Polytechnic Program Helps Teachers Integrate High Tech into the Classroom

They Build Robots To Demonstrate Scientific Concepts and Laws

By Reanna Gerber
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, be 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 bringing, with funding from the National Science Foundation, the Science and Mechanics Aided Research for Teachers (SMART) Program, to help teachers from public high schools learn more about robotics, mechanics and school disciplines. It is presided over by Prof. Vikram Kapila, Associate Professor of Mechanical Engineering at Polytechnic University.

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 as warfare, when military vehicles have to maneuver in the dead of night. A similar robot using auditory sensors was also on display — if someone speaks loudly or snaps his or her fingers near 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 programmed 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 school day, some engage in fund-raising for the SMART program. One teacher at Midwood, says Kapila, raised $30,000, although smaller amounts are more typical.

The idea of fund-raising by teachers may sound unusual, except when one considers the amount of budget cutsbacks and lack of sufficient funding for city schools in today’s world. With the SMART program, says Prof. Kapila, “Science lab can become fun.”

Teacher Ramsha Santh of Middle College High School demonstrates this cat" robot, with sensors in its "whiskers." Eagle photo by Natasha Santos

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