

**“Byting” the Bullet?
Universities, Libraries and (technical) Change.**

Jean-Claude Guédon
Université de Montréal, Canada

Exciting debates took place in Paris in the late summer of 2002. In a single room, for a couple of days, university administrators, head librarians and scholars grappled with issues raised by the unstable information environment in which universities have been working for at least a decade. Change, change, change was the constant refrain: at times, it sounded as if a group of academic explorers had stepped into Heraclitus' famed river. Participants spoke of turbulent times and indeed they were obvious to all; however, finding what these changes meant turned out to be more challenging, but it had to be done if the goal was to come closer to perspectives, strategies and solutions.

Many interpretations and answers were proposed; remarkably, the diversity of viewpoints and approaches did not prevent the emergence of a reasonable degree of convergence. This was all the more striking that participants were nationally and functionally diverse. Whether Americans (in the broad sense of the word – several Canadians participated) or Europeans, whether administrators, librarians or academics, there was a general agreement about one fundamental diagnosis: the exchange of information, ideas and concepts among scientists and scholars – a process absolutely essential and fundamental for the distributed quest for knowledge that science is - was less than optimal. Examining how to improve this situation became a major theme within many presentations and discussions.

Change, especially rapid and relentless change, also induces a sense of anxiety: the future, even more opaque than usual, appears to hide ominous possibilities. In this particular meeting, fear for the very future of academic libraries was expressed. What if, indeed?

Some, like Bill Simpson (from Dublin), reacted with brave words: “My own personal view is that the library does have a future”, he said, but his statement seemed to rely more on faith than on facts. It also had the unintended consequence of drawing attention to various negative scenarios, some of which were outlined or sketched. For example, they described some of the conditions that could help unseat the libraries from their present functions. Elmar Mittler (from Göttingen) in particular, outlined the ways in which commercial publishers could take on at least some of the functions presently held by libraries. He also underscored the dangers of the European directive on databases: with such a legal disposition, it becomes easy to imagine how collections of scientific articles, now treated as elements of a data bank, could remain indefinitely in the hands of their present owners simply by virtue of their regular growth. However generous to the owners the present time limitations of copyright may be, they still appear too limited to them and they understand that, in the digital realm, perpetuity of

intellectual property can become the rule. In a sense, the long held hopes of the London stationers¹ appear within reach at long last; but it remains to be seen what the effects may or will be on research.

This said, the OECD-IMHE meeting in Paris was not entirely written in this kind of ink, far from it. The pessimism emerged easily enough because the debates were genuinely free, not because they represented the dominant attitude. Essentially, anything could be brought to the table; no intellectual holds or outcomes were barred *a priori*. If anything, the mood was upbeat; the participants did not appear particularly resigned or depressed; on the contrary, much positive energy was available and spent imagining and designing more optimistic perspectives. Trying to bring out some of the main themes that can be extracted from these scenarios is the task of this preface.

Thou speaketh certain things strange and new²

Change is everywhere but we are not always ready to recognize it: this is one of the strong messages that Bill Simpson sent to his audience in August 2002. And indeed, the strange and the new appear as such only after one has committed to the reality of its existence. The first order of reaction is denial: old wines in new bottles, they say. Libraries used to preserve 'the still and quiet air of delightful studies' – a claim carved in stone at McGill University in Montreal. Protected and isolated from the petty worries of the world, studious and sometimes powerful minds are supposed joyfully to craft (lofty) ideas and (profound) thoughts. And in the midst of turmoil, the myth endures: blissfully ignorant of journal prices and of their stratospheric trajectory into unsustainable economic territories, scholars continue to enjoy what appears to them to be free access. They do so, largely unaware of the cost of such a privilege to their institution and to their society. They are even less aware of how much ingenuity librarians need to develop in order to absorb most of the negative consequences of the well known "serial pricing crisis".

To buffer scholars and scientists from the harsh economic environment in which they have to work, librarians have adopted sophisticated management tools. In fact, a "culture of management" has taken over the profession and the librarian scholar has become an exception reserved for the most privileged among the privileged. Gradually, concepts of "value for money", "quality audit" and "performance indicators" have come to occupy center stage within libraries. The point is obvious: in a constrained financial environment, requests for more money must be justified. Efficiency must be demonstrated; lean and mean operational principles become the norm. "Mr. Administrator, we cannot do any better. See for yourself! The price of journals is rocketing up and up. We really need more money."

