

TIM LAMORTE/RIVERTOWNS ENTERPRISE

Dobbs performs his tai chi dance as librarian Annette Gonzalez prepares to catch him if he falls.

Schools welcome pint-sized teaching aid

By Kris DiLorenzo

If C-3PO of "Star Wars" fame had a little cousin, he might look like Dobbs, the humanoid robot acquired by Dobbs Ferry School District. Though he's not gold-plated, the foot-and-a-half-high, big-eyed NAO (the robot's official name), can speak French, do tai chi, imitate Darth Vader and R2-D2, play the "Star Wars" theme music, and even fart (by accident, of course).

Looking and sounding like a futuristic boy dressed in a white spacesuit with red sensors on his head, shoulders, chest, feet and hands, Dobbs has articulated joints, interacts with humans who use commands

he understands, and speaks naturally. If he falls down, he says "Oops!"

The robot is a new teaching tool the school acquired at the end of the 2015 academic year and will use for design, math, coding, technology, and the STEM (Science, Technology, Engineering and Mathematics) program. Currently, five teachers, a teaching assistant, and librarian Annette Gonzalez are being trained to program NAO by Holly Morris, a sales

engineer representing the Paris-based manufacturer, Aldebaran Robotics.

Gonzales came up with the idea of using NAO when she saw it demonstrated at a Southern Westchester BOCES conference two years ago. She wanted to introduce students to what she thinks is "going to be part and parcel of their lives in the next 10 to 20 years; I really believe that."

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Gonzalez was the first person in the school to work with Dobbs, having simple conversations, asking him questions, and holding his hand as he walks. (The robot has fingers that can grasp.) Now she's participating with teachers Lynette Colon, Frank Adamo, J.P. (John Paul) Kaminski, Jessica Bauer and Jennifer Hickey, and teaching assistant Anthony Algeri in the two training sessions provided by Aldebaran.

NAO robots were first manufactured in 2006; more than 7,000 have been produced since. In 2013 the company launched an initiative aimed at teachers, including those working with autistic children. Now most of the robots are used in research and education. The Aldebaran website describes the robots as "cute, interactive, and progressive," and states that they were "created to love and live alongside people in their daily lives."

Though NAO robots are not classified as AI (artificial intelligence), they can reproduce human behavior through software and mechanical engineering, powered by their own operating system. Dobbs has two cameras that film his environment, helping him recognize shapes and objects. To direct him to a destination, teachers are learning how to code those instructions.

Doug Berry, the district's assistant superintendent for curriculum and instruction, is enthusiastic about Dobbs. "It's not what you initially think of when you think of a robot," he said. "You think about something much more industrial, but this actually looks like a person. We try to be ahead of the curve when we can. It's an opportunity for us to expand our offerings in the areas of coding, computational thinking, and robotics, and the possibilities for the use of our robot not just in one building, but in K-12 across the system."

The district purchased the robot for \$7,000; a Dobbs Ferry Schools Foundation grant funded the training at \$3,500. Dobbs will earn his keep, though. He will be on duty in the library for students to work with him.

"The reason I wanted it for the library," Gonzalez said, "is because if it's just a couple of classes that use it, then only a certain amount of kids can. But here, all kids can be exposed to it. They can come to the library, make an appointment with me,

and eventually they can use it themselves. Little by little, throughout the years, we're going to build on that. That's the hope — that everyone gets a chance to explore it. It's a start."

Hickey explained what the teachers need to know to operate Dobbs. "We learned how to manipulate the robot's movements and sayings through the software program Choregraphe. There is a virtual robot so you can check that what you have written will work on the actual robot. We also learned basic programming in Python [programming language] to create our own words and sayings for the robot."

Hickey gave examples of how the robot can be used in the school.

"We are looking to do some cross-building work with the high school computer class, programming a story for him to read to our elementary school students," she said. "In our design and STEM classes, students will be learning basic programming skills to make the robot move in certain ways and say things. The teachers are excited to work together to explore other curriculum connections in the future."

