

ELECTRONIC PUBLISHING : AVATAR OR METAMORPHOSIS

FOR INFORMATION ACCESS OF UNIVERSITY PUBLICS

Nathalie PINEDE and Lise VIEIRA, University of Bordeaux, France

PART ONE: ELECTRONIC PUBLISHING. CENTRING THE CONCEPT

As an intellectual and commercial activity of long tradition, publishing started an important mutation when using other supports than paper. Will research practices of information be then deeply affected ? Shall we assist to a metamorphosis implying deep changes, or will it be just an additional avatar, new uses added to the previous long list of modifications known by our old occidental culture ? Will there be a disruption or an adaptation in matter of scientific and technical information communication ? We shall try to bring to all these questions, if not full answers, at least some elements of thought.

Publishing and electronic publishing

Will hypertext dethrone books ?¹. That is an interrogation which was treated by one of our newspapers. It would certainly be imprudent to start on such a radical position. We will then introduce some attenuation in our questioning terms: in which part is the electronic publishing positioned² in the filiation of traditional publishing and what do teachers-researchers really expect from this new technique in the discharge of their duties?

We first have to precise the meaning of the expression "electronic publishing". According to J.C Guedon, electronic publishing is neither more nor less than the content of electronic networks. As a matter of fact, publishing is the process to bring out, to make public, to put a

¹ François Reiner (Director of Médiathèque Cité des Sciences. Paris) *L'Événement du Jeudi* 01/02/1995

² Philippe Schuwer, article "Édition" in *Encyclopaedia Universalis*
Jacques Breton. *Le Livre français contemporain: manuel de bibliologie*. Malakoff: Solin, 1988.

message in such a form that it would be approached under determined conditions³. If we adhere to this widely accepted definition, we may consider that electronic publishing has surpassed the frame of diffusion achieved by data banks, by proposing products on fixed supports (CD ROMs) and particularly owing to the extension of networks. Its action area will be broader when the very expected information highways, which Internet is said to be a precursor, will be developed.

Scientific and technical publishing

A rapid overview on French scientific and technical printed publishing situation will allow better understanding of the context and clearer foresight of an evolution towards more innovating forms. This evolution is characterised by a weak turnover, a limited number of printings⁴ inducing considerable difficulties. There is a very important disproportion between potential and value of French research from one side and the number of scientific books published from the other.

The reasons of this crisis are of technical and economical order. Our publishers encounter serious difficulties facing the potentials of international publishing which is taking roots in their own territory⁵. The linguistic obstacle is another issue: hegemony of English in international scientific environment is so important that, to have their works recognized, the searchers must publish in Shakespeare's language. Yet big foreign groups such as Elsevier (in Netherlands) or Springer Verlag (in Deutschland), publish in English as a basic language since many years meanwhile French publishers decided very recently to adopt the same strategy⁶. This attitude

³Jean-Claude GUEDON (publisher of on-line review *Surfaces*, University of Montreal)-*L'Édition savante et l'autoroute électronique*. <http://www.droit.umontreal.ca>

⁴ STM : turnover: 772 millions of francs (5,5% of global turnover). Average number of printings: 2250 exemplars (these are the weakest of French publishing).

SHS : turnover 828 millions of francs (5,8% of global turnover). Average number of printings: 4396 exemplars for a title (Source: Statistics 1994 of Syndicat national de l'édition).

⁵ Springer et Elsevier associated to Reed constituted empires of world-wide dimension. Elsevier, Waverley, Addison-Wesley and Wiley take roots in France, attracted by the creative potential of our authors and by the opening on the French speaking peaking market

⁶ Technip (books on petrol and gas) publish 40% of its titles in English, sometimes associating with Gulf Publishing (US). Le Moniteur has about ten English or bilingual titles. Bordas co-publishes some titles with

explains the limited presence of our production on the international markets. International scientific reviews constitute a last destabilisation factor to French publishing. Well introduced on the market⁷, they represent a considerable internal concurrence for books⁸.

French production and information and communication techniques : inventory.

