Computer Planning Board
Educational Subcommittee
Implementation Plan

Electronic Studio Plan

for

Music

Spring, 1990

Shepherd School of Music

Educational Computing Report

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January 10, 1990

Shepherd School of Music Computer Plan

1. Introduction

Educational computing and music is a rather new pairing. The faculty of the Shepherd School of Music is excited about this rapidly developing relationship, and we hope to participate fully in newly emerging possibilities. The academic side of the school is fully in accord with the general University attitude that computers are a vital part of the overall educational process, and we think that music students are no different from any other students in this regard. We feel strongly that no music student should graduate without computer skills that go beyond the obvious need for word-processing. The music curriculum can incorporate computers in many ways and at many levels. Until very recently, our version of the "electronic studio" was a place where computers were used by composers to create new instruments, sound combinations, and compositions. However, recent advances in MIDI equipment, sequencers that sample sound accurately, and extraordinarily powerful, interactive music printing programs have created an exciting opportunity to introduce high-quality, accurate sound and scores into new courses and locations. These new technologies suggest new ways of not only teaching but even thinking about music. The effect will be felt at virtually every level of the curriculum. Not only will old courses be taught in new ways, but new courses will be created. The rapid growth of the field implies that courseware development will keep pace with hardware advances. The move into a new building, with state-of-the-art facilities, is a fortuitous time to begin to integrate the various new developments into our pedagogy.

2. Specific requirements

a. Public facilities. The Shepherd School public facility is best described in paragraph C.

b. Office equipment. Initially, 14 MACIIcx 80/4, with two-page monitors. At least two laser printers are needed, one for the composition department, and one for the musicology and music literature faculty. At least 12 of the cx's must have MIDI interfaces and digital synthesizers. This is the

only way that they can effectively be used to create the necessary musical sounds   Not all of these are for faculty; at least two should be placed in a Teaching Assistants studio. In addition, at least one optical scanner should be available, as well as a fax machine. This initial round of purchases addresses currently known ways of integrating computers into the curriculum. In years two and three, additional equipment should be acquired to satisfy increased demand. This demand will emerge in two ways: other faculty discovering uses for computers in their areas, and new uses altogether.

 c. Other purposes. There are four facilities that should be set up in the new music building. The first is an Aural Skills laboratory. This should contain at least 16 MAC SE20's with MIDI interfaces. Every music student will utilize this space. Our core undergraduate curriculum includes five semesters of Aural Skills. This is one area where computers have already made significant contributions, and future developments promise even greater levels of integration. The second facility is a publishing studio. We currently have its prototype, and need only to expand it. This would consist at first of 3 MACIIcx 80/4, networked to a laser printer, and with 2-page monitors and MIDI equipment. By year four, it would expand to 10 workstations. A variety of software would be available for the students to work with. This facility could be open to the public, but only if they are working on music projects. In other words, it is dedicated to printing and analyzing music. This will be the primary student facility. It will be a place where they do both class work and independent projects. The third is a portable classroom studio, consisting of a Mac SE, appropriate sound-generate equipment, and a CRT projector. This unit would be available for a variety of presentations as needed. One of the most exciting of these is the flexibility to participate in live performance situations of various kinds. These include not only tape pieces (the "traditional" electronic music concert) but interactive performer/computer Performances, and inter-arts collaborations. The fourth purpose is Permanent classroom version of the portable facility. Over three years, each classroom in the new building should be equipped with the capacity for Projection, playback, and interactive presentations of various kinds. Since one of the goals of this proposal is the use of computers in the widest possible number of classes, it makes sense to equip each classroom.

d. Personnel. A full-time manager is needed. His/her duties -would include set-up, maintenance, software acquisition, and tutorials. The manager would have to have some musical knowledge in addition to computer skills. At least 3 students assistants would be needed to staff the public facilities, since it is more than likely that they would be open 24-hrs a day, and some staff help should be available at least for some of that time.

e. Software. MS Word, Finale, MusicProse, VISION, several other music printing programs, and appropriate data-base management programs.

f. Space requirements . Four different kinds of concerns need to be addressed to incorporate computers effectively into the new building. The first is that twisted pair music be installed in all faculty offices and the Teaching Assistants' office. As more faculty become involved with computers, networking capability must be there. The second is the Aural Skills laboratory. This will be a shared space with the class piano studio. Since that class uses electronic keyboards, it is a fairly simple matter to add the Mac SE's. Therefore, both sets of classes will be affected. The third room is for the publishing studio. Room is earmarked for it already. It should be a stand-alone network with adequate sound-proofing. The final space is the manager's office. This will be the place where shared resources can be housed, including the laser-printers for the faculty, the fax machine, the optical scanner, and the portable studio. This will be in a central location.

g. Basis of calculation..
> 1. Aural skills laboratory - 16 is the optimum class size, and is the standard size now. The software works best with one user per machine, since the essential point is personalized teaching and learning rates.

