Richard Howell, assistant professor in the department of educational practice and theory, poses with Topo, the first robot in Howell's project developing mechanical aids for severely handicapped children.

Robotics lend kids a high-tech

By Cynthia L. Reza
Lantern staff writer

Recent research, development and use of robotic manipulators show promise as mechanical aids for the severely handicapped, said Richard Howell, assistant professor in the department of educational practice and theory.

He said the key concern of this research is not just to make robotic devices, but to also focus on the learning process during which users are made more aware of their environment.

The project is a joint effort between the university and the Columbus Public Schools. Howell conducts his research at Colerain Elementary School, which is active in mainstreaming handicapped children.

But Howell stressed the importance of referring to his work as tentative research.

"I think it's important that we don't raise the expectations of the parents, of the students themselves, and others involved about miraculous cures and discoveries that may change their lives," Howell said.

Howell said Colerain is the best school in the area for the testing of new technologies for the handicapped.

The test group includes students with developmental disabilities caused by neuromuscular dysfunctions. In this group, there are four children including two with cerebral palsy and one with muscular dystrophy. The other student has suffered head trauma.

Last year, Howell's work centered on how handicapped children responded to newfound mobility. The children were able to move a robot around with the use of a computer which was programmed to go through a series of movements with the touch of a key.

The first robots used were maneuvered on the ground and were focused on letting the user deal with mobility. They were called Topo and Hero 1. Despite the children's changing perspectives—they were mentally able to leave their bodies and expand into a larger space—the robots were eliminated from the project because they were limited, Howell said.

The arm on the second mobile robot, Hero 1, exerted only a small amount of pressure, could not hold more than one pound and could not reach things. Therefore, it became non-functional in the environment, Howell said.

The researchers then began using a robot to pick things up rather than moving the robots around. Howell now uses the Rhino robot arm, which is mounted on a plexiglass table. He said he would like to be able to mount the arm on wheelchairs.

When talking to the children, the researchers refer to the mobile arm as "the duck," Howell said. The robot arm has a mouth, long neck and body like a duck, which makes telling the children what to move easier than using technical jargon.

Since the children are in school, Howell said they are lucky to work with them for one hour a week. The hour is divided into half-hour segments twice a week.

Howell's project is funded by Ohio State, which means the project is less expensive, he said.

A team of eight people from other disciplines on campus have volunteered their time for the last two years.

The Industrial Systems Engineering group within the College of Engineering offered their help by loaning Howell the use of one of their robot arms.

Paul Post, an assistant professor in the department of educational theory and practice, does maintenance and research on the robot arm. He said he was drawn to the project because he teaches about robotics in his engineering
helping hand

classes.

As a short-term goal, Howell would like to see robots take replace a number of activities that parents and caretakers usually do for the handicapped at home and in school.

“It would be nice to have a standard type of robot that is modular in the sense of the word that you could take it out and plug it into something else on another track,” he said.

Howell said the use of robotics for the handicapped is in an interim state. In the future there will be a whole new biotechnology, he added, “but we’re concerned with now.”

Other organizations nationwide have contacted Howell for information. He said he does not mind giving information about design, intent and learning features.

Besides catering to the needs of the handicapped, the project is also geared to the needs of parents and caretakers who care for children on a constant basis.

“We have to be very sensitive when working with the parents of handicapped children who really want to help their children,” Howell said. “We don’t want to elevate hopes beyond reality and we impress that upon them.”