This strongly concurrent international context explains the hesitation of some French publishers to venture in electronic publishing. Their reticence to take risks in an unknown context is explained by the same technical⁹ economic and juridical difficulties¹⁰ when facing these new activities. Many of them, backed by the long tradition of our country in encyclopaedias and dictionaries publishing, held the bet in this particular aspect of editing. They have now to imagine new products in order to keep their positions on the market and have to adopt strategies capable to encompass possibilities of New Information and Communication Techniques (NICT)¹¹. A successful transition from paper to electronic support publishing will perhaps permit overcome obstacles. An analysis of the French production will help evaluate opportunities to succeed in such a mutation.

Wiley, Masson, Flammarion Medicine Sciences, Arnette and Les Editions d'Organisation alike publish a lot in English.

⁷There are 1460 scientific reviews in France.

⁸The group Masson with its filials (in Spain and in Italy) publishes at its own 201 reviews. This activity represents the half of the turnover of the firm. The group Bordas, Dunod, Gauthier-Villars publishes 35 reviews concerning all scientific sectors, except medicine. The major part of them are in English for economic reasons.

⁹For instance, SONY or PHILIPS are working now at production contents.

¹⁰Members of Syndicat National de l'Édition, foreseeing incoming difficulties, created GAME (Groupe Audiovisuel et Multimédia) and published in 1993 *Questions juridiques relatives aux produits multimédias*.

¹¹Hachette-Grolier Interactive and le Groupe de la Cité, main actors of French publishing are now increasing their position on this territory.

Products on fixed supports (CD ROMs)

Undoubtedly, French have much difficulties recovering their handicap in matter of computing equipment. According to a sample survey realised by SOFRES¹² in May 1996 touching around 20 000 families, only 14,4 % of French families use a micro-computer¹³. This is a very low rate compared to our European neighbours¹⁴. However, evolution of domestic computing towards multimedia is increasing, since a third of micro-computers are equipped with CD ROM player. The CD ROM sales figures show a real progression. In 1995, the total volume of sales reached 3 millions of disks and in 1996, this number doubled to reach 6 millions of sold exemplars.

These indications confirm that if transition from paper towards electronic is not made without difficulties, and in spite of their extremely prudent attitude, publishers have marked a significant take off since the end of 1995 to take position on the electronic market.

Network products

If Internet was initially used essentially by researchers, it is no more the case today. The number of Netsurfers in the world is estimated to be between 35 and 50 millions, with approximately an increase rate of 15% a month. But in France, Internet have not acquired yet the large public interest. Only 1% of families are equipped with a modem, and only 4% of people used it at least once, including usage contexts on work places. To attenuate these rather pessimistic figures, we can precise that 3 millions of French families are equipped with a Minitel. This underlines a massive awareness about the use of a computer networks.

¹²LE MONDE du 3/10/96. Michel Alberganti. *Internet toujours massivement ignoré*

¹³This number shows a real evolution, compared at 11,6% of may 1995 and at 4% of 1990 the more as 3% of interrogated persons say have the intention to buy an equipment in the 6 next months. Pascal Hureau, Sofres director of studies on information technologies indicates that French market of micro-processing was multiplied by 3 on 5 years.

See also Norbert Paquel *L'Édition et les supports multimédias* (A Jour éditeur)

¹⁴ Equipment of families reaches about 20% in UK, 30% in Deutschland and 35% in United States.

Moreover, conviviality of the Web is a significant presage to the development of the Net in the coming few years. Internet is more and more utilised by scientists who were at its origins, for the powerful means it offers to accelerate investigation works¹⁵. It helps them compare their productions, exchange data, have access to university libraries all over the world¹⁶ and publish their papers. The research reviews, anxious about exaggerations conferred by a too wide freedom on the Net, follow cautiously the same way of electronic publishing. The fact of avoiding the filtering imposed by traditional publications throughout their redactional committees would involve a real threat for the quality of the scientific work. But the slowness and the heaviness of this mechanism seems the more intolerable to researchers, so that they have to face a culture of immediacy. Then, we may predict that new functions of diffusion and creation offered by electronic press will modify with the time, traditional chain of scientific periodical publishing and will open new prospects of work.

