The L.A.M.I.A. multimedia laboratory in a training college in France

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1. The I.U.F.M

In France, Training Colleges are called *Instituts Universitaires de Formation des Maîtres*. The I.U.F.M. mission is the vocational training of the new professors.

In 1998-1999, the 29 I.U.F.M. * welcomed 81602 students and trainees for 78 different competitive examinations.

– 57316 in the first year (1/3 for primary level, 2/3 for secondary level)
– 24277 trainees in the second year.

They had 4177 posts of permanent teachers and 2790 posts of administrative or technical staff.

In 1999-2000, the I.U.F.M. of the *Nord-Pas-de-Calais* had 2192 students or trainees interested in the primary education and 4303 students or trainees interested in the secondary education.

2. Curriculum in the initial training

First year (Bac+4) The training includes several tuition courses for the written and oral exams of the competitive examination and a practical training accompanied.

Second year (Bac+5) The aim is to establish links between didactics of a discipline, psychology of the child and the teenager, sociology and philosophy of education ... the practical competence (management of class, communication, teamwork ...) and the real experience of the responsibility of a class.

Three evaluations

- General professional training and disciplinary general training.
- Professional memoir.
- The exercise of the profession in the responsibility of a class.

3. The memoir in mathematics

The memoir, of about thirty pages, is a collective work made generally by two or three trainees, a work of writing and of synthesis on a precise aspect of their professional experience. They have :

to define a problem met during their teaching and they are asked to lay down the questions precisely ;

to articulate the experience of the work in class with :
- a didactic analysis,
- a deepening of the mathematical contents ;

to integrate the contributions of the history of mathematics, (if possible).

Innovations brought by the memoir in mathematics

Many academics engaged in the direction of memoirs

In 1999-2000 , 77 trainees (PLC2) have to write a memoir ; 31 PLC2 were guided by an academic, 46 by a secondary school teacher or a high school teacher.

The use of the technologies of information and communication

They are an important help, both for the trainees and for the trainers.

- The e-mail,
- A bibliographic data base ;
- A memoir on-line library,
- The resources of the L.A.M.I.A. (laboratory of multimedia creation)

4. The LAMIA

Some strong ideas have motivated the creation of this laboratory.

The new tools (hypertexts, hypermedia, animations, virtual reality ...) were developed for other aims than training, but they present a great interest for it.

- they allow much more freedom, a bigger initiative of the trainee,
- they must be integrated into the training and not placed side by side,
- an active use of hypermedia by the trainee to solve problems or to make personal works has to be privileged.

The essential point is that the creation of tools integrates the currently state of the research in didactics and in cognitive psychology and the knowledge of experiments which are led in other countries.

4.1. The tasks of the laboratory

The LAMIA * has to lead activities of research and of development in the domain of the use of multimedia tools and of information and communications technologies,

- to contribute to the creation of the new tools,
- to analyse the uses and the practices implementing them ;
- to analyze the possible effects on the teaching practices, on the strategies and on the processes of learning,
- to analyze the appropriations of knowledge which they allow and the nature of the transmitted or acquired knowledge ;
- To animate a workshop with the specific task to validate the capitalization of the reflection and of production.
- To coordinate working groups and to animate a Forum.

Current state of the uses of these technologies in mathematics

Tool of communication and exchanges with the e-mail, the Forum, the working groups and the cooperative work tools.

Tool for production of pedagogical documents with mathematical word processing, drawing and experimentation in geometry, data processing.

Calculation with the use of symbolic calculation on pocket calculators to develop the experiments in mathematics.

Access to a library of on-line resources.

Tool of publishing and of call to the teachers of the region to experiment the on-line software programmes and of exchanges to improve the software tools.

4.2. On line resources of the LAMIA

A6-3* the electronic schoolbag of the secondary school teacher, a downloadable software programme with an important data base on the curriculum and on the final exams, with a set of lessons and of exercises that the teacher can develop and modify in order to create his own database.

GEOWEB* a site presenting some creations made by the pupils themselves who created files on the solving of some open problems of geometry in secondary schools.

FUNCTIONS* the learning of functions in secondary technological schools ; this software programme allows an individual following-up of the works of the pupils.

BUTINAGE* software programme with a multidisciplinary use for research of the pupils on internet ; the teacher uses it to prepare themes of research and to select interesting sites for the work of the pupils.

Two teams of research

The two last research teams are presented after.

C.R.E.A.M.

Center of Resources for Education and Help in Mathematics.

LILIMATH

Discovery workshops for a use by the teacher in the classes.

5. C.R.E.A.M.

Center of Resources for Education and Help in Mathematics *

The team is composed of fifteen teachers of comprehensive schools and three university teachers and a PHD.

The purpose of the C.R.E.A.M. is

- to propose for the trainees some pedagogical situations which are rich and varied, in order to be interesting even for problem pupils.
- to favour or to strengthen the understanding of the contents of teaching,
- to help the teachers to rethink their relation to knowledge, from the point of view of its genesis and of its construction rather than to its transmission as an achieved knowledge.

The methodological choice focused reflection on some subjects by deepening their various aspects : historical, epistemological, didactical and pedagogical ones.

The C.R.E.A.M. *

- prepares the experimenting of several situations,
- analyzes their consistency with the curriculum,
- criticizes them and works them out.

The analysis concerns the mathematical contents as well as the forms of management of the class which are the most adapted to every situation and to the personality of the trainee : teamwork, scientific debate, workshop.

6. LILIMATH

discovery workshops for a use by the teacher in the classes.

Downloading activities

Programmes : LiliMath collège, LiliScience, LiliCé, for comprehensive schools, LiliMini, for primary schools.

Tools and java applets MiniLogo, Géolap, Imagéo

Open sources The LiliDev site of LiliMath.

Mathematical exploration park

Visit the park *

7. Pedagogical networks in sciences and mathematics

7.1. The IREM

In 1970, the France created an original network of institutes of research of the I.R.E.M. on the teaching of mathematics, to train quickly the teachers to the new curriculum of "modern mathematics". The institutes I.R.E.M. are set up in universities and they regroups teachers and trainers of any levels, (university, primary schools, comprehensive schools). Their tasks are mainly the following ones :

- to lead research on the teaching of mathematics,
- to contribute to the initial training and to continued education,
- to elaborate and to publish documents for the teachers and the trainers.

7.2. *La main à la pâte*

Best known of the educational networks in France, la main à la pâte was initiated by the Nobel prize winner in physics, Georges Charpak for the renovation of the teaching of sciences in primary schools. It is animated by scientists, by researchers of the I.N.R.P. and by primary school teachers.

7.3. On-line University

A project of production called On-line University* (U.E.L.) of the R.U.C.A., network of the self-training centers of 11 universities that agreed to take part in cooperation to the creation of resources for mathematics, physics, chemistry, biology and technology for the teaching of the first two academic years.