According to the Aldebaran website, the NAO robot has been used to teach programming in computer and science classes in more than 70 countries. Students can teach NAO to walk, talk, catch small objects and even dance.

ROBOT THERAPY

AN ENGAGING, HUMANOID ROBOT IS CAPTURING THE ATTENTION OF SPECIAL NEEDS CHILDREN AND THEIR TEACHERS.

STORY BY GERI BAIN | PHOTOS BY GAIL MOONEY

High school seniors Tyler Henning and Nick Gagliano began programming the NAO robot to interact with special education students this past year and have done several in-class demonstrations.

One early September morning, two boys—a first-grader and a kindergartener—meet for the first time with Warren Shya, the new school psychologist. One refuses to say anything but "boo" and "no" and laughs incessantly. Then Shya brings out "Nao," a nearly two-foot-tall Aldebaran NAO Robot whose body and movements are surprisingly human. At that point, everything changes. Both boys' eyes are glued to the robot. For the rest of the class, not for a moment does their attention wander.

"What's its name?" "Is it a boy or girl?" "What can it do?" The questions fly. Shya answers their questions, asks Nao to walk and then asks the boys if they'd like to see Nao look happy, sad, scared or angry.

"Happy," says one.

The robot, whose mouth is an unchanging "O," raises his arms gleefully and tilts his head up. The boys respond with smiles.

"Now sad," says the other.

The robot's body slumps a bit and Nao looks down.

"Would you show Nao how you look when you're sad and tell Nao what makes you sad?" Shya asks.

Both boys look solemn and talk about things that make them sad. The contrast between the boys' focus and openness with Shya before and after the robot's arrival is astounding.

Next, the boys work on identifying one, five, 10 and 20 dollar bills. "Can you show me a one-dollar bill?" Nao asks.

The first-grader holds a one-dollar bill in front of the robot's eyes. "That is correct," Nao says. When there is a mistake, the robot simply says, "Try again." There is no tone of disappointment or judgment and no change in body posture. Finally, the robot leads them in some fitness exercises and a dance.

"THE ROBOT IS AN IMPORTANT TOOL FOR OUR TEACHERS. PEOPLE OFTEN FEEL THREATENING AND UNPREDICTABLE TO THOSE WITH AUTISM. THE ROBOT DOESN'T INVADE THEIR SPACE OR DISTRACT THEM."

A Kiwanis International Foundation grant of US$15,000 helped pay for the NAO robot, which will be used in the Warren County school district. The Kiwanis Club of Washington, New Jersey, project helps not only special-needs students, but also involves high schoolers in advanced computer science who are programming the robot.

Their teacher, Janet Fantuzzi, is excited about the robot's potential for improving academic skills such as number and letter recognition.

"The challenge with these two boys is keeping them on task," Fantuzzi says. "With the robot, they both stayed focused and engaged the whole time."

The use of the NAO robot is an initiative of the Warren County, New Jersey, Special School Services District, which serves the county's special needs students with autism disorders as well as behavioral and severe cognitive challenges.

The robot, software and initial training, which cost just over US$20,000, was purchased with the help of a $15,000 grant from the Kiwanis Internation-

al Foundation and a casino night fundraiser, a joint effort between the Kiwanis Club of Washington, New Jersey, and the Washington Women's Club, which raised more than $4,200.

"We're very grateful for the work of our local Kiwanis club and the Kiwanis International Foundation for their support of this important project," says school district Superintendent Joseph Flynn.

Flynn has also partnered with Warren Hills Regional High School, where advanced computer science students plot robot moves.

"I love that this grant is helping us serve such a broad spectrum of students, from high school students who are developing their skills by programming the robot to students with a variety of special challenges who the robot can help to develop the social and academic skills they need to be successful," says Flynn.

James A. Miller, president of the Kiwanis Club of Washington, says his club has a history of helping special needs students. Every year, the club sponsors a party for special education students and their aides. When Miller heard that the school district was looking to raise money for the robot project, he invited Flynn to present a report at a club meeting.

"We have an annual casino night fundraiser and were looking for a project to donate our proceeds to," Miller says. "After seeing Joe's presentation, we also thought this would be a great candidate for a grant from the Kiwanis International Foundation."

The robot is especially effective with students with autism who have difficulty processing the complexity of human interactions.

See the Aldebaran NAO robot in action.
Click here to view the video.

"The robot is an important tool for our teachers," Flynn says. "People often feel threatening and unpredictable to those with autism. The robot doesn't invade their space or distract them. By providing a comfortable way to learn and interact, the robot can help students understand what is being said and what they need to do."

To those with autism, people are abstract, explains speech therapist Chelsae M. Quada.

"We change," she says. "We wear different clothes and hairstyles from day to day. We move in subtle ways that are always changing and distract from our messages.

"In contrast, the robot doesn't change. It feels concrete. That makes it less distracting."

Kiwanis members visit the school to see the robot in action in a middle school class of autistic and special needs students. The club members had seen a demonstration of the robot's capabilities, but all agree that watching the robot interacting with the kids is different.

"Seeing how the kids respond to the robot is wonderful," Miller says.

"It was especially impressive to see a boy who seemed to be totally in his own world start watching the robot and mimicking its movements," observes Lynn Webb.

"It's one thing to imagine the robot with kids, another to see how they react," notes Vanessa Galante.

"This is what it's all about!" says club Secretary Barbara A. Rose. Ⓚ

PROGRAMMING NAO

Story by Geri Bain

When it came time to find high school students willing to help program the NAO robot, it wasn't difficult to find volunteers.

"The kids were all raising their hands and trying to volunteer the entire time and the teachers kept smiling because it's so hard to keep kids' attention," says Warren Hills High School senior Tyler Henning. "It was strange to see the robot interacting with the kids. It was everything we had typed into a computer and made the robot do, so it was like us talking to them. But it was the robot talking and they treated it like a human."

Henning and fellow senior Nick Gagliano began programming the NAO robot to interact with special education students last year, and have done several in-class demonstrations. The boys first programmed the robot to do pushups and other exercises. They also programmed the robot to help teach the students about money.

"I want my students to understand that they have skills that can change people's lives," says Daryl Detrick, computer science teacher at Warren Hills High School in New Jersey, which offers five levels of computer science, including post-AP classes. "The NAO Robot project offers advanced students an awesome opportunity not just to play with technology, but to use it creatively to solve real world challenges and help people."

The boys agree that the challenge isn't the programming.

"The challenges are in defining a project in a very real way, collaborating and setting timelines. It's about logic and math thinking," says Gagliano.

Their work is paying off. The special education teachers already have come back to the team with several requests. Ⓚ

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