But do administrators listen? According to Sir Brian Follett, they actually do not listen very much, and then only in times of crisis. It may well be that the acquisition budget of libraries is crumbling under a hyper inflationary price spiral but as it represents around 1% of the total university budget at most, administrators tend to treat it with benign neglect³. Concurring, Kari Raivio (from

¹ The genesis of English copyright laws can be found in the struggles led by the London Stationers to establish a viable form of literary property. The legal struggle is recounted in great detail in Adrian Johns' *The Nature of the Book* (Chicago, University of Chicago Press, 1998).

² This is a citation taken from St. John Chrysostom, Homily 54.

³ This kind of figure is sometimes interpreted by people, presumably close to the publishers' viewpoint, as a proof that there is no serial pricing crisis, only a library funding crisis (e.g. Toby Green from OECD in this collection). However, such an interpretation makes light of the huge discrepancies in cost/page or even cost/character from one publisher to the next and it also disregards the fact that the fast rise in journal prices coincided with the growing role of commercial publishers.

Helsinki) reminded all that libraries cannot be conceived as an end in themselves inside universities. They must be, he said, reconceptualized as part of “information services”, which he sees as far more central to the life of the institution. But in so doing, he was indirectly feeding some of the survival anxieties expressed by various other participants. What are information services? Who manages them? From within or from without the institution? And to what end? Are we dealing only with information?

Other issues were raised: for example, in the industrialized world, research libraries often express their worries and complaints in the rationalized vocabulary of normalized spreadsheets; in conferences their witty remarks barely disguise a sense of impotence in front of the large commercial publishers; in paper after paper, they endlessly reiterate obvious theses about politicians who prefer to ignore obvious absurdities: why do we have to buy back at such a high price research results that originate within our own institutions? Why do you give us money to produce research results and then more money to buy these results back? Why do scientists agree to see their research locked up behind extraordinarily high toll gates – a Faustian bargain if there ever was one, to use Stevan Harnad's⁴ well known evaluation of the situation? Is this really the best way to conduct scientific research?

Meanwhile and elsewhere, silence has set in: in several dozens of very poor countries, academic libraries have not seen a single new journal issue for years⁵. If you suffer from malaria, that probably means that you live in a country that cannot afford the journals devoted to its study. Is this, some asked, the best way to make the best use of the fine human minds that reside in something like 80% of humanity? If the notion of distributive justice retains any meaning at all, should it not at least apply to fundamental scientific knowledge? Doesn't humanity need all of its intelligence to have a chance of dealing adequately with the global threats growing everywhere?

In complement and partial contrast to the political analysis of the changing situation of commercial scholarly publishing, other forms of change held the attention of a number of participants. Two were particularly important: on the one hand, the changing functions of the universities were repeatedly mentioned; on the other, the spectacular flood of technical innovations came to occupy the role of an almost obsessive *Leitmotiv*.

Again, it was Bill Simpson who helped all participants to characterize the first set of transformations: universities have grown enormously; they are far more inclusive than before; they feel they have to respond better and more quickly to the changing economic needs of their society. These and other dimensions of change mean that the genteel insularity of the old elites and their “delightful studies” will not do any more. The trick appears, therefore, to maintain the autonomy of thought and the critical distance – in short the ethos that acts as a *sine qua non* condition to the scientific and scholarly enterprise – of traditional academe while being far more engaged in current matters. Keeping the traditional values of scholarly investigations while negotiating with government ministries and gently prodding rich donors to part with some of their fortune in favor of some good academic cause can be a difficult exercise indeed. Yet, the alternative is slowly to become an annex of the professional and industrial needs of the nation with little room for free, unimpeded, and even critical, investigations, especially in fields that are regarded as marginal or even controversial. And librarians play a particularly strategic role in this context because it is they who design, enhance and protect a documentary space generally accessible to (at least) the members of their institution.

⁴ Stevan Harnad, cognitive science professor, also stands tall among the pioneers of scholarly electronic publishing and open access. He was one of the first to unveil the strange nature of the deal struck between scientists and scholars on the one hand, and publishers on the other, and, most felicitously, he characterized it as a “Faustian bargain”

⁵ This explains why programs such as Hinari, eIFL, INASP and others had to be developed.

