Sibelius Academy Computer Music Studio

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Abstract

In this paper I shall describe the Sibelius Academy Computer Music Studio. The studio has been recently set-up and furnished with modern equipment. The studio, together with the small concert hall associated with it which has special facilities for electro-acoustic music performance, offers a good working environment for computer music teaching and research.

1 BACKGROUND

The history of Finnish electro-acoustic music goes back to the 1960's. The first studio was built in the late 60's at the University of Helsinki Department of Musicology. The first Finnish home grown electronic music equipment was built there by the composer and inventor Erkki Kurenniemi. In the early seventies these systems included computer-controlled synthesizers and sequencers, and special control devices such as video cameras for transforming movement into music and the so-called Saxophone which used physical contact between people as its control source.

In the 1970's, the Experimental Studio of the Finnish Broadcasting Company (YLE) was built, and it is there that the major part of Finnish electronic music has been made up to the present day. The studio is well equipped a full range of typical electronic music equipment such as analog and digital synthesizers, multitrack recorders, computers, sound processing systems, etc.

In 1990, two studio projects were initiated, these being CARTES (The Computer Arts Centre at Espoo), which is mainly intended for multimedia, and the Sibelius Academy's computer music studio. The Sibelius Academy Computer Music Studio (SACMUS) is a studio for teaching and computer music production for students of composition.

The Sibelius Academy in Finland's largest institution for higher musical education, and has about 2000 students. Less than fifty of these are students of composition. The annual intake of composition students varies between five and none.

2 ACTIVITIES

SACMUS' activities can be divided into three equally important areas: teaching, research and production. The role of teaching is to educate young composers in the use the studio and the making of electronic music. Research is a way to understand new ideas and systems and also keeps the atmosphere in the studio intellectually lively. Production means that the students have high quality facilities with which to realise their works.

Limited resources dictate that the level of activity in these different areas varies. An ongoing research project during 1993-94 lends a more research-oriented feel to the studio at the present time, but other areas of interest may come to the fore in future years.

Next year the ISEA 1994 (International Symposium for Electric Arts) will take place in Helsinki. SACMUS will organise several concerts and happenings in conjunction with this event.

3 TECHNICAL FACILITIES

The fact that there was only one room suitable for a main studio was minimal in the design of the complex. However, there are also small rooms housing what we call workstations. By workstation we mean not just a computer but a small integrated system with computer, DAT-recorder, mixer, sound processing devices, synthesizers and loudspeakers. In principle, high quality electronic music can be made with these workstations.

Because of limited financial resources, the technical facilities of SACMUS have been developed on a step-by-step basis, and we have been willing to hide our time in order to obtain the best value for money. Some important equipment still needs to be bought (not all the workstations are fully equipped yet) and some areas have been totally disregarded (analog devices, console automation).

3.1 COMPUTERS

The computers we chose were NeXT and Macintosh models. The decision to go for two different systems rather than one has turned out to be a good one, albeit expensive.

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This solution has lately proven to be even wiser since the discontinuation of NeXT hardware has caused worries to those using only NeXT computers. We have experimented with using a Windows-based 80386 machine, but this was too slow for running Lisp, etc. If there were a good MAX implementation for Windows we would certainly try PCs again.

At the present time we have one NeXTStation, one NeXTcube and six Macintoshes ranging from Powerbook 160 to Quadra 950. For backup we have DAT-tape based machines for both types of system, We are also looking at the possibility of using Silicon Graphics machines.

3.2 SPECIAL HARDWARE
In summer 1992 we bought an Ircam Signal Processing Workstation. This has worked well at the hardware level. We have had problems with the software side because students think that objects in Max are too rudimentary and low-level for constructing good sampling devices, for instance, and would in this case prefer to use ready-made samplers.

3.3 SOFTWARE
Most of the software we use is standard, commercially available software. Our most important tools on the Mac are Final Cut, Encore, Max, Common Lisp, Studio Vision, Acrobat, Sound Designer and Prototools.

For the NeXT, most of the software is public domain software obtained via ftp from such places as Stanford, Ircam and Columbia. Virtually the only software bought for the NeXT is Franz Lisp, but this was unsuitable for a long period since it did not work under NeXTStep 3.0.

If we compare Macs and NeXTs as software platforms, the NeXT has suffered severely for the lack of good music software. There is still no adequate solution for notation and score, surprisingly, there is no good editing software which would be as good as Sound Designer and Prototools for the Macintosh.

3.4 NETWORK
All studio facilities are now connected via Ethernet. The studio is linked via a 64k line to other Ircam Academy sites. Each NeXT is very important to us for fast mailing, obtaining free software via ftp and reading news. The network allows students who are also studying at the University's Electronic Music Studio to use NeXTmachines at both sites easily and see the same files.