PART TWO: INFORMATION PLACES AND USES OF UNIVERSITY PUBLICS

The main point of our study consists of a qualitative survey next to university publics of Bordeaux. Methodology employed was the one of the half-guided interview using a list of questions based on major lines of our core subject. As the aim of this survey is to estimate the effect of new electronic tools on practices of teachers-researchers as regards information search, a double approach has been realised. First, after gathering some quantitative data and questioning several librarians¹⁷, we tried to draw up a panorama of information offer by main university documentary places in Bordeaux. This panorama could be enriched on a prospective plan by the vision that the librarians have about future evolution at professional or structural extents. As a second step, our concern turned more particularly towards uses. The first analysis proposed, obtained through

¹⁵ LE MONDE 3/10/96. Michel Alberganti, op. cit.

¹⁶ Bibliothèque Nationale de France undertook digitising 100 000 books, included recent ones.

¹⁷ Contacted persons : Mrs Montbrun, Director of Law-Economics section; Mrs Salabert, Director of Sciences section; Mrs Vitrac, Director of Medicine section; Mr Briand, Director of SICOD (Service Interétablissements de Coopération Documentaire).

librarians interviewing, allowed us to have a general view of practices of teachers-researchers by disciplinary area. But it was of course necessary to refine our investigation next to teachers-researchers¹⁸ coming from various disciplines (Exact Sciences, Sociology, Medicine, Literature and Human Sciences, Law and Economics). The sum of obtained elements will allow us better understand the progressing dynamics of acquisition and information search proceedings.

Information offer on university area of Bordeaux

After a period characterised with a lack of means and network connection, the tasks of university libraries have been strengthened by major focus upon their environment involving a credits raising. What is then today their policy with NICT and how do they deal with electronic publishing ? Three of the NICT products proposed and used by libraries for information searching (bibliographical, full text, ...) are studied hereafter : on-line data banks, CD ROMs and the Internet.

On-line data banks

Subscribing to on-line data banks providers (i.e. Questel, Dialog) was one of the very first steps of libraries towards computerised search. But it was by any way a question of self-service access to on-line data banks neither a free of charge service. Interrogation of these on-lines resources yields for the presence of an information specialist. The fares depending on research time spent consulting the on-line data banks, the public service grass-users, i.e. at the library, become aware of the cost of specialised information !

Development of CD ROMs in libraries was not without repercussions on consultations of on-line data banks, even if we notice some important differences

¹⁸Contacted persons : Mr Humbert, Professor of Geodynamics and encharged of new technologies at university of Bordeaux III; Mr Vignolles, Professor of Chemistry and searcher at LCT (Laboratoire des Composites Thermostructuraux); Mr Lamy, Professor of Sociology and searcher at Maison des Sciences de l'Homme d'Aquitaine; Mr Lung, Professor of Economic Sciences and searcher at IERSO (Insitut Economique de Recherche du Sud-Ouest); Mr Sorbets, Professor at IEP (Institut d'Etudes Politiques) and Director of CRECQSS (Centre de Recherche et d'Etude sur le Québec et le Canada en Sciences Sociales); Mr Guitton, searcher at LABRI (Laboratoire Bordelais de Recherche en Informatique); Mr Barbaron, Professor of English at LEA (Langues Etrangères Appliquées).

according to disciplines. For example, in 1991, 533 requests had been reported for all of the sections of Bordeaux university. In 1995, only 137 requests (that is about four times less) were posted concerning almost exclusively Sciences and Medicine sections. Interrogations of on-line data banks in Literature, Economics and Law have been however particularly affected by the phenomenon of CD ROMs. On the other hand, we observe a relative maintenance of consultations in Sciences because there are some possibilities of interrogations more accurate with on-line data banks. In bio-medical area, if on-line interrogations have a little suffered from CD ROMs competition, they still remain active for 5 years retrospective searches or for investigations requiring access to specific data banks. Nevertheless, we can notice a general decrease of on-line interrogations caused by economic and ergonomic elements playing in favour of CD ROMs.