While universities have certainly changed in the last few decades, many participants stressed the particular role played by technology. According to this view, technology has perturbed prevailing situations in such a deep and thorough fashion, not to speak of the swiftness of its effects, that it took on the role of an independent factor, a *primum mobile* so to speak. Libraries, of course, have been particularly impacted by technological changes, and this has happened not one, but several times. Management techniques were first affected, quickly followed by the cataloguing functions. Then, the latter was integrated within comprehensive (and expensive) computerized systems that took charge of ordering, cataloguing and circulation. As if this were not enough, the emergence of digital materials created a new wave of upheavals and libraries suddenly discovered the realities of “site licensing” with all of its attendant woes: in lieu of simply developing collections through outright acquisitions and instead of managing these collections as well as possible, librarians had to retool and master some of the arcane skills of contractual laws as applied (internationally) to the new digital resources. Still later, this led to forming library alliances in all kinds of forms and shapes, even though they are generally known under the uniform name of “consortium”.

In parallel, worries about the long term preservation of digital materials emerged, especially when publishers made it clear that they intended to retain full ownership of the digital source of access. But could commercial publishers be entrusted with the long term preservation of digital materials when their main preoccupations are the bottom line and the report that has to be made each quarter to the stock holders of the company? The answer heard in Paris, not surprisingly, generally turned out to be quite sceptical.

Universities as a whole, unlike their libraries, have not yet been hit as hard by the new technologies. Computers can be seen in every nook and cranny of academe and yet, strangely enough, the working atmosphere has not changed all that much. Beyond slight readjustments of the division of labor between professors and their secretariat, business as usual prevails. The integration of digital materials in teaching remains marginal and the dreams of revamping distance education through the new technologies remain just that – dreams. Reasons for this are not all that difficult to elicit and they do not differ greatly from the rest of society. Computers are good at storing, organizing facts; they can even crank out new facts from various combinations of previously digested facts; but computers are essentially unable to handle information, i.e. interpreted facts. As for knowledge and wisdom, Charles Jonscher, for one, reminds us how much they are being regularly neglected to the detriment of our interpretative capacity⁶.

Besides dealing well and efficiently with facts, computers are good at helping communication among people. E-mail remains the real killer-app⁷ of the Internet. However, as Jonscher notes, the ability of communicating through computers did not emerge against an empty background. Mail, fax, telephone, telegrams, etc. had previously been put to good use before the computer invaded the institutional and organizational scenes. It may well be that computers are better at helping large organizations to scale up to even larger, more geographically distributed, levels, than at helping improve their efficiency – a reference of course to the “productivity paradox” that has puzzled economists for the last two decades at least. This would account for the success of a popular quip: with computers everything goes faster, but it takes more time.

In short, the feeling of an overwhelming presence of technologically induced change may well reflect the librarians' particular position and concerns as well as their recent experience. Upon closer

⁶ Ch. Jonscher, *The Evolution of Wired Life* (New York, Wiley, 1999), ch. 7.

⁷ Short for “killer application”: a killer-app is a geek's dream since it is supposed to make a whole technical context, here the entire Internet, fly both in economic and social terms.

examination, it turns out that digitizing “content” - to use a term that, although unsatisfactory, remains without adequate substitute – and allowing it to circulate within the Internet does raise a series of complex issues. However, these are not essentially of a technical nature; they involve questions of ownership, integrity, rights management; the production of complex electronic documents requires entirely new “writing” skills, etc. All these questions refer to social skills, legal order, new cognitive approaches, and the technology constantly lies in the background.

In effect, all these non-technical obstacles may turn out to be a blessing in disguise because they provide a breathing spell for the universities. Hopefully, they will allow our venerable institutions to avoid being hypnotized by technical solutions while keeping clearly focused on human needs and projects. Ultimately, the point of technological change is never technological, but human: how do we invent the best ways to make the best use (for us) of these new toys? And who are the “us”? Commercial publishers? Scholars and scientists? Saying so shows that choosing technical solutions corresponds to debating a particular point in a technical idiom. It is but another facet of political life.

While these interrogations constituted some of the “things strange and new” that accompanied the theme of change in the Paris meeting, by no means were they the only ones.