3.5 STUDIO EQUIPMENT
Our main studio is equipped with a Soundcraft Sapphire console, three ADATs and Genelec LS30 loudspeakers. For signal processing there is an Ultra-Harmanizer and a Lexicon LXP-15. For multidirectional monitoring there are eight Audience nearfield monitors. The purpose of these is to simulate the eight-direction loudspeaker configuration of the small concert hall. The studio also has DAT machines, Protos with 1Gb hard disk and a NeXT equipped with the Ircam Musical Workstation. There are also four separate workstations (or five if my tiny one is included), each equipped with a computer, synthesiser, etc.

4 RESEARCH
A two-year research project is underway in which the studio is cooperating with the Acoustics Department of the Helsinki University of Technology. The title of the project is "The computer as computer, performer and musical instrument". Our role is mainly in the research of algorithmic tools for musical composition, while the University of Technology's contribution is described elsewhere in these proceedings (Martti Karjalainen and Vesa Välimäki 1993). Our part of the project currently focuses on three distinct topics: Mikael Laurson is working with Patchwork constructs, which is a program for developing effective code-based production systems. Marcus Caspers is doing research on set-theory implementations within Patchwork. Mika Kuuskanen and I are developing a system based on genetic algorithms which produces functions capable of simulating musical lines.

5 PROGRAMMING
Patchwork is clearly the most important program developed at the Ircam Academy. It is mainly the work of Mikael Laurson, but over the last few years it has also been developed at Ircam by Camillo Rueda et al. Patchwork is a Common Lisp-based object-oriented program with large tools for various musical purposes (Laurson 1989).

Other programming activities involve developing Max objects for our special needs. We have for example a sequencer function for easier graphics handling, a multiple-oscillation chaotic function (Freyland), L-systems and turtle-graphics.

6 MUSIC
Because our studio has been in development for a short period of only two years, not much music has been produced so far. The main reason is that young composers need time to learn to use the environment. Our first experimental concert took place in November 1992; the whole concert consisted of new material from the studio. Our official opening concert is scheduled for early 1994.

7 TEACHING
Teaching of electronic and computer music has been divided into two one-year courses. We are going more and more towards personal tuition. Only the simple basics of acoustics and theory are covered in group sessions. With personal lessons we can concentrate on each student's own questions and areas of interest.
The curriculum includes synthesis techniques, studio equipment, MIDI, the Max programming language, Csound and algorithmic composition techniques. Each student is quite at liberty to concentrate on specific aspects of the curriculum. After completing the main courses, students with special interest can extend their studies in what we call Specialised Studies.

8 CHAMBER MUSIC HALL

During 1987-91, the long-awaited renovation of the Sibelius Academy main building took place. A new small concert hall for chamber music was built in what was formerly the inner courtyard. Up until this time Finland did not have a hall specifically equipped for concerts of electroacoustic music, so the new concert hall was equipped for this purpose, making it easy to organise concerts of a fairly complex nature. The new hall is equipped with 96 loudspeakers built inside rotating wall and ceiling elements. There are also two subwoofers for frequencies below 80 Hz. The loudspeakers are grouped into 32 channels, each with a separate amplifier.

The hall has nearly 200 seating wall elements, controlled by dedicated computer hardware and software. The mechanical system for operating the elements is quite complicated, and there have been problems with the noise it creates. We are now able to change wall configurations between pieces of music, but the system is too noisy for changing them while a performance is in progress.

Spatial control of sound within this kind of system is not simple either. We started out with a very basic system without any special spatialisation hardware. During the summer of 1993 we are installing a spatialisation system. This will enable us both to control the direction of sound and move it in real time using MIDI-controllers or algorithms, for example.

A large and stable system such as this would allow the possibility of creating full-scale pseudo-acoustics. We have followed the Ircam spatialisation project with interest, since this would help us to produce variable and controllable acoustics in our hall, although at the moment this would seem to require a prohibitively amount of extra hardware.

9 CONCLUSION

The Sibelius Academy studio and small concert hall project was launched at a time of affluence in Finland and has come into operation during the country's deepest economic recession. This has caused a number of modifications to the project and re-evaluations of it. We nevertheless believe that what we have achieved our main goal of creating a studio where one can learn, research and compose in a collaborative and congenial atmosphere.

REFERENCES


SIBELIUS ACADEMY COMPUTER MUSIC STUDIO
A schematic view of equipment and facilities

- Larger Studio Classroom
- Small Classroom
- Main Studio
- Channels 1 ... 32
- Loudspeakers 1 ... 96

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