CD ROMs

CD ROMs turn out to be, for a few years, an important electronic alternative within documentary structures. In 1996, there are about 50 titles in all sections of university libraries of Bordeaux¹⁹. Owned titles are mainly of a bibliographical nature but can also be presented as statistical directories, encyclopaedias or newspapers. We could not obtain some statistics of consultation due to the almost general lack of CD ROM networks²⁰. In Sciences and Medicine, evolution towards a CD ROM network is at present under consideration : the choice of this technical solution would allow indeed to propose to the public a larger range of titles. One of the major problems encountered by librarians concerns the CD ROMs acquisition policy. Excessive offer of titles brings up the problem of the necessary choice to make; choice which gets complicated by budgetary restrictions. Moreover, physical number of disks goes raising, especially in scientific disciplines. This increase in number of CD ROMs for each requires to think about limits the library of CD ROMs must have.

¹⁹Some titles, like Doc-Thèses, Francis, Pascal, Myriade, Medline or Le Monde may be redundant from one section to another

²⁰Only Literature section disposes of a CD ROM network but this configuration is too recent to give relevant statistics.

In spite of these few material problems, CD ROMs are considered as an interesting educational tool, as a transition between paper and on-line data banks. It remains attractive, easy to use and consequently, it does not need any special assistance. The only exception : the thesaurus of Medline CD ROM presenting some difficulties, an important effort of training has been made at the university library of Medicine in behalf of post graduate students and teachers-researchers²¹. From now on, CD ROMs are integrated into the package of information search tools in any library constituting as such a key element of documentary policy.

Internet

Contrary to CD ROMs, Internet terminals are not yet widely used in university libraries of Bordeaux. Public access to the network resources arises some interrogations and comments among librarians. But we notice different levels of progress in these questionings according to disciplines. If almost all of the internal services are now connected to Internet, it is rather about the free public access that we noted some significant variations. In Law and Economics, there is actually no Internet free access terminals. The section has however the project to offer multiple choices of servers for research. In Sciences, two « semi » public terminals are proposed : a selection is made according to the type of research and the identity of the person. In Medicine, after a preliminary step locating useful documentary sources in the discipline, an Internet terminal has been proposed for public access. According to the person in charge, there is no extraordinary infatuation for the moment. Explanation of this fact may be inferred to the impossibility for teachers or students to have a personal electronic mailbox on this terminal.

This quick talk of Internet position in documentary sections shows the variety of opinions and situations. Nevertheless, despite still prevailing doubts, a real ineluctability of electronic trend is becoming concrete. This does not mean the extinction of paper but simply the establishment of another way of organising and communicating knowledge.

²¹1500 persons have been trained for two years to using this CD ROM.

Evolution of documentary structures and their tasks : trends

Growing development of NICT in university libraries generates many interrogations or at least needs a real adaptation-mutation. The problem of staff training is particularly acute. Choosing a CD ROM network or a free public access to Internet implies the institution of a continuing training policy for all personnel of different grades within hierarchy so that they could apply technical basic maintenance or user research guidance. But the real state-of-art, as for means and time volume available, can obviously constitute an obstacle to the need for such a training.

Irruption of electronic networks phenomenon also disrupts the order of documentary world : how university libraries should be positioned in their relation with Internet ? If it seems inexorable that in a more or less near future, almost all university libraries propose one or several accesses to Internet, this « advent » provokes varied reactions. In Law and Economics, and more generally in Literature and Human Sciences, the Net at present offers rather few elements (electronic journals or important Web servers) susceptible to rally public of these disciplines. In others areas where Internet has an older past, reflections and realisations progress better.

Electronic reviews particularly mean an important stake for libraries. For example, in Medicine, it is time to investigate free « services » available on Internet : many abstracts and contents are in free access²². But the main objective is to make mentalities evolve towards services on request which would allow to notably reduce financial charges because of complete subscriptions. For instance, it would be interesting in case of specialised and expensive reviews to propose only contents and after, to obtain electronically articles on user's requests. This solution, financially attractive for libraries, needs an important transformation in mentalities but also in structures : with this new model, library would wander from a millenary tradition of keeping documents with an

²²Except for Nature (<http://nature.com>) or Science, there are few full texts in free access on Internet.

exhaustive vocation and would become involved in an optimised management of information.

