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Students 'ship' off to Stevens Institute for robotics workshop

Former Linwood students build robots that perform underwater

BY JENNIFER AMATO Staff Writer

NORTH BRUNSWICK — What was once considered a child's toy is now being used to teach students about science and engineering.

Linwood Middle School eighth-grade teacher Danita Guarino and two of her former students, Tommy Ikuss and Joey Stefan, participated in the 2008 Build It Summer Institute last week, using Lego building blocks to create ships that could move robotically underwater.

"We learned the dynamics of water and how different it is to control things [underwater] than in the open air," Ikuss said.

From Aug. 18 to 21, the students built the models and programmed them using the Lego Mindstorms NXT software program to have them go in a straight line across a pool, complete a figure eight around two obstacles, move in the motion of a figure eight mid-way underwater and pick up weighted balls to put in end goals.

The challenges stressed knowledge of gears, gear ratios, structural support, buoyancy and the forces of motion.

"They're familiar with Legos, so it's not that they don't know how to design, but now they have to put them in water," Guarino said.

"It taught us a lot about group dynamics and how to work with people we don't know … to improve our skills exponentially," Ikuss said.

The two students, who will be freshmen at North Brunswick Township High School next month, had a basic understanding of the lesson based on work they completed in Guarino's class last year. Guarino's students were assigned projects such as a marble roller coaster, building fuel-cell cars, creating a future city and building model airplanes.

"It gives us the chance to do workshops like this so we understand engineering and the concepts that are used," Stefan said. "I think other schools should do this because it's a different way than textbook learning, which is not fun. It's something new and creative, and a new way of learning."

The next part of the middle school's STEM curriculum — science, technology, engineering and math — will be implementing the robotics course in Guarino's class. She said that around October she will set up an 8-by-2.5-foot, 8,000-gallon pool in her classroom, and alternate projects so that as many of her students can participate as possible.

"Trying things out for themselves is the best way of learning," Guarino said. "It's amazing, the ideas the kids come up with."

The summer institute was sponsored by the Center for Innovation in Engineering and Science Education at Stevens Institute of Technology, Hoboken.

Guarino was one of 36 New Jersey teachers asked to participate in the threeyear program, which received grant money from the National Science Foundation.