Berry is also looking to the future of robotics at the school. "As the need exists, we may have to think of purchasing some others along the way," he said. "We're always looking for ways to take the Dobbs Ferry schools forward and move beyond what people think of as traditional education to education that's reflective of the 21st century."

Both Berry and Gonzalez emphasized that one major purpose of the robot is to stimulate computational thinking, so that students will work out the individual steps needed for Dobbs to function. Berry wants the children to learn day-to-day problem solving. "That's the key," he said. "It's a cute toy, but it's much more."

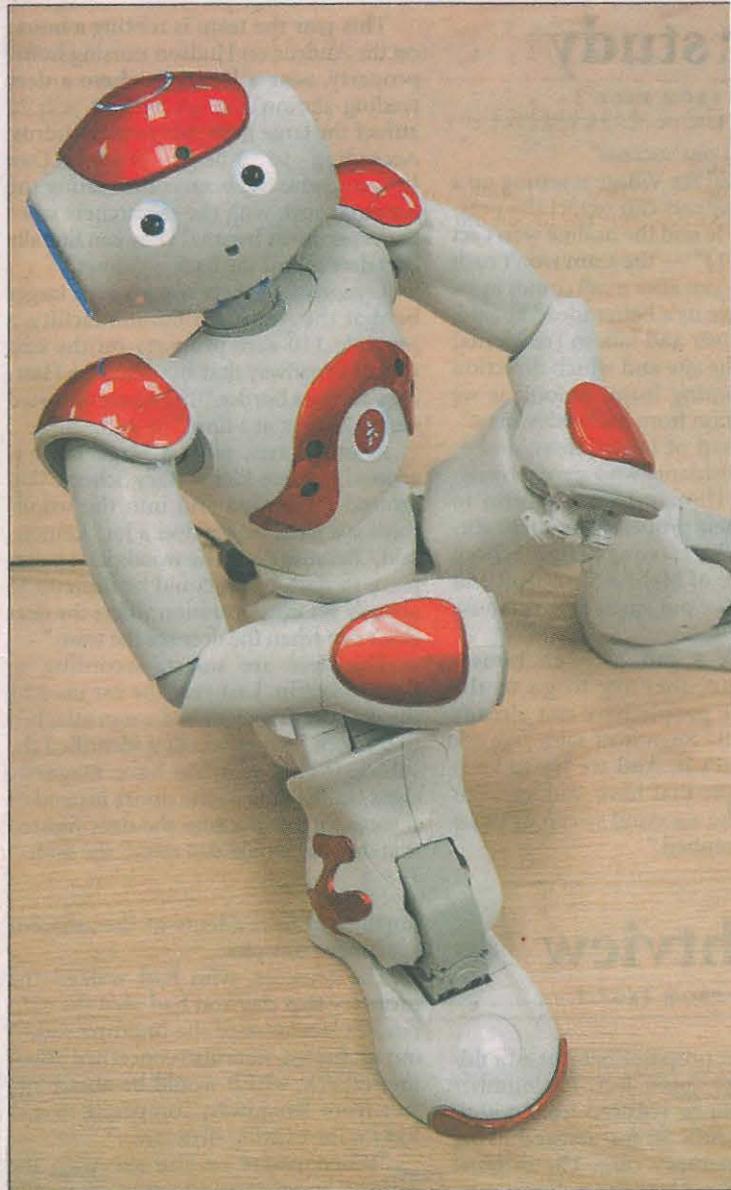
Gonzalez discovered another benefit provided by Dobbs. "What I've noticed is that a lot of girls are getting interested in it, which is a good thing, to try to focus them on that field," she said.

Dobbs seems to understand his mission. He recited the laws of robotics for the teachers:

"A robot may not injure a human being or through an action allow a human being to come to harm;

A robot must obey the orders given to it by a human being except if those orders conflict with the first law of robotics;

A robot must protect its own existence as long as such protection does not conflict with the first or second laws. That's pretty cool, right?" and, finally, "Robots should love humans."



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Dobbs sits up after being turned on.