AN E-LEARNING VERSION OF THE FRENCH HIGHER EDUCATION CURRICULUM "COMPUTER METHODS FOR THE COMPANIES MANAGEMENT"

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Abstract: International e-Miage International (IEM) is a program for Miage distant teaching. This Information System Engineering curriculum (to a professional end) now gathers 20 national sites which deliver fdegrees recognized by 22 universities. The IME consortium, issued from the "French Digital Campuses" proposals, regroups 18 universities. What IME program aims at is offering an e-learning version of the Miage curriculum for working computer scientists in continue training, students unable to attend face-to-face training and foreign students.

Key words: e-learning, Miage, contents, e-contents, ODL, resources deployment, virtual campus; virtual university, resource model, learning object, metadata, interoperability, development engineering.

1. THE INTERNATIONAL E-MIAGE (IEM) PROJECT

1.1 Objectives

The aim of the IEM programme tends to propose a "distance" version of the Miage curriculum

- to reach a new public
  - data processing specialists in activity in the frame of the continuing education
  - students who cannot integrate the classical training devices (handicapped people, prisoners….)
  - foreign students (from where the "international" qualifier and the possibility of a multilingualism).
- to improve the current modes of teaching, in particular by proposing online resources to in presence students "présentiels" and by the way of a sensibilisation of the academic and professional teachers with new teaching methods based on the use of the ICT.
- to place, in the domain of open and distance learning, the IUP Miage as privileged actors for the training of the companies workers in the field of data processing and information systems.
  - in dialogue with the professional and industrial environments
  - while being based on the Miage network
  - under the animation and the management of the Conference of the Directors of Miage.

The distance Miage curriculum is cut out in thematics modules of the same weight (ETCS[3]) making it possible to define learning routes (see figure 1) holding account of the personal, academic assets or professionals of the learning people. It thus anticipates, to a certain extent, the reorganization of the higher education in LMD[4] and allows a flexible application of the legal texts on the Validation of the Assets of the Experiment (2002).

The modular device makes it possible, indeed, to constitute itineraries of formation adapted to the situation of learning, people by taking into account its level of studies like its professional or personal experiment.

The Miage curriculum comprises 6 complementary fields of formation :

- Applied Mathematics

[3] ECTS : European Credit Tranfert System

[4] LMD (Licence, Master, Doctorat) concerns the new european organisation of the higher education studies ; "L" comprises 3 years of study to get the Licence diploma, "M" comprises 2 years of study to get the Master diploma (For the Miage cursus, the second year M2 of the Master cycle corresponds to a specialization year).

- Computer science
- Information systems
- Management of Organisations
- Techniques of communication
- Professionalisation

and comprises between 14 and 16 modules per year of study in e-Miage. Within the framework of the cycle Licence, e-Miage modules of prérequis are proposed with an aim of handing-over on level (L2).

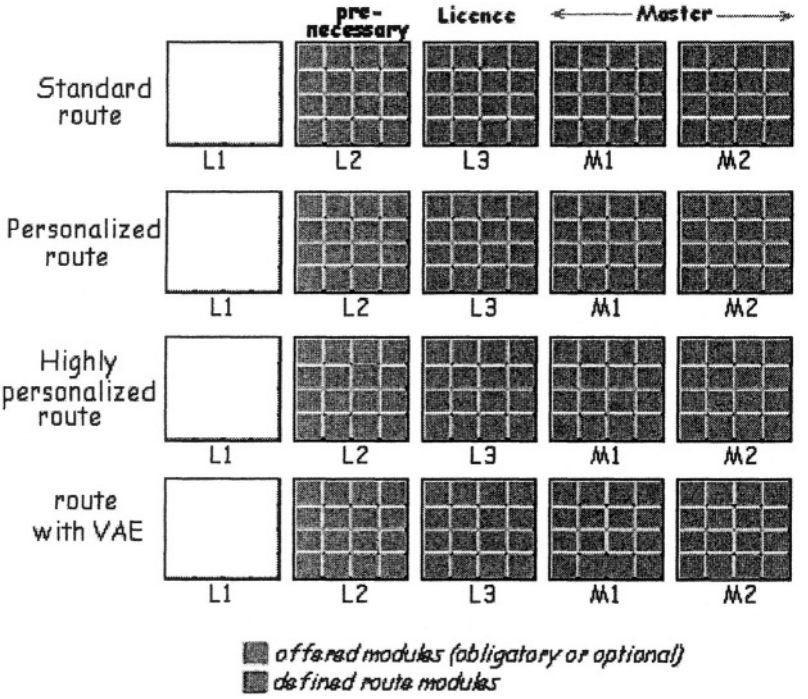

Figure 1. Examples of personnalized routes to reach the Master

A route of formation can be diplômant and lead to obtaining a national certification guaranteed by the French Ministry for National Education within the framework of enablings of the universities or simply qualifying by acquisition of thematic knowledge and practical. Modularization allows also obtaining pre-necessary to integrate a diplômant cycle.