Rethinking the library and its role within the university

With the realization of the highly elastic nature of the institutional and technological front came the understanding that descriptive accounts were of real, but limited, value. It is one of the enduring values of this meeting that it rose to the challenge and quite a few speakers moved beyond the merely descriptive and anecdotal to identify a number of important conceptual shifts. Among the several themes that emerged, the following stand out:

- The university is restructuring away from the disciplinary mold. The intellectual assembly line of old is slowly giving way to the needed skills to “navigate complexity”⁸;
- In pedagogical terms, the university is moving away from the “sage on the stage” to the “guide on the side”⁹;
- Libraries have moved away from ownership and seek to provide maximum access and best services;
- Libraries have to reinvent the way they divide tasks and share resources; universities should see themselves as nodes in an educational network, rather than as sovereign hubs;
- Finally, and this will feed into the conclusion, many expressed a general concern for “information literacy” - a notion that deserves being fleshed out a little.

Let us examine these points in some greater detail.

The future of disciplines

Long confused with the divisions of knowledge, disciplines appear more and more like sub-institutions and their role is to locate scholars and researchers both in specific research sites and within

⁸ We owe this felicitous phrase to Sarah Thomas.

⁹ Again, thanks to Sarah Thomas.

“invisible colleges”¹⁰ spanning several sites. They rely on various social, cultural and institutional means to increase their hold over a certain sector of intellectual activities: departments, chairs or equivalent structures, journals, conferences, prizes, learned societies, etc. If for a minute we borrow terms from the geographers, disciplines could be said to correspond to territories while divisions or forms of knowledge refer more to something like space¹¹.

In this perspective, universities act like a collection of semi-autonomous territories – not unlike the European Union in its present, emerging, state, or the United States before the Civil War. Participating parties¹² remain sufficiently interested because both financial resources and intellectual opportunities emerge out of this arrangement and this allows the structure to keep together; however, establishing any kind of policy is extremely difficult as any university administrator will readily testify - the proverbial problem of herding cats readily comes to mind in this context. Furthermore, all these territories constantly compete with each other for scarce resources within the universities and also within the libraries. The translation of this institutional concept into more familiar terms leads us to the familiar term of “discipline”.

The disciplinary structure is not eternal; it emerged only in the 19th century and, in order to thrive, it needed a relatively stable intellectual environment where advances were steady but progressing at slow enough a pace for disciplines to accommodate the changes. When a particular discipline did not manage to do so, as in the case of “Tier Chemie” (or “animal chemistry”) - the prototype of biochemistry - a process comparable to cellular meiosis took place; in the case of disciplines, it involved passing through an intermediate phase, often referred to as “interdisciplinary” which allowed for the later partition of the discipline into two separate, yet related, territories. Computer science also emerged through a kind of meiosis; it separated from electrical engineering with some help from the mathematicians. Many similar examples readily come to mind (chemical engineering, molecular biology, etc.).

More recently, the creation of new disciplines through the orderly interdisciplinary stage seems to be challenged by new ways to tackle problems: case studies and team work ranging over vast numbers of varied specialists grow more common: Cornell University, we were told, harbors a genomic research center with over 600 researchers ranging from molecular biologists to ethicists. Likewise, the teaching of medicine has been reorganized on the basis of case studies and team work. In short, many signs point to a general move not toward interdisciplinarity, but toward problem-focused, transdisciplinary, activities. Why transdisciplinary rather than interdisciplinary? Because the new dynamics leads not to new disciplines, but to vast and mobile research structures, which may still lean upon disciplinary foundations at their inception but which, in the end, have little to do with disciplinary structures. Genomics, for example, is the study of a complex object, just like oceanography or the environment, and no discipline can claim exclusive responsibility over it.

¹⁰ The expression, transposed from the pre-history of the Royal Society of London, was introduced by the late Robert K. Merton, the great sociologist of science. The standard study on invisible colleges was written by one of his students, Diana Crane.

¹¹ Geographers define a territory not only as a bounded surface, but as differing from geographical space because it is structured by means of communication. It is interesting that invisible colleges, learned societies, journals and congresses are all communication tools. The departmental structure is more complex and a sardonic observer might even question its communicational usefulness, but this ironically induced ambiguity does not weaken the general observation just made.

