EYE COLOR

Interdisciplinary computer project allows Campus School students to “finger paint” with eye movement

By Sandra Howe
Staff Writer

Brenda, a 17-year-old student in the Boston College Campus School, can't move 98 percent of her body, but through new computer technology created by a team of Boston College researchers, she and several other Campus School students can now interact with computers with only their eyes.

Recently, Brenda has been eye painting, a technique where she can look around the computer screen, with colors appearing wherever she looks. The result is similar to finger painting.

This innovation is an outgrowth of the “EagleEyes” Project, a collaboration between associate professors James Gips (CSOM), Joseph Tecce (Psychology) and Peter Olivieri (CSOM) that was a finalist in this year's Discover Awards for Technological Innovation. Eye painting, explains Gips, allows severely disabled children to finger paint by moving their eyes. The computer monitors their eye movements by reading signals from electrodes placed around their eyes. The computer “paints” the screen where the users direct their eyes.

Finished paintings — color printouts of the screen — are displayed at the Campus School and also brought home to parents.

“It's still in the experimental phase,” said Gips, “but the kids are enjoying it because it gives them control over their environment.”

The researchers hope software for reading, writing and arithmetic — as well as for a new, visually presented IQ test for the severely handicapped — can be developed.

“This technology is changing the way people interact with machines and we plan to improve and add to it,” Olivieri said. He mentioned navigating large databases for business applications and customizing lessons for students as two possibilities for “EagleEyes.”

“We're asking a lot of people to use their eyes in a way they've never done before,” said Tecce. “Eyes traditionally bring information into the brain. We've reversed that, with eyes being used to control the environment, rather than reacting passively.

“Clinical populations is where we're going with this and we're hoping this gives [Campus School students] a little more quality of life,” Tecce added.

“The potential is awesome,” said Campus School Director Philip DiMattia. “Our children have severe sensory damage and disabilities, but we know they take in information because of the way they communicate with their eyes. This project is a first because their eyes, for the most part, are not disabled.

“I want Brenda to read and do what other 17-year-olds take for granted.”

Associate professors Peter Olivieri (CSOM), standing at left, Joseph Tecce (Psychology) and James Gips (CSOM), seated, work with their eye-controlled computer project. They have created a program that allows severely handicapped Campus School students to paint using only their eyes. (Photo by Gary Gilbert)