COMPUTER MUSIC ACROSS DISCIPLINES
IN AN UNDERGRADUATE CURRICULUM

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ABSTRACT: Taking advantage of the Electronic Classroom at Vanderbilt University, the Blair School of Music course Computer Music is open to the entire campus community. Students from many disciplines stretch themselves across the traditional boundaries of their major areas of study. Using a general purpose computer lab/classroom these students are able to participate in computer-based music making.

There are no electronic music studios at Vanderbilt University. A course in computer music is taught however, using Vanderbilt’s Electronic Classroom (EC). The EC is a computer-based classroom that is used for classes in several disciplines including mathematics, psychology, astronomy, foreign languages, engineering and music.

Students in the EC use one of 30 student stations, each with its own computer, monitor and other peripherals. The instructor uses the instructor’s podium. Each computer has a wide variety of software loaded on its hard drive and is connected to one of four postscript printers.

Each student station is a Macintosh IIX with 20 MB of RAM and a 160MB hard drive. The processor of each IIX has been upgraded with Daystar’s Turbo ‘040 accelerator board. The accelerator board is a 33 MHz 68040 microprocessor with an integrated FPU and a 128 KB processor cache. Each station also is equipped with a 16” E-Machines monitor and a Digidesign Audiomedia sound board. The Audiomedia is crucial to teaching computer music. Through upgrades and additions the useful life of these machines has been well over six years.

The software on each classroom machine is identical. The core applications used in Computer Music are (in order of introduction to the students) Digidesign’s SoundDesigner II, SoundHack by Tom Erbe from CalArts, Lenzar and LemurEdit by Kelly Fitz, Bryan Holloway and Bill Walker from the CERL Sound Group at the University of Illinois, Digidesign’s TurboSynth and Csound by Barry Vercoe at the MIT Media Lab. Each machine has two stereo headphone jacks for auditioning sound from the Audiomedia board, and a stereo input for recording to hard disk through the Audiomedia board. Each computer is connected to an Ethernet network which allows users to access classroom servers, the campus-wide network and Internet resources.
The instructor’s station is outfitted with a variety of audio-visual equipment including DAT and cassette players, CD-ROM, VHS VCR, and laserdisk players. The instructor may route any of the audio or video signals to any of these devices or to a ceiling-mounted large screen projector.

This course follows an historic approach to computer music covering musique concrète, classical tape techniques (realized digitally), software synthesis (Music V to Csound) and coming full circle with sampling (musique concrète revisited). MIDI is not dealt with in much detail as the EC systems are not MIDI equipped. (They will have basic MIDI capability next year using Quicktime 2.0 and Midifont.)

Starting with fundamental terminology, the course covers the following topics:

- Physics & psychophysics of sound
- Tape techniques/musique concrète
- Sound analysis/synthesis
- Instrument design
- Software synthesis with Csound
- Temporal structure/score construction

The focus of the course is sound. Students are given many opportunities to analyze, manipulate and create sounds. Students are encouraged to continually challenge their notions of what music is, and they have many opportunities hear and make music in new ways.

Projects are assigned in support of these topics and can all be accomplished using the available hardware and software. Many students complete small compositions on the systems during the semester. An engineering major composed a fractal music piece, an astronomy major simulated a Bach three-part invention with chaos algorithms, an English major created a composition of musique concrète with spoken text from an original poem. Many students extend themselves. Through the interdisciplinary study of computer music (both its history and techniques) the rigors of academic achievement are combined with the creativity and play of artistic pursuit.

While there is a good amount of technical information involved, the class concentrates on concepts and not specific systems. The hope is that the students will be well equipped to continue working in computer music on their own, long after having taken this course. And many do.

REFERENCES: