



May 1997

Promoting research-based training in Cyberspace and in the Real World : the story of HotDocs

Abstract: At the end of April 1995, a long document, entitled “*Doctoral Training: what is at stake, what has been achieved, what we propose*” (often referred to as the “rapport HotDocs” or HOTDOCS report) was put together by doctoral students and young researchers from all over France through the Internet. The text is an overview of doctoral training available in France today, how it works and future employment prospects. The main crux of the main facts and thoughts included in the document take as their focus the evolution of the Higher Education and research sector in France and links with the economic sector.

The present article provides a summary of the story of the “HotDocs community”, from the first days of the HOTDOCS mailing list and the birth of the report to the most recent involvement in the reforming of the research and higher education system initiated by the french minister for Education, Higher Education and Research.

Finally, as the HOTDOCS report itself is rather long, below is a summary of the guiding principals we adopted in drawing up the report.

PhD studies in France take place after five years of university studies. Just as the American PhD, they are supposed to last between two and four years. Approximately 10000 PhDs are delivered each year, in all possible fields ranging from pure mathematics to economical sciences, not forgetting about medieval history and genetics.

However, the employment situation is rather tough. Global data, collected by the French ministry of Higher Education and Research show that in 1995, there were roughly 7000 stable positions for doctors: 3000 tenures in research or high education, 1000 in civil corps and secondary education, 1500 in the private sector, 1500 foreign students going back in their native countries. The remaining 3000 share between unemployment (1050) and postdoctoral positions or temporary positions.

Obviously, the situation heavily depends on the scientific field. Nevertheless, supposedly heavily demanded scientific profiles such as molecular biology, or physics lead to a very percentage of postdocs (52 % in molecular biology) or unemployment (19.8 % in physics). Even

without entering a detailed analysis, one may hardly deny the existence of a severe job crisis.

Part of the crisis arises from a turnover in PhD training's vocation. Historically, one has to remember that fifteen years ago, the PhD was mainly devoted to academic recruitment. Before 1984, there were even two diplomas. A first thesis, called "third cycle thesis" to be performed in one or two years, and a "national thesis" to be performed in five to twenty years, which was given to confirmed researchers, very often already inserted in academic institution. The 1984 law replaced this two thesis system by a single diploma, to be performed between two and four years. This change was a starting point for enlarging the vocation of PhD training towards extra-academic jobs. Around 1990, this policy has been reinforced by increasing the number of financial supports for PhD. For example, the French ministry of Higher Education and Research has started providing around 4000 fellowships, under the form of 3 years positions, payed around 7400 FF/month¹. An increased in the number of PhDs delivered each year followed: 9801 were delivered in 1990 against 5963 in 1990. However, as explained above the job market didn't follow, especially in the private sector.

It is in this context that a mailing list called HOTDOCS has been created on December 4th, 1994. Created by the Collective of Doctoral Students of Toulouse, this list aimed to provide information about problems associated with their training and future career prospects.

Rapidely, the list gave birth to various Internet services, gathered under the name of GUILDE DES DOCTORANTS². Information then started to spread on the Net and after a few weeks, the need for a deeper and stronger action was felt by many subscribers of the list. Several people emitted a call for creating an authoritative document which would give the low-down on doctoral training and all its potential difficulties. This report would then be widely circulated, either via HotDocs and via the Internet. After this consultation, the agreed report would then be used for lobbying politicians and the media as well as those in the academic world: researchers and lecturers; main research funding bodies; doctoral cycle students.

After six weeks of intensive work, in which doctoral students and young researchers from all disciplines and institutions across France had taken part, the HOTDOCS report came off the presses. Several hundred copies were sent out: to Government Ministries, to research agencies, to university Vice-Chancellors, to national and international student organisations, research societies, research training supervisors, the press, trades unions, etc. Freely available on Internet³, the report was consulted by several hundred people in the first few days of its existence.

As far as I know, the HOTDOCS report is now considered as a reference on the subject. These last two years, the Minister for Education, Higher Education and Scientific Research, F. Bayrou, carried a long reforming process of the French Higher Education System. At various stages of this process, the HOTDOCS report and its proposals have been taken seriously. In the meantime, the HotDocs community has given birth to a representative organization designed for representing doctoral and post-doctoral researchers on temporary contracts. It

¹Social protection included in this salary : health insurance, retirement fund cotisation and unemployment insurance. Part of these insurances is payed by the State and another part is payed by the PhD fellow thus leaving him around 6000 FF/month.

