Virtual Sound On Line - Computer Music Courses on the Internet

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Abstract
Following the publication of our textbook *Il Suono Virituale* in Italian (May, 1998), we started a series of courses on sound synthesis and processing by means of Csound on the Internet for Italian students. The course is called *Csound On Line*. The paper focuses on the methodology of Internet instruction for computer music, and describes the experience about interactive learning and teaching. The courses were not intended as stand-alone, but as an interactive complement to the textbook. In this paper we will present a series of visual examples of the tests proposed to the students with related answers and corrections.

1. INTRODUCTION

*Virtual Sound* is a project dealing with electroacoustic music education which started in 1998 with “Il Suono Virtuale”, the first textbook on sound synthesis and processing in Italian (with a CD-ROM enclosed), published by ConTempo and available through its website (http://www.contemponet.com).

The English version of the book, *Virtual Sound*, based on the new Italian edition, is now available on the same website.

In December, 1998 we started the first series of Csound courses on the Web in Italian, called *Csound On Line*, with the aim to create a deeper and more wide-spread knowledge in the fields of electroacoustic music composition, and digital sound synthesis and processing.

The aim is not to substitute a university course, but rather to create a bridge from the introductory level to an intermediate level of knowledge.

The courses are organized by Edison Studio, an association of composers based in Rome and especially devoted to electroacoustic music production, research and education.

2. ADVANTAGES AND DISADVANTAGES OF INTERNET COURSES

After six months of experience of *Csound On Line* we found many advantages and some disadvantages in the use of the Web for our Csound-based educational project.

The main advantages are:

a. The possibility of attending an advanced course staying at home, without any extra expenses (travelling, lodging etc.)

b. Instruction at a pace suitable to the individual

c. Access to software that is free and freely updatable, and available on almost every platform or operating system (Windows, Mac, SUN, SGI, Linux, etc.). This means that the composer does not need to buy a specific hardware, but she/he can work on her/his own computer.

d. Very low cost of the courses: approximately 65 USD or 61 Euro for each unit, lasting about two months.

e. An individual relationship between teacher and student that is not limited to the time of a lesson (this interaction takes place by E-Mail). In fact the number of questions that can be answered on an individual level is much greater than in conventional classroom teaching.

f. Access to the archive of FAQ (Frequently Asked Questions), accessible to every student. The archive constitutes both a useful knowledge base and a stimulation to investigate.

The main disadvantages are:

a. The feedback is not instantaneous: if a student needs further information about a specific problem, she/he has to wait.

b. Lack of interaction by non-verbal language: the relationship between teacher and student is limited to written language, where in conventional classroom teaching the interaction between student and teacher is immediate and lively. For example, if the teacher can see the student, she/he can enhance the level of her/his comprehension, and can help her/him to overcome a difficult moment when she/he perceives it, whereas by the Internet the teacher does not even know whether there is any difficulty if the student does not write it down explicitly. Furthermore, the teacher her/himself is always enriched by a teaching experience, whereas in courses via the Internet, due to this limited
amount of feedback, this enrichment is often very limited.
c. While in conventional classroom setting it is easy to modify the path and the structure of the course in relation to the background knowledge of the students, the limited amount of feedback in Internet courses and their rather impersonal structure make this modification rather difficult.

3. INTERACTION BETWEEN THE USE OF THE TEXTBOOK AND THE INTERNET
The use of a textbook has the advantage of not requiring the student to be in front of the computer all the time, but only in practicing Csound orchestras and scores, and when interacting with the teacher and with on-line tests and lessons.
Most of the knowledge comes from reading the book and practicing sound synthesis and processing on the computer, so the Internet is mainly used as a communication tool, rather than an on-line database.
The tests are linked with each chapter of the textbook. The Internet courses, as the textbook, include theory and practice together, followed by immediate practice with Csound exercises. The theoretical part covers the basics of a particular processing method, the practical part includes Csound orchestras and scores, tests and exercises.

4. THE COURSE
Once the student has received the textbook and the password, she/he can access the Csound On Line page on the Edison Studio site. She/he answers clicking the appropriate radio button (Yes/No, True/False etc.) or writing a short text in a text-box, sometimes even submitting a Csound orchestra and/or score. Then the student enters her/his name and code, and clicking a button sends the answers to the tests directly to Csound On Line.
Each unit contains from five to nine lessons; each lesson can contain up to twenty-one tests. The teachers will correct the tests, and request the student by E-Mail to explain the reason why some answers are not correct.
Only after the student has finished and passed each unit, she/he will be given the password for the next unit.

5. THE LESSONS AND THE TESTS
Each lesson can consist of a short theoretical part (which can augment the textbook) and of a series of multiple-answer tests. See an example of test in the following figure.

The following orchestra fragment generates an error:

```
kamp = 10000
k1 linseg 0,.1,kamp,p3-.2,5000,.1,0
```

Why?

1. It is not allowed to use control variables as arguments to `linen` True False
2. It is not allowed to assign a constant value to a control variable True False
3. Variable `kamp` is not defined True False

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Each answer can be true or false: so the answers to a certain test can be all true, the answer to another test can be all false. In any case, the student has to answer all the questions.
Each student can post a maximum of 20 FAQs per unit. These FAQs, with the answers, will be put on line in the FAQs page, accessible by all the students.
Other test examples follow.

**Test 12.6**

What is the use of a band-pass filter?

1. To obtain a better attenuation than a low-pass filter
   - True ☑ False ☐
2. To let only one frequency pass through, and to zero all the others
   - True ☑ False ☐
3. To attenuate the frequencies below and above a certain range
   - True ☑ False ☐
4. To let pass the frequencies within a certain range without modification
   - True ☑ False ☐

**Test 13.4**

Write an orchestra and a score that implement the following:

a) Oscillator with any complex waveform, with amplitude and frequency controlled by score parameters p4 and p5
b) Six band-pass filters in parallel, with center frequencies spaced by an octave, so as to realize a simple graphic equalizer. The first center frequency will be 100 Hz. Each filter will have such a bandwidth as to obtain, with the same gain, the flattest possible response curve.
Score parameters from p6 through p10 will control the gain (amplitude multiplication factor) of each filter.

6. **WHAT NEXT?**

Our work in the field of the electroacoustic music education has expanded the number of Italian musicians who started to have a deeper awareness of making music with electroacoustic media.
Due to the requests, we are now preparing other, more advanced units of Csound On Line.
The second edition of the textbook *Il Suono Virtuale*, revised and expanded, will soon be available.
Following the present experience, we are considering the possibility to start the same courses in English based on the English version of the textbook.