Bringing STEM to Life in Elementary School Classrooms

The Mercy College Center for STEM Education is providing professional development training to hundreds of elementary school teachers as part of a five-year New York State grant called Smart Start that supports teachers in integrating STEM learning into everyday classroom lessons.

The teacher training was designed, developed and is now being delivered by the following faculty from Mercy's School of Education (SOE) and Center for STEM Education (MCCSE): Amanda Gunning, Ph.D., and Meghan Marrero, Ed.D., SOE professors and MCCSE co-directors; and Elena Nitecki, Ph.D., professor and chair of the Department of Early Childhood and Childhood Education and MCCSE affiliated faculty. Through Smart Start, the funding aims to make STEM learning more accessible — not only to all students at an earlier age, but also to school districts that historically have dealt with socioeconomic and other barriers to administering STEM education.

Since 2019, when Mercy was tapped as the preferred provider of professional development for teachers of STEM in school districts granted Smart Start funds, the College has been training up to 100 educators per year from seven elementary school districts across Westchester and Rockland Counties in New York.

The STEM concepts that the teachers are being trained on to integrate into their classrooms, and the technologies used to introduce those concepts, equip students with knowledge beyond science and math. STEM introduces students to inquiry-based learning and problem solving through computer science and engineering, not out of a textbook but through lessons that apply to the world around them. And participation is not limited to teachers as the MCCSE has begun to train other school district employees. "We're working with speech therapists, school psychologists and librarians to develop new ways to introduce STEM learning tools to every child," said Marrero.

The emphasis on STEM accessibility arises out of the growing worldwide demand for STEM skills in the workplace — and not just in health care and engineering. "These skills, which focus on problem-solving, innovative thinking and collaboration, are great for curious young minds, forming habits that will prepare them for success in any field in the future," said Nitecki.

Yet for all its power and promise, STEM learning at the elementary school level can be limited. It might be offered to a handful of families that can afford to send their children to workshops or special camps, but these opportunities can be a luxury. "STEM subjects should not be locked in an ivory tower," said Gunning. "Our daily lives are filled with challenges that are begging for solutions, and we need all kinds of brains to solve them."

For example, said Marrero,

Photo by Lesley Semel

Amanda Gunning, Ph.D.

Photo provided by Marrero

Meghan Marrero, Ed.D.

Photo by Leslie Kahan Photography

Elena Nitecki, Ph.D.

"Robotics is a popular enrichment course that's historically been offered in affluent, white school districts. By training teachers in underserved districts how to create their own robotics resources, we're removing the barriers to students who might see themselves as a scientist or an engineer." The Smart Start grant allows for districts to purchase computer science and engineering materials, such as robotics and

Lisa Dulin, STEM ambassador from Ossining, teaches elementary students how to plan and engineer a better house for the 3 little pigs.

STEM Ambassadors test out programing a drone during a robotics session of the Smart Start training.

software, thus leveling the playing field to some extent with more affluent districts.

"Our program is very hands-on and practical," said Gunning. "It's not just the content, it's the skills that can be applied to every subject and every learning experience. Learning a technique for problem-solving in one area sets the stage for finding solutions in another." Susan Yom, director of the Smart Start program in the Clarkstown Central School District, concurred. "Participants tell us they leave each session with tools they can apply in their classroom the next day. Our students' enthusiasm for STEM is becoming contagious," she said.

Many educators believe it's never too early to introduce STEM learning, to which Nitecki, an early childhood educator, can attest. "When students start learning STEM foundations from day one, they build on it year by year. As they encounter more challenging subjects, they will have the critical skills they need."

> "This program is changing education in a way that fits with Mercy's commitment to equity and inclusion. This is the legacy we are building."

By increasing the number of STEM-trained educators in neighboring school districts, more students than ever now have access to learning that can transform their lives. "Our collaboration with Mercy College reinforces my belief that there is no limit to what teachers can create for our students when the conditions are right," said Christopher DeMattia, director of STEM for the Ossining Union Free School District and coordinator of the Westchester STEM Ambassadors Program. "We expect the positive impact on the skills, understanding, and confidence of our students to be immense."

As the grant period comes closer to its midpoint, approaches are being refined and made more relevant and applicable to classrooms — and not just in public elementary schools. In Mercy's SOE, this same technology is being delivered to teacher candidates in the master's programs for elementary and secondary educators. And as more of the region's teachers develop and share their own resources — a key component of the grant — the result will be a lowering of the barriers that previously have hindered the growth of diversity in STEM fields.

Nitecki, Gunning and Marrero are beginning to see a legacy of knowledge arising out of the work they are doing now. "A basic underpinning of the professional development curriculum is a commitment to provide an education that is culturally relevant, student centered and inclusive," said Gunning. "This program is changing education in a way that fits with Mercy's commitment to equity and inclusion. This is the legacy we are building."