1.2 The International e-Miage (IEM) Consortium

The IEM consortium regroups french universities[5] participating to the project either in the field of production of online resopurces or in the field of the exploitation of the learning system. University Paul Sabatier (Toulouse 3) is in charge to represent the members of the consortium.

Associated to the consortium are various and essential partners for conducting the project and to exploit it:

- Professional and industrial partners : representatives of the economic sector of computing services and engineering activities,
- Public institutional organisations : French ministry of national education, Datar, Administrative Regions, …
- Organisations for international development : Agence Universitaire Francophone
- Foreign institutions of higher education in the scope of a cooperation in the exploitation of the e-learning device.

For the project management and the decisions making a steering committee composed of representatives of members of the consortium was constituted and meet every two months approximately.

Working groups and committees were created to think of the various problems to solve and propose solutions :

- The group "Infrastructures and Functionalities" examines the conditions of pooling of the resources on line (structure, update, deployment) and the definition of the tutoring tools.
- The group "Structuring Legal and Organisational" studies the legal problems involved in the production and the exploitation of resources on line.
- The "committee of the programs" established a national program and its ventilation in thematic modules; it contributes to the more precise definition of these contents and to their actualization.
- The "editorial committee" is in charge of the evaluation of the resources on line under the scientific, pedagogical, aesthetic and ergonomic aspects.

[5] They are the universities Aix-Marseilles 3, Amiens, Bordeaux 1, Bordeaux 4, Evry, Grenoble 1, Lyon 1, Nantes, Nancy 2, Nice-Sophia Antipolis, Orleans, Paris 1, Paris 5, Paris 9, Paris 11, Rennes 1, Toulouse 1, Toulouse 3.

1.3 The learning device

It comprises the current duality (Table 1) of the formations based on the use of Internet:

- accessible online contents starting from a Web site and displayable via a Web browser.
- pêdagogical services to accompany learning people (tutoring).

Table 1. Pedagogical components]

Online contents	Pedagogical services
Informations on the cursus and modules	Mailing
Courses	Network meetings – chats
Exercices and self-evaluation tests	Modules discussion forums
Annals of examination	Physical meetings
Works or training documents submitted to correction	Evazluation and corrected documents

Each center of exploitation comprise a server of resources incorporating the components of the Table 1. Access to the server of resources can be carried out by use of a individual customer station (in residence, in company) or of a customer station placed at the disposal in a public or private numerical space (communal centers, schools, universities, cybercafés,…)

1.4 Pedagogical Model

In the field of the pedagogical organization taking into account the specificity largely "continuing education" of the public, the duration of training for a module is the six-month period (from January to June and July to December).

One or more modules of formation can be studied during the six-month period with a made up teaching accompaniment

- tutorat by electronic mailing.
- participation in the forums of modules.
- personalized correction of work ou devoirs
- suggested·meetings or chats on the network according to a definite calendar·physical
- physical regroupings.

For the practice of the tutorat, no platform of e-formation was imposed ; on the other hand the selected platforms must satisfy a schedule of conditions of minimal functionalities pointed out further.

1.5 The first experimentation

Table 1. e-Miage Candidates

Number of registered people in Licence (L3)	34
Number of registered people in Maîtrise (M1)	15

Table 2. Place of residence

Place of residence	total
Paris and suburbs	8
Rest of France	28
Dom/Tom	1
Foreign countries	12

Table 3. Age distribution

Âge (years)	total
21-25	5
26-30	19
31-35	12
36-40	4
41-45	2

Table 4. Academic level of admission

In Licence	total
Bac	1
B ac+1	0
Bac+2	24
Bac+3	3
Bac+4	1
Bac+5	

Table 5. professional situatione

Professional situatione	total
Unemployed	15
Workers of the data processing domain	26
Other workers	8

	1
autres	
	4
In Maîtrise	
total	
Bac+2	
	2
Bac+3	
	6
Bac+4	
	1
Bac+5	
	6

These data, although not yet convincing because of the first experimentation, show nevertheless that it is about a public quite different from that from the students from initial formation (age, professional situation). One will also note the heterogeneity of the academic levels of admission and the already significant number of learning foreign. Since March 2004, it should be stressed that the proportion of foreign registered learners increased considerably.