¹² It would be interesting to develop a theory of the “raison d'être” of various units of research transmission and production (universities, faculties, departments, research centers, etc. in the spirit of the Nature of the Firm published by Ronald H. Coase in 1937.

The reorganization of documentation and research results in large, digitized banks of articles increasingly searchable in a variety of ways has positively contributed to this evolution; it obviously decreases the relevance of the journal as a retrieval filter permitting to access most of the best information most efficiently. New emphasis is being put on individuals' names, laboratory titles and institutional origins. What this will do to the branding processes that presently regulate the worldwide scientific pecking order is anybody's guess, but affect this process it will. Concurrently, new forms of serendipity appear as searches through vast data banks reveal interesting articles in sources that would have been totally ignored by earlier, more discipline-based, search tactics. Data banks, in effect, create a situation of hyper-browsing, which also contributes to the weakening of the disciplinary stranglehold on knowledge.

University administrators have no inherent reasons to resist trends pointing in the direction of trans-disciplinary forms of organization: it holds various promises, for example a better use of local intellectual resources. It does so by focusing them more easily on problems that appear relevant or important from a particular perspective. The new question is: whose perspective? Indeed, some of these problems may have been directed to the university from the outside. On the one hand, it translates into a university more responsive to social and economic needs; on the other, it may decrease academic autonomy. At the same time, it tends to dilute departmental power to some extent, which, from an administrator's standpoint, amounts to making cat herding a little easier.

For their part, libraries also should view these developments in a positive light because they position them most strategically. Libraries, by essence, have always straddled the disciplinary divides. A library cataloguing scheme subsumes disciplinary divisions into general knowledge maps. Rather than fragmenting themselves to try and respond best to particular disciplinary needs, libraries seek to provide flexible guidance to sectoral or thematic requests emerging from within the university. In other words, in this new era where "navigating complexity" is very much of the essence, librarians find themselves in the potentially enviable position of pilots *cum* compass!

The guide on the side

Teaching evolves remarkably slowly. It is hardly an exaggeration to claim that the classroom was the last refuge of the scriptorium: for literally centuries, teachers simply dictated their courses to students who proceeded then to transcribe them "*au propre*" before studying them and reciting them back to the teacher. Such practices were still common after the Second World War in Europe and they are probably still in use in various parts of the world today. The "sage on the stage" phase really corresponds to the Gutenberg era. Based on a collection of well chosen printed texts, some of which read by students, the teacher organizes a series of lectures where he/she summarizes, interprets and weighs the relative value of these texts. The idea is to introduce the students to "the literature" of a field – literature meaning here the canonical set of essential texts needed to master a domain of knowledge. In some ways, the teacher proceeds very much like a preacher, who relies on various sacred texts to teach what he – very few women here, at least until recently – understands. The "sage on the stage" teaches his/her little secular religion and the tone, of course, is magisterial.

If we think about the teaching side of the university as a sophisticated piece of social machinery aiming at replicating skills and competences from generation to generation, these various pedagogical strategies make sense only within a slowly evolving context. Such conditions, as has been pointed out repeatedly in the Paris meeting, do not apply any longer; instead, a fast and furious pace of complex problems relentlessly pile up at the gates of the harried institution. In such circumstances, sticking with the traditional "sage on stage" approach in our universities can be likened to poor military preparation, something like training soldiers for trench warfare instead of more dynamic and mobile forms of tactics and strategies.

Because of this new and dynamic environment, universities everywhere are sensing a growing need for what might be called “meta-learning” - in effect fostering a feeling of great self-reliance on the part of each participating student. The “guide on the side” does precisely fulfill this role, but, in so doing, he/she discovers that more than a teacher is needed here: part librarian, part seminar leader, part sage, the teacher and the librarian, together, must invent what amounts to new forms of apprenticeship, if one thinks about it for a minute. The difference from the traditional forms of apprenticeship is that the new technologies somehow manage to scale the process to such numbers that the economics of apprenticeship are not incompatible with mass universities. Here again, the role of the new technologies appears less in providing information to individuals than in allowing human organizations to scale up at a higher level. However, the old forms of communication and the old skills remain central. The only thing that really changes is that teachers and librarians must complement each other in a much more coordinated way than has ever been the case before. Librarians may begin to feel that they must act as “applied epistemologists” or “epistemological engineers” while the faculty become more specialized and perhaps “deeper” guides on the intellectual territories for which they take responsibility. Note in passing that these “territories” may or may not correspond to any pre-existing discipline; on the contrary, they may have to be designed “on the fly” so to speak, a little like dynamic web pages that are assembled as needs arise, and unlike their static counterpart.

