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STEM Class Harnesses Collaboration to Inspire Students

The call for improving science, technology, engineering, and mathematics (STEM) education has challenged educators to produce innovative solutions. Funding for new programs is essential, yet often finding effective ways to implement funds has been even more challenging. A school in Georgia has integrated three critical elements—funding, innovation, and teacher training—in a pioneering STEM program.

Carrollton High School (CHS) received federal American Recovery and Reinvestment Act funding to improve its STEM offerings. Wanting to combine academics with application, Carrollton formed a program that embraces collaboration across all STEM disciplines. The program brings a math teacher, a science teacher, and an engineering teacher together to work jointly in one class. The elective-credit STEM class gives students a taste of engineering and can be a pathway to an engineering career.

“We thought it would be great to have homegrown engineers,” explains Kasey Austin, the engineering teacher. “We target the high-flying students in hopes that we get them hooked on engineering early, then they go to college and come back to Carrollton to work in the community.”

Joining Austin are science instructor Kristie Bradford-Hunt and math teacher Will Melton. “We create stuff together, communicate it to students together, grade together,” says Melton.

“By bringing all the disciplines together we’re able to look at one single project at the same time and bring in principles from science, prin-

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ciples from math, and make sure all those core principles are included,” says Austin. “The students get more out of it because we have different backgrounds and share the planning time.”

With the funding in place and

collaboration as the guiding concept, the next challenge was to find the right curriculum and lab equipment.

“We decided our focus would be on engineering,” explains Austin.

“We had to have something for the first year,” says Melton. “We had CAD that directly applies to engineering, but we had nothing else to go with it. So we started from scratch as far as that goes.”

The teachers took note of the success Carrollton students had in after-school remotely operated vehicle



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(ROV) competitions. “The ROV team had been successful, and because of the type of companies that surrounded our community, we narrowed it down to the manufacturing side of that,” says Austin.

After searching through STEM offerings on the market, CHS selected intelitek’s Engineering Program, centered on the LearnMate® learning management system and featuring VEX® robotics. This provided the content framework for the fall semester. Looking forward to spring, they will implement CAD/CAM/CNC and industrial robotic courses.

A key element of intelitek’s program was training and support. “We didn’t want to go buy a piece of equipment and have it just sit there because no one knows how to use it,” says Austin.

“We had a CAD teacher, a math teacher, a science teacher,” says Melton. “We didn’t have any connections on how to teach this exact content.”

After attending factory training at intelitek’s headquarters in Manchester, NH, the teachers felt equipped to put the program to work.

“We were a bit overwhelmed by all we needed to accomplish in creating a brand new engineering program,” says Austin. “After the training we were much less overwhelmed. We actually got to build a robot—that was really helpful to starting our program.”

The online engineering content also proved a great asset for the first year of the innovative program. With core concepts delivered online, followed by leveled activities using the VEX® robotics hardware to put the concepts to use, the robotics engineering curriculum provided the flexibility the STEM teachers and students would need during the first year.

“LearnMate is flexible enough that if we need to slow something down or speed something up or do something different compared with what’s in LearnMate, we could easily pull that together based on what they had already been taught,” says Melton.

“It allows the kids to be self-

paced,” Bradford-Hunt adds. “We can come in and help them when they need it.”

Austin notes another advantage to the online delivery of the content: “The interface prepares them for the next step because you see a lot of that in college—it’s all online. You navigate it yourself, talk to your peers through the email portal—it’s nice they can get a taste of that before they leave high school.”

Melton is happy that the program’s project-based approach helps students to realize an important element of education: application.

“We have found that even though almost all the kids are top of their class, really smart, and making good grades, sometimes they don’t have a way to apply that to the engineering context,” Melton says. “This is a new opportunity that they never would have had: to see that direct application with the hands-on stuff we do every day.”

“We were also able to target a lot of girls,” says Austin. “With the robotics there is that design element that can hook them.”

“We finished our first semester with 21 kids who went through the program,” says Melton. “The culminating project was to build a robot that could compete in the VEX competition. The kids built some really good competitive robots. We were impressed with what they did.”

As the program develops, the teachers hope to move beyond classroom competitions and compete in local competitions including TSA, SkillsUSA, VEX, and other events sponsored by local high schools.

“Going further, our goal is to implement STEM in K–12 so they get it early and at all levels,” says Austin.

With the first semester behind them, the STEM class teachers agree that this collaborative model has improved student outcomes. “Collaboration adds a lot to what this class has become,” says Bradford-Hunt.

“It helped us get a lot further than we would have gotten on our own,” says Melton. “It definitely was a huge help in actually integrating all the parts of STEM.”

Mastercam Announces 6th Annual Innovator of the Future

CNC Software, developer of Mastercam CAD/CAM software, has announced the winner of its 2010–2011 Innovator of the Future (IOF) competition: Scott Harrel, a student in the computer-integrated manufacturing technology program at Rowan Cabarrus Community College in Salisbury, NC.

Mastercam’s IOF competition helps introduce students to real-world manufacturing by challenging them to put their own creative twist on a specific part to be judged by a special guest from the manufacturing industry. In the 2010–2011 competition, students designed and machined a working guitar capo. Prizes were a major motivation, with the winning student receiving a \$1,000



Scott Harrel’s winning capo

scholarship and a trip to Tolland, CT, to tour CNC Software, Inc.’s world headquarters.

Scott put his best efforts into his entry, displaying exceptional aesthetic and mechanical creativity. In the documentation accompanying his entry, he explained how the competition helped improve his Mastercam and machining skills. He said that the IOF competition pushed him beyond his comfort level through researching capos and working with many designs before coming up with a shape and movement that didn’t use a spring. Although a capo made of brass is a little heavy, Scott chose that material because of the look of the polished brass with the engraved scrollwork.

When asked about the IOF competition, Scott replied, “The trip was