2. PRODUCTION AND MANAGEMENT OF CONTENTS

2.1 Design and realization of the numerical contents

For the design and the realization of the numerical resources relating to the modules of formation, "modular" working groups were made up gathering voluntary teachers of Miage to take part in the project. There is thus, in theory, as many modular groups, therefore teaching staffs and

technical, that modules in building site. Each modular group is animated by a modular head of project.

The contents are defined like a structured set including·

- a preamble : objectives of the module, pre-necessary, programs with accompanying notes, methods of training, contact tutor, bibliography and webography.
- the strictly speaking· course under two versions : online with multimedia and to be download for printing.
- exercises of synthesis (with solution)·
- works suggested to the students·
- annals of examination (with correction).

The course is also structured in·

- Sessions: work unit of learning, the part usable on line not having to exceed 45 minutes of work. The session seems the atomic element of the device.
- Chapters: regrouping of several sessions with an aim of better legibility or for the organization of the production of contents (division of a module between several authors).

From the beginning of the project, it has been decided that it was necessary to use the existant supplys, in particular in the form of lectures note, of presentations PowerPoint, etc... and to regard these resources as starting materials. In fact, the suggested and adopted steps are as follows (see figure 2):

- Design includes 3 phases: definition of the contents (starting from the supplys in hand); structuring (cutting in sessions); scenarisation (setting in multimedia scene of the sessions).
- Technical realization consists of the elaboration of the documents relating to the sessions, intended to be put on line and consulted via a Web navigator; these documents are generally composite (texts, images, sounds….) and can comprise short animations or numerica vidéos 1.
- Evaluation: a first evaluation of the contents is carried out by the editorial committee; after the startup of the contents approved by the editorial committee, an experimentation of these contents during one year makes it possible to collect the opinion of learning people and to proceed to the modifications, additions, final necessary improvements (Cochard, 2003c).

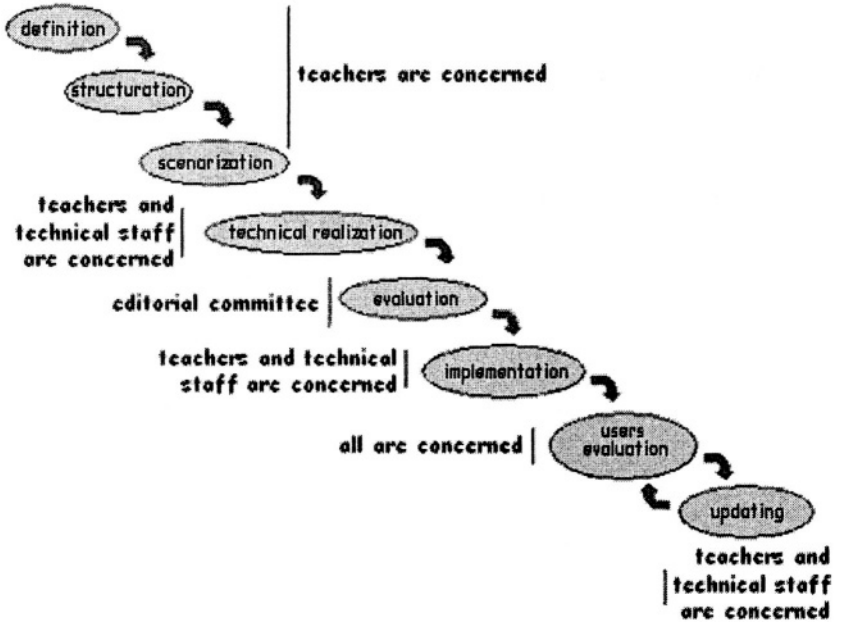

Figure 2. Prodcution chain]

2.2 Contents interoperability and distribution

Being given the structure of the consortium and its international ambitions, a standardization of the contents is necessary. The current standards (Alibert, 200á), seem insufficient or badly adapted with respect to the teaching device selected. For this reason, the working group "Infrastructures and Functionalities" produced specifications on the structure of the contents for a functional interworking, in particular to facilitate the supply contents of the exploitation centers. This work was the subject of the realization of an editor of structure (David, 2004). The structure of a module of formation IEM is described by the metadata of Table 2:

