

Using pedagogical hypermedias in real situation: Experiments results.

Stéphane Crozat

*UMR CNRS 6599 HEUDIASYC - Université de Technologie de Compiègne
BP 20529 - 60206 COMPIEGNE Cedex - FRANCE
Stéphane.Crozat@utc.fr*

Introduction

Several efforts are being made to have the traditional pedagogy enhanced, especially for education in university, where the pedagogical aspects have been neglected for a long time [Donnay, Romainville, 1996]. Whereas tutoring systems are one of the means offered to invent original ways of teaching, their introduction remains marginal. In order to better understand the reasons of this lack we have been doing several experiments for one year. These experiments involve students in real situations, introducing multimedia supports and transforming the traditional pedagogical processes. The purpose was in each case to identify the role that multimedia supports can fulfill, the prerequisites for their correct use, the changes introduced in the pedagogical process, etc. This paper describes these experiments, along with some observations and propositions.

Initial context description

Our experiments concern teaching of the basis of computer science (algorithmic with Pascal language). Each semester about from 150 to 250 students follow the course. It is composed with three separated kinds of session: lecture, seminar and lab. Several problems have been pointed out, such as the lack of interactivity of the lecture, the passivity of the students, the problems of links between theory and practice, the difficulty of managing great disparity in the initial skills, the lost of motivation of some students, etc. A first solution has been tried, in order to improve the lectures: The students were given an exhaustive paper version of the contents. They were expected to read a part of it each week and then to come to a session of questions and answers instead of a classical and structured exposition of the contents. However the expected interaction hardly took place and the passivity of the students remained quite the same. This solution seems worst than the traditional one, since it does not bring much, and since students lost the organization provided by the traditional lecture. We think that the large number of students involved in the lecture apparently explained the failure of this approach. Consequently, the following experiments we describe concern small population of students.

Using hypermedia on Internet for distance learning

A small group of students (about ten) was isolated from the others, in order to follow the course staying at home. The device was mainly composed by: a web-site to consult the course, to make exercises and auto-evaluations; a paper version to present a linear version of the contents; a meeting each month with the teacher in order to check the understanding; a regular communication by e-mail with a tutor.

This approach seems reasonably efficient since the students appreciated this solution and obtained similar results to the exams, comparing to the students following classical courses. We made several observations, as summed-up below (further information can be found in [Crozat, Trigano 99]):

- The need for a multi-support environment in order to benefit from the particularity of each support (paper to begin with, hypermedia for personal deepening and dynamic aspects, e-mail and physical meeting for interactivity, etc.)
- The need for a multi-tools environment in order to have diverse ways of presenting information (frequently asked questions, interactive simulations, multiple choice questions, etc.)
- The need for a important tutoring activity since the human intervention remains essential in order to fulfill certain aspects of the pedagogical relationship (explanation, motivation, follow-up, etc.)

Using hypermedia in the classroom

A group of twenty students was isolated from the others. They did not either follow traditional lectures or seminars, but instead they spent an equivalent time in tutored sessions. These sessions gathered theory and exercises following this process:

- A step of questions and answers (the students were expected to read a paper version of the contents before coming).
- A step of autonomous utilization of an hypermedia realized for the experiment (consulting contents, doing exercises, evaluating themselves, etc.).
- A step of restitution (paper productions, presentations of results to the classroom, etc.)

This experiment was a real success in terms of motivation and satisfaction (from the students and the teacher point of view). This is mainly due to the fact that the hypermedia is able to take in charge the exposition of the contents, so that the teacher can concentrate his efforts on other activities more difficult to realize in traditional configuration. In other words the hypermedia **frees the teacher** from spending time doing the lecture, in order that he can **develop the pedagogical relationships**, *i.e.* the human aspects (such as explanation, motivation, personalization, management of heterogeneity, etc.). Another important aspect is the autonomy provided to the students, which allows each one to work following his own strategies and skills (from theory to practice or the opposite, linearly or hierarchically, adapting their time to their own difficulties, etc.). These assertions can be illustrated by a questionnaire we gave to the students in order to evaluate the experiment at the end of the course (Figure 1).

85% think they learned better following this approach instead of a traditional one.
100% found it more pleasant.
70% say they would have less regularly come to traditional courses.
25% think they will succeed to the exam whereas they would have not with traditional courses.
85% would like to extend this experiment to other courses.

Figure 1: Samples of evaluation questionnaire

Conclusions and perspectives

Three other experiments are managed at the moment: another similar experiment of distance learning, another experiment of hypermedia in the classroom with another teacher and an experiment of autonomous use of the hypermedia at home as a complement of a traditional course. We still do not pretend to have enough results to deduce real conclusions, but some propositions emerge from our works:

- Distance learning with a large panel of tools and with close tutoring seems efficient.
- The use of an hypermedia in the classroom seems a relevant solution in order to promote human interaction between students and teachers (whereas the opposite is often asserted).
- The introduction of computer in education seems relevant when the whole pedagogical process is adapted to it.
- New skills seem to emerge from such training configuration, such as autonomy, self-evaluation, cooperative learning, etc.
- It seems possible to suppress (or at least restraint) traditional lecture when an exhaustive and well-structured support exists.
- The size of the group of students seems an important factor, since the pedagogical interactivity can not emerge within too large groups.

Our work is presently to verify these hypotheses by doing other experiments. Further problems have also to be studied: What happens when extending such experiments to larger scale? What happens when extending the experiments to others domains (mathematics, human sciences, communication, management, etc.)? Which new skills teachers should acquire in order to introduce hypermedias in their courses? Can hypermedias be used independently of the students' level? Are the institutions ready to invest in developing numeric supports and changing traditional ways of teaching? etc.

Finally we hope so our experiments could profit the community in order to find adapted solutions to the present evolutions of education.

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