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## Reading, writing and robotics

Science Exploration class gives students early lessons in computer programming

By Megan Wood The Press Tribune



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Cavitt Junior High eighth-grader Ashley Arrington watches her Lego robot to see whether it is accurately programmed to recognize the blue ball and not mistake it for the red one, which it's programmed to push.



While "Bob" works on his golf swing, "Oliver" attempts to maneuver around obstacles that he cannot see or touch, but rather senses thanks to an onboard computer that is controlled by eighth grader Thomas Taylor and seventh grader Ben Pavik.

At Cavitt Junior High in Granite Bay, Ron Pozzi is giving students in his Science Explorations class a crash course in computer engineering with the help of Lego Mindstorms, a robotics and construction toy set that teaches students the basics of computer programming.

Robots built by the students are equipped with onboard computers that receive messages and instruction from an NXT program.

"Each of the different icons means a different thing and when you put them all together, the robot moves or makes sounds," Taylor said. "But you have to pay attention and make sure you do everything right or he won't move at all."

Students were in charge of building their robots from the Lego pieces, which required close attention to detail as one misplaced component or forgotten step would force students to start all over again.

"It was working fine and then we got to one program and it stopped working," Pavik said. "We had to go back and figure out what went wrong. We realized we forgot a part when we were building it, so we had to go back and fix it."

The Science Explorations class is part of a larger program called Challenge 21 that the Eureka School District officials have implemented to combine 21st century technology and education to foster life-long learning skills.

Pozzi said the biggest lesson the students are learning with the robotics unit is problem-solving, critical thinking and working as a team.

"I try not to give too much help," Pozzi said. "I will ask questions to get them back on the path to solving their own problems, but for the most part the kids are figuring it out and solving their problems as they go."

Pozzi said he was shocked at how quickly the students learned to operate the software.

"They've grown up using computers since they were very young so I guess I'm not all that surprised," Pozzi said. "But it was still really fast."

The training software consists of 40 levels, or maneuvers, starting with building the robot to basics like moving forward and backward and advanced maneuvers like swinging an appendage attached to his arm to hit a ball.

"Each of the levels builds off the previous ones so the students are learning what combinations do what," Pozzi said. "Eventually some of the groups will start writing their own programs for their robots."

The robots are also equipped with sensors that "see" obstacles like a hand placed in front or behind the robot that will cause it to stop moving or maneuver around the obstacle.

Taylor and Pavik said they like to confuse their robot, which they named Oliver, by flashing their hands on either end of the robot to make him move forward and backward repeatedly.

Seventh-grader Alex Chew, or "Chew" as the students call him, owns his own Lego Mindstorms set at home and has mastered building several robotic toys including a gun that shoots tiny plastic rods and a car that he can operate to drive around his house from his bedroom.

"Chew knows how to do all sorts of stuff and he's been teaching us tricks and how to do different stuff," Taylor said. "He's a mastermind at this."

Chew and his partner, seventh-grader Kami Gendi, were busy at work helping their robot, Bob, move toward a blue ball balanced on a pedestal, stop, and swing at the ball in one fluid movement.

"This is one of my favorite electives because I can really use this when I'm older," Chew said. "If I were to become a doctor, I could program a robot to assist me, or I can even be a civil engineer. This is something I will actually use."