> 2. Publishing studio. This facility will be heavily used. Nearly all Shepherd School students will use it, many extensively and daily. At first, there should be three workstations open 24-hrs to accommodate 25-30 students daily in two to three hour sessions. As demand grows, fueled by increased pedagogic incorporations and new, currently unseen uses, and an increased student

population, this studio should grow to at least ten stations by year four. Indeed, more could well be needed.

h. Colleges. No need is seen to locate any music-dedicated equipment in the colleges. Students could use the facility in the music building, assuming they have knowledge of the systems and legitimate needs.

i. Training. The success of the entire project depends on appropriate instruction and support. Some fundamental software systems should be handled on a University-wide basis, and each music student should avail him or herself of this. The basics of the music - specific software should be taught to all music students and any interested others in mini-courses throughout the year. The newly-hired director should plan for this.

3. Connectivity.

a. The computers located in each of the facilities described in 2.c. should be connected internally. They are truly stand-alone, internal networks. The one system that we currently have would be a part of the Printing studio. The faculty computers could be connected in by department. Shared printing facilities are appropriate.

b. The faculty equipment should be connected to the University backbone for e-mail, student advising, and other such generalized University business. It is crucial that access to the library be a part of this. Furthermore, the faculty need a kinetics gateway for access to bibliographic databases. Some of our faculty are involved in the actual creation of these; all of us need access.

4. Unfortunately, coordination with other divisions is essentially impossible. The primary difference between the needs of the Shepherd School of the needs of other divisions is the need for high quality sound. Our computers need to have sound generating and reception capabilities, and require specific software to process this.

5. Budget

The following tables are for equipment and resources that are currently available. Obviously, as either new versions of these come into existence, or new things altogether are created, we would want to purchase them. (Numbers in parentheses are total number of units.)

2.b. Office hardware

	year 1	year2	year3	year4	Year5	total
kinetics gateway	2500	0	0	0	0	2500
laserwriter IINT (2)	6144	0	0	0	0	6144
print server (2)	598	0	0	0	0	598
optical scanner (1)	1500	0	0	0		1500
fax machine (1)	1500				8	1500
MacIIcx 80/4 (14)	58744	(3)12588	(3) 125880	0	0	83920
extended kybd (14)	2030	(3) 435	(3) 435	0	0	2900
2-page monitor (14)	19124	(3) 4098	(3) 4098	0	0	27320
2-pg video card (14)	5320	(3) 1140	(3) 1140	0	0	7600
MIDI interface (12)	1980	(3) 495	(3) 495	0	0	2970
synthesizers (12)	18000	(3) 4500	(3) 4500	0	0	27000
subtotal	117440	23256	23356	0		163952
20% amortization	23488	28139	32790	32790	32790	149997
total	140928	51395	56146	32790	32790	314049

2.c. Instructional hardware

i Aural skills lab

	year 1	year2	year 3	year 4	year 5	total
Mac SE20 (16)	30960	0	0	0	0	30960
MIDI interface (16)	26404	0	0	0	0	2640
kybd controller (16)	12800	0	0	0	0	12800
Imagewriter printer (2)	874	0	0	0	0	874
Localtalk kit (2)	112	0	0	0	0	112
subtotal	47386	0	0	0	0	47386
20% amortization	11477	11477	11477	11477	11477	57385
total	58863	11477	11477	11477	11477	104771

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2.c.iii. Publishing studio

	year 1	year 2	year3	year4	year 5	
MacIIcx 80/4	(2) 8392	(2) 8392	(3) 12588	(2) 8392	0	37764
extended keyboard	(2) 290	(2) 290	(3) 435	(2) 290	0	1305
2-page monitor	(2) 2732	(2) 2732	(3) 4098	(2) 2732	0	12294
2-page videocard	(2) 760	(2) 760	(3) 1140	(2) 760	0	3420
localtalk network kit	(2) 112	(2) 112	(3) 168	(2) 112	0	504
1aserwriter IINT	(1) 3072	0	0	0	0	307.2
print server	(2) 598	0	(2) 598	0	0	1196
MIDI interface	(2) 330	(2) 330	(3) 495	(2) 330	0	1485
synthesizer	(2) 3000	(2) 3000	(3) 4500	(2) 3000	0	13500
subtotal	19286	18739	32512	18739	0	77612
20% amortization	3857	6980	12398	15521	15521	54277
total	23143	25719	44910	34260	15521	143553