“Lackbook” librarians...

Not owning a territory never stopped a committed individual from claiming a crown: John Lackland, drawn from English history, is a well known example of this paradoxical situation. He is far from being alone. However, the lesson may be of little value for librarians as they may have to reverse the process. In effect, they have to show that they remain librarians despite the gradual disappearance of the physical collection. Already, off-site storage is common and the physical importance of the collection dwindles as more and more resources become digital. Soon enough, print will find its place alongside manuscripts, the transition concept of hybrid library notwithstanding.

In the digital age, it makes sense that sharing should not be experienced in the same way: after all copying a file and sending it along somewhere else is trivial and costs almost nothing. If, while sharing, I lose nothing, and it costs me essentially nothing, why should I deprive myself of the good will that such an attitude will undoubtedly bring me? Indeed, Sir Brian Follett made the remark that deep resource sharing was easier in electronic form than with print, which suggests that taking a byte out of the library does not feel nearly so painful as taking a book. Print has indeed made us very, very familiar with a peculiar dimension of books – namely they can be owned because the Gutenberg era was very successful in transforming documents into commodities. Because of the commodity dimension of the printed book, library collections maintain invisible, yet deep, ties with the notion of treasure¹³ and, curiously, much before the phrase “data bank” was invented, libraries did tend to behave like a book bank. At any rate the metaphor comes easily to mind which is telling in and of itself.

The analysis of the present digital stage leads to some strange tensions. For example, although digital, the article file remains a commodity; at least, publishers insist on this point. But this commodity can be owned only by the publisher because it must remain unique, if it is to be adequately controlled. However, in treating the digital content in this manner, publishers unwittingly assign it to a position that, strangely enough, looks very similar to that of a manuscript. As in the case of a manuscript, the only privileges that can be granted are access and private copying. Of course, access to a digital file is infinitely easier than access to a manuscript and publishers will make it as easy as they

¹³ In some French-speaking institutions, the rare book collection is sometimes called “le trésor” - a treasure.

can for a library to gain access to the collection, provided a system of guarantees and exclusions are put in place and monitored locally by the librarians. However, this simple point leads to a number of important consequences: not only are the librarians moving further and further away from their paper books and their collection, but they also have to reverse some of their rules of behavior; for example, instead of maintaining a collection and making it as widely accessible as possible, they find themselves holding nothing more than a knowledge pump and checking carefully which tanks can be filled. We all know that gas pumping is not a very exalted form of work.

This sad story does not end here: librarians used to organize catalogues, create research aids in the form of bibliographies and thus help users – students and faculty alike - in a variety of ways, nowadays, the collections are essentially packaged somewhere far away; users demand having access to these materials from their office or even their home. As a result, and to attract people inside the library building(s), a series of “attractions” (for lack of a better word) have to be built in: good work stations, of course, to attract students who may not be so well equipped, and – why not? - a coffee house with pleasant and comfortable armchairs.

What kind of kingdom is this? Will the training programme for future librarians include a course or two on how to prepare a *caffè latte*, a *cappuccino* or an *espresso*? Fortunately, the future does not look quite so bleak and, in fact, new opportunities arise. Sarah Thomas, from Cornell University, while documenting the rapidly changing appearances of libraries, also stressed the emergence of new roles within libraries: for example, digitization projects and institutional repositories amount to placing publishing skills into the hands of the digital librarian. New spaces, she demonstrates, can be opened and new forms of “epistemological engineering” - not her term, but she would probably accept its usage - can find their way in the libraries as they now emerge.