²French server : <http://poppea.polytechnique.fr/guilde/>
International server : <http://poppea.polytechnique.fr/guilde/International/>

³<http://enslapp.ens-lyon.fr/~degio/guilde/Rapport-HD/>

A short English version is available. The original document has been written in French and is 145 pages long.

has the form of a confederation of associations, was created on the 2nd March 1996, and is called the *Confédération des Etudiants-Chercheurs* (CEC)⁴.

At present time, both the Confederation, the Guilde and a reflexion group named Action-HotDocs⁵ work together to promote the PhD training in France. In many universities and research institutes, discussions have started on the basic proposals issued from the HotDocs report. Many actions toward extra-academic insertion of PhDs' have been and will be performed, involving PhD student associations, industries, the Bernard Gregory Association⁶ and the Ministry for Higher Education and Research. Members of the Confederation are working with the French Academy of Sciences on the future of PhDs' in France. Discussions are now undergoing at institutional level on the possible ways to improve PhD training's quality and professional insertion of doctors. Although the election process surprisingly initiated by President Chirac might slow down these discussion, they will be continued with the next team to be nominated.

In my opinion, the success of this action is based on three facts: first of all, the strong mobilisation of many PhD students and young researchers that felt deeply concerned by the situation of PhD employment and by the future of research and higher education, next the seriousness and the quality of the work performed⁷, and third the general philosophy for PhD training underlying the HotDocs report. This document does not focus only on academic aspects of PhD training and professional insertion but strongly affirms the need for research based training in other fields of society such as the industrial sector and high level civil services.

Therefore, the HotDocs report, and all texts produced after this one, always keep in mind the role of research training in society as a guideline for propositions and the rest of this text is devoted to summarizing this general philosophy.

More precisely, as shown by the national consultation initiative on French research in 1994⁸, the French higher Education and research sector must adapt to reflect the wider changes brought about by the worldwide economic crisis, in which technological development and strict economic competition seem to govern everything else. These economic pressures are compounded by the growing social crisis in every part of society, perhaps especially in the educational system. The widening of access to French universities, coupled with the problem of youth unemployment, makes restructuring of the Higher Education sector - and by extension, the research sector - a great necessity.

This restructuring should focus upon doctoral programs, given that this training will prepare not only the future teaching and research staff in universities, but also the kind of innovative managers vital for industrial development.

Our propositions are aimed at restructuring French academic life, in order to create a new dynamic and a closer relationship with the industrial sector. We have identified three main

⁴See <http://poppea.polytechnique.fr/cec/>.

⁵Directly issued from some of the main contributors to the HotDocs report.

⁶Reviewed by NextWave :

<http://www.nextwave.org/server-java/SAM/pastrev/abgrev.htm>.

⁷In depth analysis was carried in the HotDocs report and in subsequent documents, based on legal information and official statistical information. Several reports on the French research system have been read by contributors to the project. Many people from the academic and industrial world have been informally consulted.

⁸Initiated by François Fillon, scientific research minister from 1993 to 1995.

areas for action:

- a widening of access for recruitment to top industrial posts as well as management jobs in the Civil Service. At the moment, university training is often seen as inappropriate⁹.
- encouragement of closer links between public and private research. This will be vital for fostering company innovation and will contribute indirectly to the creation of jobs. The use of university-trained researchers in the world of industry is a powerful means for the transfer of skills, methods and networks from the academic to the applied sphere.
- the renewal of the teaching force in French universities. The years 2003 - 2010 will see a wave of retirements which need to be anticipated, but also new posts are needed to allow universities to offer ever more diverse methods of teaching to respond to the widening forms of student recruitment.

Above all, the dual focus on the acquisition of theoretical knowledge and the mastering of operational applications must be maintained. This duality is increasingly vital as technological advances mean that purely practical training quickly becomes obsolete. Such a theoretical basis should become the cornerstone for the development of a policy of continuing education, which is still underdeveloped in France.

Unfortunately, French universities suffer from an image problem which means that they are badly understood by society at large: they have failed to ascribe themselves clearly-defined missions, they lack funding and resources, they have no long-term funding strategy, there appears to be a never-ending turnover in personnel. These perceived limitations mean that the university sector is at present ill-equipped to respond to the actions outlined above. The highest form of training, the PhD, would appear to be particularly vulnerable, given that the job situation for post-graduates looks to worsen from 1996 onwards. In the best possible projection (See the HOTDOCS report, chapter 3), around 1700 students over a flux slightly above 10000/year completing doctorates will be hard pressed to find employment in 1996 and 1997. We predict that if such a situation were to continue, the consequences will be disastrous - a spectacular "brain drain" may occur, with many students leaving to take up post-doc contracts abroad. For example, recent estimations by our group show that at least 4000 young French PhDs live on postdoctoral positions in 1996, mostly abroad. The real number may probably be around 5000. Known estimates give more than 6000 in year 1998, to be compared with 3000 academic positions each year in France and to 1500 jobs in the private sector taken by PhD's in year 1995. The situation is therefore rather critical.

