

Robotics, from pg 1

of them eat, breathe, and sleep Robo Dawgs,” says Evele. He has seen some team members who are special education students “move into regular classes because they realize they can do what other high school students can do.” One boy who failed all his classes in middle school joined RoboDawgs, then earned good grades throughout high school and is going to college, Evele relates.

Girls have been active in Robo Dawgs from the very start. The percentage of girls on RoboDawgs teams has increased every year, and “we [now] have 26 girls among 72 active RoboDawgs. The team is more than one-third female,” he declares.

Incorporating Robotics and Computing

Harry Cheng, a professor in the Department of Mechanical and Aerospace Engineering at University of California, Davis (UC Davis), says he established the UC Davis Center for Integrated

Computing and STEM Education (C-STEM; <http://c-stem.ucdavis.edu>) to help schools—especially those with at-risk students—“bring computing and robotics into formal education” by helping middle and high school teachers “integrate it into classroom teaching in math and science.” With National Science Foundation funding, C-STEM has developed “integrated curriculum with computing and robotics and unique professional development (PD) geared to teachers who have no computing or robotics experience—it is easy to get them engaged in learning our material,” he contends.

Taught at more than 60 schools statewide, the curriculum centers on “algebra, the gatekeeper for science, technology, engineering, and mathematics (STEM),” Cheng observes. During PD sessions, which C-STEM provides during a summer institute and on-site at schools and in districts during the academic year, teachers learn “computing and robotics knowledge and teaching strategies that allow them to

integrate computing and robotics into a variety of teaching settings,” including science, math, technology, engineering, computer science, and digital media, he explains. “We emphasize teamwork and collaboration [and other 21st-century skills during the training], which are also emphasized in the *Common Core State Standards* and the *Next Generation Science Standards*,” he adds.

C-STEM Education Specialist and Technology Coordinator Ryan Mangan taught physics for three years before joining C-STEM. “The key tie-in is that in physics, everything is related to motion,” which makes incorporating robotics feasible, he maintains. He wrote computer programs with the C-STEM curriculum that used robots and allowed students to track their position, speed, and velocity; measure and graph their findings; and understand the relationships among them. “I wrote programs so objects moved at random speeds, then student teams had to use their problem-solving skills to determine the speed of their robot,” he explains.

“I noticed students were more engaged,” says Mangan. Though his physics classes didn’t teach programming, he witnessed how students who learned programming in another class “mentored those who hadn’t had programming. It led to more collaboration and more engagement,” he recalls.

Annually in May, the C-STEM center and its partners hold a C-STEM Day at various sites to build awareness of integrated computing and STEM education. The event includes curriculum-based RoboPlay Competitions and Math Programming Competitions in which “students show off their computing skills,” says Cheng. Noting that competitors are typically “40% female students and 40% underrepresented minority students,” he adds, “Our major objective is to close the achievement gap for underrepresented groups in computing and STEM. We want schools to provide computing education to all their students through integrating learning STEM subjects with computing.” ●



Nothing *common* about this

Core®



Starting at \$110

With its exceptional value and durability, the Core is the perfect balance for your classroom.

To learn more about the Core, visit
www.adamequipment.com

Visit us Dec. 4-6 in **booth 604** at **NSTA** in Long Beach, California.

NA 4035 ©2014 Adam Equipment Inc. All rights reserved.



ADAM