European leaders used to distinguish carefully between spiritual and temporal forms of power. When the Catholic Papacy had to resign itself to being limited to the former, it promptly discovered that this dreaded compromise did not decrease its effectiveness nearly as much as would losing monopoly control over education, for example. Something comparable may well be happening with libraries: while collections lose some of their importance and can no longer serve as the sole justification for the institution itself, new forms of “spiritual” power appear. And from the coffee shop – a lovely echo of the Enlightenment literary scene, by the way – to the digitization and repository projects, librarians are moving to occupy one single position which is extraordinarily strategic if it is defined (roughly) as follows: you say the university is about knowledge transmission and creation; well, this is all true, but do not forget that, first and foremost, it is also about people and people communicating. And our role, from now on, may well be to bring various epistemic communities to the fore, and nurture and encourage them. We can use all our skills to help people with common interests to discover each other; we can also help them discover the information they need. Our true role, in short, is to engineer and then grow “distributed intelligence” and we shall do so first within our institutions, then among institutions within our countries, and finally among countries in our world.

Nodes, not hubs...

Libraries, in short, far from being in the last throes of historical irrelevance, find themselves at the forefront of a trend that is becoming stronger every day in the scholarly and scientific world. It is the understanding that, if the best way to establish ultimate intellectual value is based on competition, then the competition had better be as wide as possible to make the results credible. Running a race in a village has never been very glorious compared to the Olympic Games. Likewise, what does it really mean to be the best scientist in your field if you know that over 80% of humanity is cut off from the needed training, information and equipment? How many formidable brains are prevented from focusing on really important problems because they have no greater horizon than their personal, day-

to-day, survival. Such is the situation nowadays and for one Abdul Salam from Pakistan that wins a Nobel Prize, how many others see their intelligence thwarted and go to waste?

Meanwhile, through their peculiar history and their tradition of sharing, libraries are discovering that they work better if they think of themselves as nodes and not as hubs. Note that being a node does not mean yielding to uniformity: in passing, it is one of the great pitfalls of all the consortial activities taking place nowadays in response to the relentless concentration of publishing power within fewer and fewer commercial hands. If nodes can be nodes, it is not by virtue of their conforming to some unique model, but rather by virtue of their being able to interoperate with each other. Nodes are interesting to other nodes only to the extent that they harbor some degrees of difference; in this regard, libraries do not differ so much from individuals who also bolster their claim to be alive through some significant distinction, i.e. some difference that can make a difference, as the Palo Alto communication school used to say. Useful individuals are always nodes, not hubs. Only through significant distinctions can sharing and even comparisons mean something.

Of course, particular collections, preferably of rare or unusual items, have always contributed to a library's sense of identity alongside the size of its main collection and other characteristics; but with the gradual fading of physical collections into the background, the distinctiveness of the resources published locally or provided from elsewhere, the differences in the navigating tools and the vitality of the epistemic communities nurtured by particular institutions will undoubtedly come to incarnate the main signs of quality and fame for a given "nodal" library. Many participants echoed this kind of vision in various ways and, for example, Alan Bundy and Sir Brian Follett each provided their own vision of this new status for libraries: the vision is perhaps more systemic (and systematic) as well as more ambitious in the latter author but both clearly see the need for some sort of networking between libraries. And although the scale contemplated is clearly national, nothing prevents from reaching beyond these boundaries. Continental or (multi) linguistic networks could easily be organized

The story could well end here if it were not for the fact that, as universities digitize their activities, they too have to study and choose which path they want to follow. Should universities be hubs or nodes? The trend is clearly in favor of the former at this stage of history: sovereign and proud, each university wants to define something like a territory for itself, and it does not matter if this territory is indeed based on some geographical or linguistic region, or whether it aims at a certain category of students and professors. Actually, all these factors generally conjoin to reinforce the particular sense of territory harbored by a university; they also bolster the thesis that, for the moment, hubs appear preferable to nodes and competition is favored over collaboration. Yet, this may not all be for the better and, ultimately, it may turn out to be no more than a phase. For example, Michael Gibbons, the Secretary of the Association of Commonwealth Universities, has argued that too much competition between universities can end up weakening a national system of higher education in a given country

Also, the situation may change fast. For example, creating modules suited to distance education and dispensed through the Internet already requires a level of team work and a number of resources that few universities can organize or marshal alone. Competences do exist here and there and solo achievements can be quite impressive indeed, but their very success, alas, also reflects their limits: the sustainability of such efforts is always problematic at best. In short, the attempt to take advantage of the digital technologies for the purpose of teaching may well impel universities to create various kinds of alliances, and indeed several examples already exist, although no great success has been signaled yet.

