Piano tutor is a computer at CMU

By Marcia Dunn
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Practice makes perfect in piano playing, especially when the tutor is a computer.

A new computer tutor keeps beginning pianists in line by selecting appropriate lessons, while monitoring their efforts on an electronic keyboard.

Piano Tutor, as it's called, is just one example of how music-minded computers are tapping technology and pushing beyond the boundaries of the familiar Moog synthesizer of the 1960s and 1970s.

"What we're doing is learning how to control the technology that is part of our culture, and that's not just for the sake of using technology," says Craig Harris, president of the Computer Music Association.

"We need to re-evaluate how we learn, how we think about sound, how we think about music and art," Harris continues. "Piano Tutor accomplishes that as an instructional tool, missing none of the subtleties of the human touch."

There was something extra between these notes. Try again," the computer flashes on a screen after a less-than-perfect performance by a student.

"Your rhythm was very uneven. Try keeping a steady beat."

During downright awful renditions, the computer interrupts and instructs students to begin again - and again again, if necessary.

"We're trying to model this after real teachers, and a real teacher would interrupt right at the beginning," says Roger Dannenberg, a professor at Carnegie Mellon University and a research computer scientist at Carnegie Mellon.

His collaborators, Annabel Joseph and Marta Sanchez, music professors at Carnegie Mellon, have introduced computers into piano studies over the years for a mysterious and materializing in practice.

The three entered exercises and tunes such as "Yankee Doodle Dandy" into a computer by describing how the music appears on the written page and by arranging the selections on an attached electronic keyboard.

"As piano teachers, you're concerned about what happens with a student between lessons," Joseph says. "No matter how carefully you explain things, strange things happen in the week between, so you spend a lot of time correcting.

Another Carnegie Mellon research, Paul McAvaney, has invented VideoHarp, a computerized instrument capable of sensing gestures to reproduce the sound of any instrument, including an entire orchestra.

Images of performer's fingers are reflected by mirrors into an optical sensor designed by Carnegie Mellon's McAvaney. From this pattern of light and shadow, the position and velocity of each fingertip are deduced. The information is then transmitted by computer and transmitted to synthesizers that produce the sound.

The kind of sound emanating from amplifiers - string, woodwind, percussion, brass - is determined by programs stored in the computer.