The Computer-Assisted Music Classroom: A Catalyst for Creativity

Bruce P. Mahin
Center for Music Technology
Box 5774-Radford University
Radford, Virginia 24142
email: bmahin@ruacad.ac.runet.edu

ABSTRACT

In an effort to take advantage of recent advances involving the management of instructional media, the Center for Music Technology at Radford University has implemented a plan which embraces new teaching techniques aided by available technology. Music classrooms have been outfitted with a computer, a digital piano, a large screen projection system, laserdisk, videocassette player, and a sound system of the highest quality.

Music can be displayed, as it is performed, on a large screen in front of the classroom. Excerpts can be extracted as desired. The computer can "perform" examples using a variety of orchestral timbres simultaneously in order to highlight structural features which might be difficult to hear in a normal context.

Projecting music on a screen in front of the class accomplishes distinct advantages over traditional text book approach. First, it focuses student's attention to the front of the class. When the instructor wants to emphasize several notes or chords in a musical example all eyes are riveted on the source. Changes made to the score are readily seen and heard by all.

Moreover, students can complete assignments on computer, then store their work on floppy disks. When these disks are brought to class, the instructor can project a student's work in front of the class for immediate critique and discussion. After class a student can review the corrected assignment alongside his original effort.

INTRODUCTION

In an effort to take advantage of recent advances involving instructional media, the Center for Music Technology at Radford University has implemented a plan which embraces new teaching techniques aided by available technology. Facilities include 1 computer-assisted classrooms, a computer keyboard lab, 6 personal music workstations, a MIDI lab, a direct digital synthesis lab and a music therapy laboratory. This represents an effort to accommodate students enrolled in music literature and history,
music theory, composition, performance, music therapy, education, computer music and music business.

Four courses in computer music have been added to the curriculum: introduction to Computer Music, a second semester course titled Computer Music Techniques, a course in Computer Music Applications, and a seminar titled Computer Music Forum. All ear training and written theory courses use computers in a laboratory setting and in classrooms.

COMPUTER-ASSISTED CLASSROOMS

Three music classrooms have been equipped with a computer, a digital piano, a large screen projection system, laserdisk, videocassette player, and a sound system of the highest quality. Images produced by laserdisk and videocassette players can be projected onto a 10x10' screen at the front of the class. Sound is reproduced in digital stereo through large loudspeakers mounted on either side of the classroom. Thus, short video snippets of a work can be heard and seen repeatedly, if necessary, and tailored to fit classroom discussion. Students have the opportunity to experience a work many times before hearing it in the concert hall and can make observations in class. The actual concert experience then becomes more memorable, and thus more essential to the student's everyday experience.

Laserdisks can re-create an actual performance, reproduce a score page by page, and offer mini-lectures on a composer's life, costume design, sets, musical instruments, whatever is appropriate. A computer can also be used to access information on the laserdisk in an efficient, orderly manner during class. Outside the classroom, a hypercard stack can be used to structure viewing sessions for students.

The use of a computer in the classroom has greater implications however. When connected to a digital piano the computer can display music, in standard notation, as it is performed. The music can also be projected on a large screen in front of the classroom. This parallels the traditional textbook approach with significant advantages.

First, it focuses student's attention to the front of the class rather than burying it in a book. When the instructor wants to emphasize several notes or chords in a musical example all eyes, theoretically, are riveted on the source. Changes made to the score are readily seen and heard by all. When a student inquires about a specific musical detail, all eyes are focused on the same illustration.

Moreover, students can complete assignments using personal music workstations and store their work on floppy disks. When these disks are brought to class, the instructor can project a student's homework in front of the class for immediate critique.
and discussion. The teacher can make changes which are observed visually and aurally by the entire class. In this way, a few students receive individualized attention while the class benefits too. After class a student can review the corrected assignment alongside his original effort.

When an instructor uses a computer instead of a chalkboard a lecture can be saved on floppy disk as a permanent record of the class session. Likewise, instructors can prepare illustrative examples prior to class and display them quickly before the class. Unlike paper copies, computer graphics can be altered in class to suit the discussion. After class this material can then be copied onto student disks. Students spend time digesting material discussed in class rather than copying information from the chalk board. Copying errors become a thing of the past.

After completing a music analysis students find it helpful to "orchestrate" a composition in order to bring out structural features which might otherwise be hidden. A Scarlatti sonata, for example, can be stored in computer and heard as it was meant to be performed using a harpsichord sound. Next, students can highlight important thematic motives, and separate exposition from development by adding other instruments into the performance. They may add a trumpet voice when the principal motif returns in the development section contrasting this voice with strings on accompanimental features.

This classroom model is taken one step further in the computer keyboard lab, a situation ideally suited for class piano, improvisation, and theory classes. Here each student has a computer and a keyboard which is connected, through a local area network, to the teacher's computer. As in the classroom model, each computer has access to music notation, music sequencing, and word processing software.

Now, however, the instructor has access to student's work during class, with the option of projecting examples onto the screen at the front of the class. Moreover, the network opens up two-way information transfer, between students and teacher, providing an avenue for monitoring student responses during class. When class is over each student has a record of the class proceedings stored on floppy disk.

THE PERSONAL MUSIC WORKSTATION

The personal music workstation offers the advantages of the computer classroom but emphasizes private study. Its components include a computer, digital piano, sound system (or headphones), and MIDI interface. This system can be assembled for as little as $1,000. The workstation also serves as a model for any environment where individualized instruction is desirable.

While most classrooms now have access to at least one computer, few make use of this resource to further the arts
curriculum. The computer can serve as a stimulus for creative, imaginative work, and as a vehicle for arts instruction.

Consider a program called ovarlute, which transforms the Macintosh computer into a creative artistic instrument. Students of any age can experience the magic inherent in the creative process. Without prior artistic or musical knowledge, a student can "create" a multi-media show simply moving the computer's mouse. This work of art can be stored in computer memory and performed later, perhaps, in front of the class.

Thus, students learn about art by participating in the creative process. They also learn to feel comfortable with the computer, and their own artistic abilities.

Integrating the workstation into traditional curriculums, though, is more difficult because most teachers lack the training necessary to make them most effective. Faculty training must become a high priority if we are to successfully integrate technology into the arts curriculum.