In research, collaboration also turns out to be crucial at least at some fundamental, pre-competitive level. For example, genomics has shown the importance of shared data sets and similar

situations are evolving in other fields, for example astronomy. Finally, universities and research centers are beginning to understand that the machinery to create symbolic value in science – namely the branding capacity of certain journals – has moved too far out of their control with the results that, beyond the pricing crisis already mentioned, it also affects the way in which certain scientists or scholars can accede to the status of “gatekeeper”, i.e. members or even heads of various editorial boards of prestigious journals. As a result, various distortions adversely affect the present state of scholarly publishing and echoes of these ominous trends were also heard in the Paris meeting. But, more importantly, universities begin to understand that, in order to wrestle the branding capacity away from large commercial publishers, they will have to network once more, if only to create a credible system to generate scientific value: peer review is only the beginning of a long chain of possible value generation devices, processes and algorithms, and it goes well beyond the simple, sometimes mechanistic, and even legal (Finland) reliance upon impact factors. In short, the hub approach appears to be reaching some kinds of limits nowadays.

This said, it remains that libraries have already been forced to take measures that, although difficult and painful, already place them in the forefront of a series of evolutionary steps that universities will have to consider in not too distant a future if they too do not want to see commercial entities offer training services in competition with their own. Universities could do worse than looking at how their own libraries have negotiated and are still negotiating the transition from the hub structure to the node model.

In lieu of a conclusion

All the preoccupations summarized here can finally be summarized with a single phrase, “information literacy”. The phrase is tantalizing but remains allusive and elusive; consequently, it deserves some comments. Alan Bundy provides an interesting starting point in this regard: he essentially defines information literacy as an understanding of the importance of information and an understanding of the nature of needed information; it also means the ability to access information, evaluate it, manipulate it, recast it; it finally calls for the understanding of its context and it should be an integral part of lifelong learning – a recent and fashionable phrase that may mean little more than being cultured and educated.

What is most interesting in Bundy's definition is that it never mentions new technologies, and this is precisely what makes it sound right. In a very real sense, learning to write and read are the beginning steps of information literacy, which means that the Sumerians were already practicing it five thousand years ago. But this ability is not enough: manipulating information-carrying symbols must be preceded by a deep understanding of what information really is. For example, if someone understands the art of reading only as an aid to memory within a culture dominated by orality, and this is what much ancient reading appears to have been, then one may wonder whether this skill really supports a quest for information or whether it is simply an important element for the performance of some repetitive ritual.

The nature of information is also of the essence: the same information carried by a newspaper or a few scrawled letters on a small piece of paper may not have the same meaning at all. The ability to derive hidden, second- and even third-order meaning from the very mode of being of a document is very much part of information literacy; so is the ability to relate a given document to one's own life experience. Interpretation and relevance making are essential skills for the person claiming to be information literate.

But isn't saying all this just recasting the whole question of what a true education is about? Through information, everyone one of us can shape himself or herself; symmetrically, one's ability to

reshape information is facilitated by one's previous informational experience. All this is precisely what human beings do. Technologies just lie on top of this fundamental human layer – a fact that must never be forgotten. Machines can never be information literate¹⁴. However fast and furious the pace of technological change may be, however deeply it affects the economic and logistic dimensions of our institutions, however much it succeeds in mesmerizing many administrators and politicians, it must never be forgotten that the only possible meaning for all these efforts can reside in one spot, and one spot only: the human beings ultimately affected by all these changes. The point that must be strongly made in this regard - and it was often reiterated at the Paris meeting of August 2002 – is that, in the end, is that human beings are the beginning and the end for all these new developments. Without human beings, no technological change would be possible; without human beings, the function of these technological changes would be meaningless. Unless the whole analysis of technological change is centered around human beings, their need for education and their research needs, the whole process becomes essentially meaningless or even absurd.

Finally, because they have explored, pioneered and also suffered through some of these changes, librarians have gained a precious experience of, and sensitivity for, the essential dimensions of the institutional changes that will sooner or later be felt in all sectors of higher education. This is perhaps the most important lesson gained from the stimulating debates that went on all too briefly in the OECD headquarter in Paris.

¹⁴

Again, Charles Jonscher provides an interesting entry into this question. See note 6 above.