be successful, too.”

Each STEMscopes unit is developed around the 5E (Engage, Explore, Explain, Elaborate, Evaluate) model of instruction, with additional phases for Intervention and Acceleration.

“With the 5E model, students are using inquiry and critical thinking to explore STEM individually, in pairs, and in teams. They’re communicating and collaborating with each other, and using their creativity to problem solve. Through this model of instruction, they’re taking control of their learning and building a deeper understanding of the concepts they’re studying and the world around them,” she said.

CREATING A MOVEMENT

“Good STEM teaching is about the standards plus the four Cs, meaning it should help students master our state standards and develop collaboration, communication, creativity, and critical thinking skills, which are critical for success in college and careers. Our district is now seen as a leader in STEM, and our community values and feels invested in our schools and the work we are doing,” said Ogando. “This is a movement. This is the next step in the evolution of education. It doesn’t matter if a student is in a Title I school or a private school--this is the type of learning all students need.”