Table 6. Module structure

Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Module	Header	Identifier			
		Title			
		Module pre-necessary			
		Coordinator			
		Project manager	Name		

Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
		Identifier			
			First name		
			Mail address		
			Postal address		
		Objectives	Objective		
		Programs			
		Tools	Tool		
		Methods	Method		
	Body	Chapter	Preambule		
			Session	Preambule	
				Pre-necessary	
				Course	
				Exercices	Exercice
				Tests	Test
		Exercices	Exercice		
		Bibliography	Ressource	Title	
				Author	
				Editor	
				Date	
		Works-to-do	Work-to-do	Pre-necessary	
				Statement	
				Solution	
		Annals	Annal		

This table can be supplemented by other metadata for a compatibility with the usual standards (Dublin Core, LOM, etc). Let us note that this structure is always the object of work among the members of the consortium (Heiwy, 2004)

The contents produced by the various modular groups are placed on a site of reference[6] which plays the single role of supplier of contents (Figure 3). Very new contents or all new version of contents are placed on this site.

Work is in hand (Broisin, 2004, Alibert, 2004b) for an automatic provisioning of the exploitation centers starting from the contents of the reference site and preceding metadata for an incorporation on platforms satisfying the functionalities exposed further. The first automatic deployment will relate to platform INES[7] used in the first experiments (Cochard, 2003d, Sidir, 2002).

[6] Currently established on a server at the University of Amiens, the site of reference will be transferred soon to the University of Toulouse 3.

[7] INES (Interactive E-learning System) is a platform developed by the Université de Picardie Jules Verne (Amiens), proposed free in "open source" with the university establishments.

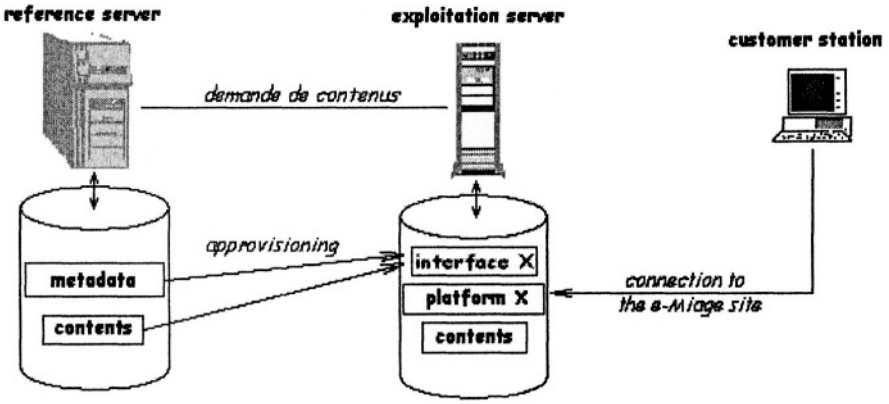

Figure 3. Contents provisioning

3. TRAINEES FOLLOW-UP AND MANAGEMENT

3.1 Tutoring actors and activities

We describe here the methods of tutoring such as they are applied and used at the Université de Picardie Jules Verne, first center of experimentation of the learning device (Cochard, 200á, 2004c, Sidir, 2004).

Each module is placed under the pedagogical reponsability of a teacher, himself tutor. Other tutors can be required according to the number of the registered students (1 tutor for a group of 25 students per module). The tutors can be university teachers, not necessarily affected to the operating university, or by doctorants specialists in the taught discipline. In the first case the service of tutorat is quantified by a specific scale; in the second case, a contract of employment fixes the tasks to be achieved and their remuneration.

The activities of tutorat include asynchronous activities and synchronous activities. The synchronous activities consist of electronic interaction with the students in the following forms:.

- Answers to the messages of the students (private correspondence tutor-learning).

- Animation of the forums and answers to the asked questions (collective public correspondence[8]).
- Proposal for works-to-do[9] (in general 3 per module per semestre) and personalized correction of these works.

For the university teachers, the quantification of the asynchronous activities corresponds to a contractual working load of 2h by module, student, six-month period.

