The Pedagogy of Open Environments in the SONVS Electroacoustic and Computer Music Departement of the *Conservatoire National Supérieur de Musique* of Lyon

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SONVS, the Electroacoustic and Computer Music Department of the *Conservatoire National Supérieur de Musique* of Lyon seeks to fulfill three principal aims: teaching, composition of new works and research. These three complementary goals are intended to interact in order to make up today's musical world.

The regular staff is composed of two professors and one teaching assistant, one computer engineer, one sound engineer, and a part time maintenance technician. Researches and experiments performed by this team and some graduate students are made available for composers and integrated with the studies.

The department may accept about sixteen students on the main courses. Additional non-qualifying students may also be admitted: these students can attend group classes and seminars but cannot take part in practical sessions.

SONVS possesses a large general purpose hall and recording studio with variable acoustical characteristics (70 m^2), linked to a main control room with a specific *Live End-Dead End* acoustics (LEDE, 50 m^2). Five smaller studios are also available for group classes and individual work.

The department uses a large quantity of electroacoustic and computer equipement installed in all these rooms. In addition, some portable devices are also available for concerts or specific projects.

This equipment enables the staff and students to make use of musical tools of different types: all common professional and/or commercial musical software and hardware, together with specialized research and experimental musical environments released by international institutes and universities. Sound analysis and (re)synthesis, sophisticated audio processing and transformation, MIDI and other event processing techniques, etc., are all available for the creation of electroacoustic and mixed instrumental music or video post-production, in compliance with the best modern professional technical standards.

The main course concentrates on *Electroacoustic, Computer and Instrumental Composition*. The principal aim of the tuition consists in the simultaneous study of traditional techniques (vocal and instrumental) and of electroacoustic and computer music. Present day composers must have a sound grounding in these interconnected areas, which are essential for contemporary art. They should be taught to master these techniques at the same degree of perfection so that their work is not limited to any one speciality.

The studies in *Electroacoustic, Computer and Instrumental Composition* are divided into three parts. Their normal length is three years, but may be extended to five. Composition students must create a mixed electroacoustic and instrumental work for an examination at the

end of the second part, and at least one other work of the same type to be performed during the final examination ending the last part.

Another course is intended for students not aiming at composition: for instance, instrumentalists interested in technological extensions of their performing skills, students interested in the technical aspects of computer music, etc. This *Short Course in Electroacoustic and Computer Music* consists in the first two parts of the tuition, and lasts normally two years, but may be extended to three. During the second part, whereas composition students prepare a composition examination, the *Short couse* students concentrate on the realization of a final technical project backed by a dissertation.

At least two complementary subjects must also be chosen by all composition students, among those proposed in the conservatory. Students in the *Short Course* need to choose only one complementary subject. In some cases, these additional subjects can be selected by the professors upon admittance to part one, according to each student's previous background.

Pedagogics is primarily concerned with time, and relies on a summation of small individual progressions. For the students, most of the essential learning and experimenting processes are often solitary. In this context, special events play an essential part in the coherence of the pedagogical structure of the education. SONVS invites guest composers to create and perform works in its studios and share their experience in seminars with the students. Concerts and public events, lectures by invited guests are organized in order to complement the proposed courses, and to promote the compositions and technical projects produced in the department. Such crucial events allow a confrontation with external reality, a renewed and refreshing insight on all theoretical subjects, and their taking shape in a unique experience.

During the studies we try, as much as possible, to cover the essential aspects of the main fields of electroacoustic and computer music, in theory as well as in practice: sound processing, analysis and (re)synthesis, general issues of computer assistance and algorithmics, particularily in the context of the preceding subjects or applied to musical composition, real-time and instrumental interaction, acoustics, etc.[1]

A sound pedagogical process must take into account two opposite poles. The first is limited to short term: the need for the student to *produce*, to achieve concrete goals, to realize his compositions and to face his academic duties. Overemphasized, this pole of *immediate action* could merely amount to the study of all soft- and hardware *User's Manuals*, together with individual "hands on" trial and error experimentation. But at the other extreme, the educationalist's duty is to bring the matters on a higher level, to discuss the *basic principles* involved, to give the keys of a true *understanding* — much more than a mere empirical *know-how*. The ultimate goal is for the student to "learn how to learn", during his entire career: this antique and well known aphorism is nothing less than overstressed by the everchanging trends of new technologies. It is necessary for the modern young professional to share a truly creative insight on technologies, and to possess the theoretical knowledge and robust mental structures with which he will deal with probably unforeseen situations in the future. This pole of *reflection*, although somewhat limited in the context of a music conservatory, would lead to the study of mathematical and cybernetic theory, digital signal processing, history, aesthetics, etc. These two poles not only point in diametrally opposite directions, but they also imply incompatible *time scales*: short term opposed to long term. One must try to manage a compromise between the horns of this eternal dilemma.

There is no universal answer to this problem. The approach we use consists, without neglecting the necessity of basic technical and practical apprenticeship, in stressing the study of *open environments*, which involve a genuine programming skill on the student's part. *Programming* can be here understood at different levels or in a variety of styles (*MAX*,

CSound, *LISP*, for instance), but implies the confrontation of the student with the task of organizing, of "creating" himself a rather important part of his own technological environment, the means through which he will ultimately produce his own music. He thus faces the *how and why* of things, the basic principles acting behind the interfaces or front pannels of all hard- and software: it then becomes possible for him to have an authorized and argumented *crititical* point of view. In this manner, we hope to give him the versatility of dealing with the perpetual adaptation he will have to perform in his professional activities, and to enable him to eventually *initiate* future technological developments, rather than to submit himself to the passive expectation of the availability of more or less satisfying commercial products.

The essential aspects of this dilemma opposing *open* to *closed* systems, creative and customizable personal environments to dangerously — and so skillfully! — controlled commercial products, is of course not restricted to music, and imply ethical and philosophical issues of utmost importance[2].

Even scientists face this problem, for instance in the field of mathematical research: "the mathematician must question the machine himself — that is: he must program his problem without leaving it to others. If he leaves programming to a programmer, it creates two sorts of individuals, the ones who know one thing, and the others knowing another, and this is very dangerous for the future of humankind. It is infinitely preferable and more efficient that scientists know both fields in order to lead them to a synergical progression[3]". Each and every word of this quotation is valid when one changes *mathematics* and *science* to *music*!

The total implication of new technologies, not only in music of course, not only in art, but in all aspects of contemporary life, leads to a redefinition of the very notion of reality, of

art and of *work*, of creativity, and leaves our society craving in urgent need for competent artists relying on an authentic *technological culture* in order to cope with these challenges.

Notes

(1) VINET, Hughes, 1998: "Les enjeux de la recherche et du développement technologique pour la création musicale", *Culture et recherche*, 64: 6-7 (Paris, Ministère de la culture).

(2) DAUCHET, Max, 1998: "Informatique et société : faut-il qu'un système soit ouvert ou fermé ?", *Pour la science*, 248: 11.

(3) SOURIAU, Jean-Marie, 1997: "Les inattendus de l'informatique", *Pour la science*, 232: 10-12 (translated by the author).

(4) LORRAIN, DENIS: *Apollon et les seize millions de couleurs : la musique et les nouvelles technologies* (to be published shortly, Torino, Fondazione G. Agnelli).