Facing development of CD ROMs and beginning of new prospects with networks, tendency to stop paper subscriptions in university libraries seems to be most dominant²³. But we must stay cautious because many variables come to temper this point of view. In Law, jurists are still doing their documentary searches on paper. Emergence of electronic publishing does not mean therefore extinction of paper documents. According to unanimous opinions, they will last for longer time and will coexist with electronic means. Differences of approaches between these both modes are not source of annihilation but, at the contrary, an enrichment of access processes to knowledge. Nevertheless, there is still an uncertainty for librarians : archives and memory on Internet lead to fundamental interrogations. Instability and fleetingness of data present on network go against the principle of « trace » that founds the core of documentary places.

Finally, as a last aspect of these transformations induced by NICT and imagined by librarians : delocalization. According to the person in charge of Sciences section, first tasks of university libraries are of educational nature. The researcher is naturally a specialist and the librarian, with his general training, cannot substitute himself for a research process. He just can assume a guide's role towards some potentially interesting applications, paper or electronic resources. Accessibility to these applications on networks allows user to free himself from the library dependency and to build at distance some new access ways to knowledge. Availability of remote resources by means of networks, generates other forms of collaboration, research and learning.

Uses of university publics : qualitative study

Librarians hold a priori a privileged situation to look at uses of NICT. With regard to teachers-researchers, this observation is rather difficult because these constitute a more undisciplined and elusive public than students. Nevertheless, we can advance some

²³Paper subscriptions to Pascal and Francis data banks have been for example suppressed since 1994.

noticing. Some disciplines, like Human Sciences or Law, are more impregnated with « papyrocentrist » culture than others. Exact or applied sciences are more implicated in an electronic process but there are some notable variations according to the stage of development on uses²⁴. In Medicine, there are some help to diagnosis applications for training which open innovative prospects as regards to distance learning. But globally, a network like Internet is basically detected and used as a tool of exchanges between researchers (thanks to e-mail, newsgroups or mailing lists). Exploitation of electronic documentary applications is still in its infancy. For the moment, Internet seems to be a communication media rather than an information tool.

Hypothesis of work

The objective of our enquiry upon searchers is to highlight differences in research practices according to several parameters:

- The nature of the discipline: exact sciences-human sciences
- The criteria of generation: age of the searcher

Our first hypothesis defends that professors are more inclined to use new technologies if they belong to scientific disciplines and if they are young. According to our second hypothesis, when implicated into the process of delocalization of information, NICT contribute to build a natural progression of research modalities. Products of electronic publishing propose new proceedings of information acquisition and treatment which do not substitute the ancient ones, but get combined with them.

The points of view of teachers-researchers we met, translate diversified opinions and a thought in full development. An adhesion to the power of new technologies is as well observed as a reluctance towards tools yet not well known. Resistance is caused by a repugnance to change habits, by a certain laziness to get into abilities which would request an effort of training and finally by hesitations in front of computing tools²⁵. If there are numerous teachers-

²⁴Physics Laboratories of Bordeaux are more dynamic than Mathematics ones regarding electronic publishing.

²⁵In UFR (Unité de formation et de recherche) of Sociology, 16 Professors, only half of the 16 professors use computer technology for various uses (Excel, Word) and 3 of them use Internet.

researchers to working with word processing softwares (Word) or spreadsheets (Excel)²⁶, too few of them use yet the Net. An evolution can be apprehended with coming generations. But students will have to be motivated and to be trained.

We would have thought that among all the disciplines, searchers in exact sciences would fully use computer resources. Yet, it is not always the case: LCT is internationally known in the field of chemical engineering. According to its own researchers, computing is perceived there rather as an unpleasant necessity. So, its use is reduced and there is no motivation from the teachers to make students work with it. The second reason is that the laboratory is shared with an industrial partner strongly engaged: SEP (Société Européenne de Propulsion). Due to this partnership, this laboratory is compelled to a double confidentiality: industrial and of defence. Thereby, a single machine, independent from this institution network is authorised²⁷. On the other hand, in a discipline like computing, the very nature of the speciality imposed from early times the use of computers for computational developments and the use of the networks to work with remote super-computers. LABRI²⁸, using networks since the late seventies, was the first laboratory in France to use Internet.