The synchronous activities are programmed by a semestrial calendar:

- Network meetings or chats (4 one hour meetings in general per module and six-month period)·
- Physical regrouping (optional; a half day or a day by module and six-month period)

The general coordination is ensured by a formation organizer whose role is triple (Cochard, 2003b, Sidir, 200á):

- to manage information spaces on the site (platform): general information, specific information, update of the calendars of events·
- to take care to identify the dysfunctions of the device (generally announced by learning) and to bring, with the adequate actors (tutors, administrative staffs or techniques) the best solutions.
- to carry out a total evaluation of the device while basing itself on the feedbacks coming from learning like tutors.

The organizer can be a teacher or a formation engineer.

3.2 Functionalities and tools for learning follow-up

The working group "Infrastructures and Functionalities" drew up a list of the functionalities required by the adopted teaching model:

- Accessibility to the contents; integration of external documents, management of the synopses.
- Offer of basic teaching services: mailing, chats, forums, information spaces.
- Actors management : students, authors, tutors, administrative staff, technical staff; attribution of rights of access.
- Activities management: management of the calendar of the events, management of the mailing addresses and constitution of mailing lists, procedures of update of the contents…

[8] Learning use also the forums as tools for discussion between them and often provide answers to their own questions.

[9] In some modules, these works-to-do can be noted and to contribute to the validation.

- Learning follow-up: follow-up of the modular asset, followed connections to the contents,·
- Statistics of use: statistics of consultation.

The first experimentation was carried out with the platform INES which fills these basic functionalities in particular on management of the actors and the activities.

3.3 International dimension and cooperation

Whereas the device is reserved in metropolitan France with the students of continuing educationg, it can concern, at the international level, all types of students, the conditions of access being negotiated with foreign institutions of higher education.

The strategy of the IEM consortium is to create or contribute to the creation of relay centers in the countries where the number of students allows it. A relay center is a center partner managed by one or more schools or universities generally; they can be public structures like private. A center relay is at least

- a center of resources making it possible to use customers PC to connect itself to the teaching resources and the services of tutorat.·
- a team of "local" tutors who replace french tutors in the teaching accompaniment of local learning in the various modules proposed.·
- a center for the physical regroupings of learning.·
- a center of preparation to the diplomas of the Miage cursus and, in particular, a center of examination (the conditions of examination are identical whatever the centers).

The center relay can also lead·

- with co-operative developments of new modules·
- with the translation in the national language of the existing French modules.

It can, in the long term, become a center of open and distance learning for the considered country by putting on line local formations. Accordingly IEM consortium begins to bring all help and the necessary expertise. The modules of the e-miage can besides be used as components for local formations and be used for obtaining local diplomas.

This scheme of international co-operation lays down a certain number of training activities in the interested countries; these training courses concern,

according to the cases, the teachers "authors", the teachers "tutors", the administrative and technical staffs.

Another significant characteristic of a relay center is its financial autonomy : after calculation of its running costs, the relay center fixes the local price of the formation. For the countries with low income, this provision allows a greater accessibility the formation. To obtain the French diplomas, learning them must however be registered in a French university of IEM consortium.

4. CONCLUSION

The development prospects for the device and for its implementation, in addition to the progressive assumption of responsibility by Miages and the creation of relay centers abroad relate to the following aspects :

- continuous improvement and enrichment of the contents, in particular by the addition of exercises and tests, and of course by annals of examination.·
- creation of specific tools to follow-up the students, in particular for tests on line[10].·
- study and experimentation of on line practical works (definition and implementation of "servers" of practical works)·
- experimentation of co-operative work between students of different Miages (Buffa, 2004, Sidir, 2003b) and relay centers abroad[11].
- addition of various specializations of master (M2)·
- addition of on line devices facilitating the registration, but also the procedural treatment of the Validation of the Assets of the Experience[12] (Cochard, 2004b).

The construction of the device and its first experiments, in addition, gave place to research tasks in the field of the e-learning and association, for this goal, of several groups of research within IEM consortium.

It is clear that the exploitation on a large scale, at the national and international level of the IEM programme, reveals true problems of the e-leaming with real confrontation of the theory and the practice and that this situation is favorable, because of the lessons of the experiment, with great

[10] Certain tests on line are already proposed by some modular working groups

[11] while being based on already existing initiatives like the project management (Nice-Bordeaux)

[12] by benefitting from the work undertaken within the framework of the project ACT (Acquisition of Competences and Trajectories of Employment) by the universities of Versailles Saint-Quentin en Yvelines, Amiens and Toulouse 1.

progress towards a standardized and mutualized device of e-formation. The IEM programme gives also a contribution, to a certain extent, to a relative teaching restoration/innovation of the university education system and to the dissemination of knowledge.

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