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Polytechnic Program Helps Teachers Integrate High Tech into the Classroom

They Build Robots To Demonstrate Scientific Concepts and Laws

By Raanan Geberer
Brooklyn Daily Eagle

BROOKLYN — Teenagers nowadays, says Devora Geller, a physics teacher at the New York Museum School in Manhattan, are surrounded by technology — cell phones, computers, CD and DVD players, and more.

But when they go to school and attend science classes, he says, they frequently are taught the same way they would have been taught 100 years ago. Clearly, a new type of technology is needed to make kids' science lessons fun.

That's why Polytechnic University is now hosting, with funding from the National Science Foundation, the Science and Mechatronics Aided Research for Teachers (SMART) Program, to help teachers from public high schools learn more about robotics, mechatronics and related disciplines. It is presided over by Prof. Vikram Kapila, Associate Professor of Mechanical Engineering at Polytechnic.

The teachers, in turn, will be able to impart what they have learned to the students, come the fall.

Some of the robots used as examples and teaching tools were on display last week when this reporter visited. One, a robot with the face of a cat taped onto its front, had tactile sensors in its "whiskers." If someone or something brushed against them, the "cat" walked the other way.

This technology, said Prof. Kapila, can be used in warfare, when military vehicles have to maneuver in the dead of night. A similar robot using audito-

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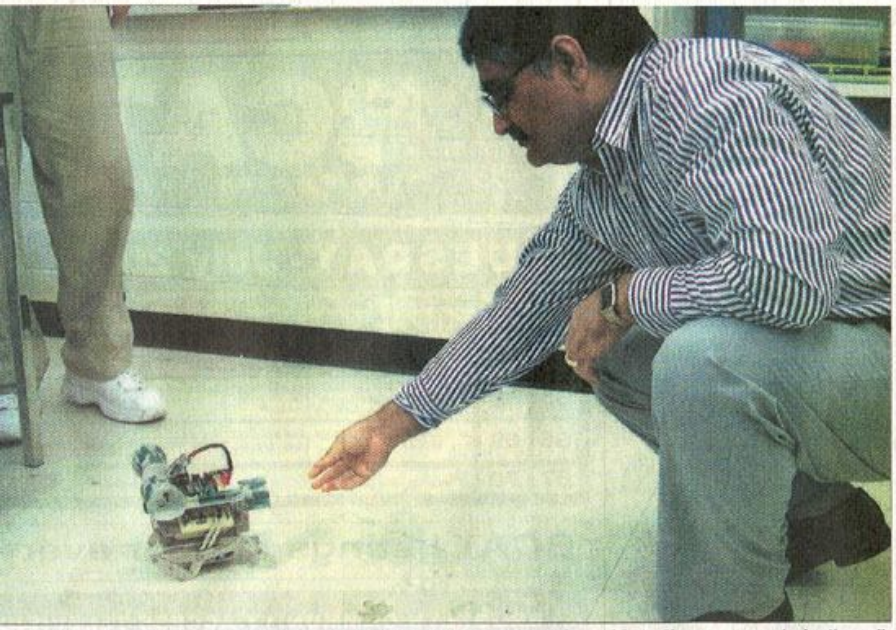

Prof. Vikram Kapila of Polytechnic University demonstrates this robot with auditory sensors in its "ears," magnified by paper cups.

Eagle photo by Natasha Santos

Polytechnic Program Helps Teachers Integrate High Tech into the Classroom

These New-York area high school teachers are taking the SMART (Science and Mechatronics Aided Research for Teachers) program at Polytechnic University.

Eagle photos by Natasha Santos

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ry sensors was also on display — if someone speaks loudly or snaps his or her fingers next to its "ears" (actually paper cups), the robot will move to avoid the sound.

One interesting example of high tech, invented last year by a teacher from Midwood High School who took the seminar, demonstrates the Law of Projectile Motion. A miniature golf cart, with a launcher for a tiny ball, is preprogrammed for distance and trajectory of the angle. Then, it is rolled that precise distance from a Velcro pad. When the ball is launched, it should hit the pad squarely — and usually does.

Yet another device makes use of a slot-car track, but with a speed limit programmed in and speed sensors on the track. If the cars exceed the speed limit, the sensors pick it up and the controller slows them down.

Teachers who are taking part in the SMART seminar come not only from the five boroughs, but also such nearby locations as Rockland and Westchester Counties.

One teacher, Lennox Henry, who teaches earth science, says he was here to learn more about using microprocessors, programming languages and robotics. Ms. Geller, the aforementioned physics teacher, said the school is starting a new elective applied robotics and programming.

Not only do the teachers use these techniques in their classes during the year, some engage in fund-raising for the SMART program. One teacher at Midwood, says Kapila, raised $300,000, although smaller amounts are more typical.

The idea of fund-raising by teachers may sound unusual, except when one considers the amount of budget cutbacks and lack of sufficient funding for city schools in today's world.

With the SMART program, says Prof. Kapila, "Science labs can become fun."

Teacher Rami Avni of Middle College High School demonstrates this "cat" robot, with sensors in its "whiskers."