The advantages of using new technologies are however far from being ignored, but this thought states more on the level of the social phenomenon than at the individual basis. New technologies changed the relation towards writing and memory. We are in another temporality and the recourse to documentary structures is less necessary. These new ways of information induce an individualisation of uses, but this autonomy will lead us to consider again the notion of responsibility.

²⁶In Economic Sciences for instance, all the searchers are equipped with a micro-computer and doctorate students use computing workroom to effectuate their works. In Political Sciences, computing is overall used for numerical treatment of data, for consultation of documentary data banks and by students to produce their texts.

²⁷LCT : 40 persons, with 12 permanent, other ones are doctorate students and students in probationary period.

²⁸LABRI : 60 permanents with 20 Professors and Directors of research at CNRS and 40 Maîtres de conférences and encharged of research. There are also 40 doctorate students, 10 invited postdoctorats and 10 administrative and technicians.

In front of the present multiplication of access to resources made easy by information technology, we observe a double risk of saturation and of over consumption: when we become insatiable of information, we shall have to protect us from this abundance because an efficient research practise requires an important selection. The increase of documentary mass shows us our limits. Specialists of information will be necessary for extracting the significant information from this profusion, and this would be the occasion to initiate the indispensable reorientation of libraries missions.

The access to resources

Concerning the access to bibliographical references, we observe a cohabitation between three sorts of resources (paper, on-line data banks, CD ROMs) corresponding to simultaneous uses. In other words, new resources have not supplanted traditional ones. In fact, the most part of researchers we met use this three sorts of resources at the same time, for they bet for the complementary aspect of their respective qualities.

This situation shows that a support does not substitute to another, and won't do it in the future. Paper will stay, for it fits with a possessive desire manifested by human beings within a quasi pathological behaviour to conserve, to appropriate, to keep trace. We shall have to get familiar with other practices: surfing on networks may be a pleasure similar to leafing through a book, but it is another culture we have to learn about. The playing side of surfing takes very attractive aspects, but each screen gives only a partial vision, since the meaning of a book can be approached in some minutes skimming it and referring to table of contents and index. Otherwise, rapidity of access, immense richness of resources and possibilities of downloading make the Net an indispensable tool. Thus, the discussion has to be expressed in an efficient approach: in work context and particularly in research, quality and competence are leading. The question to be asked is to know whether contribution of networks will bring a maximum benefit in teaching and research tasks.

Uses of networks

E-mail is henceforth used by a great number of researchers. We have to observe as some of its disadvantages, the unsightliness and weak readability of its characters and the a lack of restraint of messages exchanged. Nevertheless, the scientific community uses it every day in almost all sectors of university. This way of transmission largely facilitates communication between searchers and permits an efficient workgroup activity. This rapid exchange of information may have a positive influence upon reducing time for publishing contributions as well as for colloquies organisation. Otherwise, mail is very advantageous for international relationships because it is faster and cheaper than telephone calls.

Concerning other possibilities offered by the Net and particularly Web servers, we observe a certain discretion and even a patent reticence of some of our colleagues in Bordeaux. Attractive aspects of these servers are not ignored: the care brought to build screen contents on ergonomic criteria is an undoubtful advantage. However, some people consider these elements as gadgets or as subject of entertainment, as if the fact of being pleasant to the eye and easy to use would inevitably induce a mediocrity of contents of these objects. Others insist on the fact that the web is essentially used by students and not by teachers. Several explanations can be found to this depreciative judgement:

- the age issue : young persons born in the era of computer science use it easier. The colleagues we asked, being 45-55 years old are less familiarised with it.

- the standing or statute issue : surfing on the Web is good for students, but teachers have better to do!

- the validity of information issue : only what is collected in resources well known and tested (data banks, reviews, books) is trustworthy.