22.c.iii Portable studio

Portable studio	year 1	year 2	year 3	year 4	year 5	total
MacSE20	(1) 1935	0	0	0	0	1935
MIDI interface kit	(1) 165	0	0	0	0	165
keyboard controller	(1) 1000	0	0	0	0	1000
Kodak CRT projector w/adapter card	(1) 2000	0	0	0	0	2000
stereo amp, speakers	(1) 500	0	0	0	0	500
equipment cart	250	0	0	0	0	250
subtotal	5850	0	0	0	0	5850
20% amortization	1170	1170	1170	1170	1170	5850
total	7020	1170	1170	1170	1170	11700

2.c.iv. Classroom projection and playback facilities

	Year1	year2	Year3	year4	year5	total
Mac SE20	0	(2) 11700	(2) 11700	(2) 11700	0	35100
MIDI interface kit	0	(2)330	(2) 330	(2) 330	0	990
synthesizer	0	(2) 2000	(2) 2000	(2) 2000	0	6000
Kodak CRT projector	0	(2) 4000	(2) 4000	(2) 4000	0	12000
stereo amp//speakers	0	(2) 1000	(2) 1000	(2)lOOO	0	3000
subtotal	0	11700	11700	11700	0	35100
20% amortization	0	2340	4080	7020	7020	20460
total	0	14040	15780	18720	7020	55560

3. Software

To be site-licensed:
    coda <u>Finale</u>
    Microsoft <u>Word</u>
    Opcode systems <u>Vision</u>
    Digidesign <u>Sound Designer II</u>
    Other aural skills, Ear Training, and simple playback software TBA

4. Service and maintenance

	year 1	year 2	year3	year4	year5	total
MacIIcx	(16) 7490	(21) 9831	(27) I2639	(29) 13575	(29) 13575	57110
2-page monitor	(16) 2312	(21) 3034	(27)3901	(29) 4190	(29) 4190	17627
Mac SE20	(17) 5335	(19) 5962	(21) 6589	(23) 7217	(23) 7217	32320
Laserwriter IINT	(3) 1912	(3) 1912	(4) 550	(4) 2550	(4) 2550	11474
imagewriter	(2) 100	(2) 100	(2) 100	(2) 100	(2) 100	500
total	17099	2078	25729	27582	27582	118781

5. Total budget

	year1	year2	year3	year4	year5	total
office hardware	140928	51395	56146	32790	32790	314049
aural skills laboratory	58863	11477	11477	11477	11477	104771
publishing studio	23143	25719	44910	34260	15521	143553
portable class studio	7020	1170	1170	1170	1170	11700
classroom facility	0	14040	15780	18720	7020	55560
software	30000	30000	30000	30000	30000	150000
facilities total	259954	133801	159483	128417	97978	779633
maintenance	17099	20789	25729	27582	27582	118781
Salaries	31350	33231	35225	37340	39580	176726
total	308403	187821	220437	193339	165140	1075140

6. The impact on our curriculum will be radical. There are perhaps three areas of the curriculum that will be immediately affected. The first is wherever there is repetitive, drill work, such as in the teaching and practicing of Aural Skills. Here computers can quite easily augment current classroom instruction in a sequence cf courses required of all music students. The second area affected will be Musicology and Music Literature courses.

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Computers can be used in courses for such things as bibliographic searches (required as early as the Freshman year), the creation of databases (an essential part of musicological research) and the teaching of editing and transcription. Of even more far-reaching consequences is the ability to create scores and recordings where none currently exist. In other words, the technology is such that a piece that has never been recorded, or possibly never even performed, could be heard via computer synthesis, and the score could be edited, printed, and studied. The third area is in the teaching of composition and theory. Here, student work could be performed, analyzed, and discussed in ways that have truly never existed before. The students in all of these classes would, therefore, have the opportunity to discover and to learn in new ways. Here, an interactive classroom environment would be welcome. It would certainly make the teaching far more creative, and far more meaningful for the students. It would provide a constant hands- and ears-on experience where one now only exists sporadically. In all of these areas, once students have gained some expertise in the computer applications available in the more basic courses, they will have the ability to engage in creative, speculative work hitherto impossible. Indeed, the most exciting feature of all this is the insight that it provides into the creative process itself.

In addition to the reproduction of sound, which is impressive enough, the ability to edit rapidly is a dramatic, exciting thing. The best example is in the teaching of composition. Here, the process has been virtually unchanged for centuries. The student brings in a work in progress, which the teacher tries to hear, either by playing it on the piano, or by imagining the sounds in his head. The teacher comments on the work, makes suggestions, and the student goes home and tries to remember what has been said. *Several* months later, at best, the piece is performed, and the student finally hears it. Revision is difficult, if not impossible. Right now, though, it is possible for the student to put his piece on the computer and play it for the teacher. He or she can make suggestions that can be implemented on the spot, and both student and teacher can hear it virtually as it will be in the performance. Editing and revision is simple. And better music will be the result.