This will of course damage the already flagging motivation of researchers and teachers working in universities and research institutes. The policy of research training in place for the last decade would effectively be rendered useless and all hope of major reform would be lost. The knock-on effect would be a harmful lack of technological transfer to the industrial and tertiary sectors.

Doctorates are greatly undervalued in the private sector, making it extremely difficult for young doctors to find jobs. As we say, only 1500 doctors are recruited by the private sector each year. It seems to us that the fact that many companies believe PhDs to be exclusively

⁹France has a somehow unique bi-component Higher Education system in which, besides universities, specific high schools provide high quality education to their students. For various historical reasons, these schools are traditionnally used by industries and high level civil administrative corps for recruitment.

academic in focus is a major block to post-graduate recruitment. Moreover, the structure of doctoral training often lacks a clear focus which would make it better understood by the non-academic world: subjects are badly defined, wider research support is lacking or inadequate, laboratories or research group fail to include post-grads in their social or scientific work, no links with the extra-academic world are afforded the student.

All this leads to a waste of human resources and of public and private funding (via PhD fellowships). Doctoral students cannot play a full part in the development of the higher education sector, and are also lost to the industrial sector, which needs to improve its innovation capabilities.

Our propositions to remedy this situation revolve around two main assertions:

- the thesis must be viewed not only as background training but also as part of a genuine period of practical applied training.
- all those involved in doctoral research must be alerted to their wider responsibilities, be they doctoral student, supervisor, future collaborators.

The notion of a ”**thesis contract**” is the cornerstone of the propositions made in the HOTDOCS report. A clear and coherent scientifically-expressed project binds the doctoral student, the thesis supervisor and the directorate of the research unit. In terms of the thesis being viewed as training in a professional setting, the contract should be formulated in such a way that financial support, of institutional, industrial, or mixed origin, is given for each specific accepted project research post. At present it is possible for a student to work on a doctorate unfunded (it appears that actually 19 % of PhDs are unfunded). Finally, the contract will only be of any value to the student if it is used by the other partners to evaluate their role in the doctoral training process. We would therefore suggest that any overall evaluation of researchers, lecturers carrying out research and research groups or labs should include an evaluation¹⁰ of any thesis contracts in which they are engaged.

Furthermore, the extension of PhDs to the non-academic setting (industry, administration etc) and the changes within the university sector itself, mean that alternative forms of advanced training are needed. This training should comprise:

- on the one hand, high-level scientific training which is carried out in graduate schools and which should be pursued during the whole PhD;
- on the other, interdisciplinary or technical training (foreign languages, writing and presentation skills, information technology, understanding of the socio-economic climate....)

The *Centres d’Initiation à L’Enseignement Supérieur* (CIES), which could be translated by “Centers for Training in Higher Education” and which were established in 1992, would be a natural place for such interdisciplinary training. Indeed their role will increase in importance as future university staff have to confront constant evolution in the workplace and have to

¹⁰French researchers belonging to government agencies such as CNRS or INRIA are regularly evaluated by a national refereeing comitee. These practises now extend, in a slightly different manner, to the universities which have their public ressources fixed through a four year contract with the Higher Education and Research Minister. However these evaluations often focus exclusively on the research production or on quantitative facts such as the number of diplomas delivered in various curses. Our proposal aims at a finer and more qualitative evaluation, focused also on PhD management activity and more generally on teaching activity.

fill increasingly varied roles as lecturers who also undertake research. Some of the training offered by these centers will also be useful for future high-level management in the industrial sector. Their training will be rounded off by thesis research and more specialised training available in graduate schools. On the other hand, graduate schools may also provide less specialized training and even prepare students for professional insertion outside the academic world. The emerging picture of advanced trainings for PhD students is thus based on a wide panel of different trainings and structures. In this landscape, the PhD student would then choose among this wide choice trainings that correspond to its professional project. Doctoral or graduate schools such as the CIES offer an interesting way ahead for Higher Education, given the way in which they are the result of federal cooperation between several universities. At a city-wide or county level, they could provide a model of diversified training for first- and second-level undergraduate work without resources having to be thinly spread between several institutions.

Finally, the widening of access to higher education, as well as the smooth running of research centres, both rely on a regular and well constructed recruitment policy. Such investment in human resources needs material resources also: recruiting high-quality people without providing good working conditions is a non-sense. It must be noted that such good conditions have not always been forthcoming. We stress that clarification is needed with regard to the financial means which should be afforded to the Higher Education and research system in the next few years, as well as with regard to the missions which this system should fulfill.