More seriously, some colleagues aware of the power of this new tool, use it daily. Some of them even use it for applied research, developing an educational method based upon study of articles spread on network²⁹. Today most of the laboratories present their activities and their annual report on W3. This use allows teachers to weigh up its risks

²⁹Invented and improved by Mr Barbaron, this method is used for one year and consists of a multimedia database composed of articles circulating on Internet (Times, Economist, Daily Telegraph, Business Week) and of articles stemming from encyclopaedic CD ROM like Britannica Universalis, Atlas Microsoft, PC Globe, with links to texts and pictures.

and limits while assessing its qualities : abundance of information on the Web and saturation of networks calls for urgency of adjustment of search engines to find information³⁰. Furthermore, there is a transformation of search procedure induced by hypertextual architecture and so, we're evolving from a linear or sequential process (one document after another in a well-defined order, like left brain) towards an heuristic or « systemic » process (access to data based upon association of ideas, like right brain).

These changings of approach represent an important disruption for the researcher who puts uppermost in his mind reliability for his problematic and validity of his hypothesis. This needs a great intellectual rigor which may seem to certain people in contradiction with multiplicity of approaches and profusion of information on networks. Furthermore, it is still extremely significant for researchers to directly communicate with each other. They have got indeed some favoured interlocutors they regularly meet during international conferences.

It is likely that new logic of evolution in careers will appear : it is important to be connected to useful networks and to be introduced to one's peers in one's own special field. Modes of promotion will be modified³¹. Furthermore, networks are powerful means against the compartmentalisation of research on international level. As a result of immediacy of connections, there is no longer territory neither frontiers. Research becomes more universal, running the risk on « de-contextualization ». This risk, however, is limited because products remain strongly marked by their country of origin. Culture of each nation has an effect on abroad products and we can predict that production of contents will remain territorial.

Publication of articles in electronic reviews is another application which will probably have an important development during the years to come. Despite few hesitations related to dangers that this way of distribution may represent, especially as for

³⁰Most employed search engines like Lycos, Altavista or Yahoo, although extremely powerful, are too generalist to satisfy definite needs of researchers who ask for more specific tools.

³¹In a discipline like Politics Sciences, competition in our country is however much less important than in United States; there are 2 000 « politicians » in France while we're counting 25 000 ones in USA.

risks of information pirating, most of researchers admit that traditional ways of publication have to be reconsidered. Reviews with editorial committee have adopted, for profit making and public image reasons, a working of quantitative nature based on number of publications and of quotations for each researcher. This tends however to be substituted by a qualitative approach that should prevail. There's so much competition that researchers run the double risk to see the content of their articles spirited away and to wait indefinitely for a review to publish them. This dictatorship of publishers (most often commercial) can be circumvented using the expedient of articles proposed in newsgroups then read by colleagues³². This new model of publication that begins to expand in research communities does not even so exclude the necessary ratification of contents on scientific level (coherence of demonstrations, intelligibility of conclusions, accuracy of form). In most of cases in Bordeaux, we're only for the moment on a consultation stage³³.

CONCLUSION

This sum of elements comes to confirm our first hypothesis: use of NICT is included into the processes of information delocalisation and becomes integrated into logic and dynamics of evolution as regards research. Nevertheless, we must mention that documentary resources available on networks are not still completely used by teachers-researchers.

Far from establishing a caesura towards previous practices, new tools contribute to build a natural progress of access ways to knowledge: we have noted an extension in individual scientific relations. With Internet, information exchanges between specialists reach an international scale. Thus, expert networks are constituted increasing by the same time the audience of disciplines. New proceedings come to be added to ancient ones, but at different levels and rhythms, according to scientific field, generations and characters.

³²In computer science, for example, every element diffused on network immediately get regard of 2 000 specialists, what makes circulation of information easier.

³³Reference reviews are frequently consulted (for instance, in Chemistry, Electrochemical Society, <http://www.electrochem.org>, or Elsevier publications, <http://www.elsevier.nl>).

On this last point, we realised that the priority of most of the teachers-researchers concern rather communication between peers and publication of their works than facilities of access to information. While traditional system is locked, the Net offers opportunity to pass around precedent filters. There, would be the real metamorphosis.