THE HISTORICAL DEVELOPMENT OF THEORIES AND METHODS FOR ACCESSING SCIENTIFIC PUBLICATIONS

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1. THE EARLY SCENARIO OF THE DIFFUSION OF SCIENTIFIC PUBLICATIONS

From the beginning of the printing revolution in Europe, different kinds of literature started to follow rather different distribution channels. General public literature, mainly the Bible in Protestant countries, but also short manuals on every practical activity were sold using different channels, door-to-door distribution included. Then someone had the idea that something we can now call " virtual library " was going to develop. Erasmus said that, while the library in Alexandria was contained inside a single building, the library that Manutius was creating had no other limits than the world itself.

Scientific dissemination followed different phases; professional scientists, writing in Latin, not easily understandable to the general public both on account of the language and of the content, did not print their work immediately. Then, following on from the classic works, now available in unabridged editions as well as the great " Book of Nature ", scientists had their modern texts printed.

Although there was more freedom from religious constraints inside the Royal Society, and there was even a group interested in promoting " useful knowledge ", a kind of science for all the people, this important scientific editorial organisation was still involved in taking actual scientific works apart from yellow-gutter discoveries, and using every effort to prove the utility of this new printing tool for the scientific community [1].

As a matter of fact, scientific channels where not widely developed. Due to religious censorship, in 1639 Galileo wrote that neither he nor the emperor could find a printed copy of his " Discorsi su due nuove scienze ", published in Vienna.

From the publication in 1665 of the " Journal des Savantes ", considered the first scientific journal, to the end of the eighteenth-century, scientific journals were the main source of reference to find scientific books. They only hosted a few articles in the form of letters between scientists, tantamount to a very ancient form of "discussion list", not journal articles as we know them.

The possible, desirable aim was to be able to transmit knowledge to a rather limited, albeit international, circle of scholars.

Only at the beginning of the nineteenth century did the scientific journal become the main source for scientific and technological information, and scientific and technological journals started to grow, acquiring the importance we now give them, and showing the modern problems of the exponential growth of publications : fast ageing, need for indexing, organisation, information retrieval.

2. DIFFUSION AND ACCESS TO SCIENTIFIC PUBLICATIONS

From the end of the nineteenth century, the questions of knowledge organisation and information redundancy, selection and dissemination, have been considered in various ways and following different approaches.

The mentioned questions are strictly related and may acquire different meanings with reference to particular communica-

tion goals and priorities.

More specifically, a main dichotomy in considering information dissemination has been present with mixed results in the last century and pivots on the two concepts of diffusion and access.

Speaking of diffusion, attention is placed on the linear way of transmitting scientific information. Transmission is one of the meanings of communication. Interest in diffusion-transmission means aiming to reach particular individuals or profiles, in our case scientific users, readers and authors in a particular scientific community.

The concept of access pays more attention to communication in the meaning of sharing, and considers not so much the interest of an actual member of a scientific community to address his/her work to the community members as the possibility of an individual, inside or outside a particular scientific community, to be active part in the process of knowledge creation and development. In the last few years, the concept of access has been consequently used to identify the chances of participating in the information society, considering several different aspects besides telecommunication and technological infrastructures (Internet address, education and training, freedom of information, electronic citizenship).[2]

All the last century's efforts in the direction of information dissemination and organisation may be seen as moving from one of these two different approaches.

The choice between the two is based on historical context, technological possibilities and cultural environments, beyond the sensibility of single theorists in the field of information and documentation.

The transmission-diffusion approach, moving from the principle of effectiveness, matches a need for specialisation, while the sharing-access approach, including the multiplicity of individual cultural paths, matches a trend towards interdisciplinarity.

Speaking about documentation as a modern science, Paul OTLET stressed its interdisciplinary character. His modern view of international co-operation and of a system of communication and sharing of discoveries and scientific acquirements created the basis for the development of documentation science, but was, arguably, too innovative for that cultural and technical context.

FUMAGALLI considered the utopian project of a ” Répertoire bibliographique Universel ”, discussed in the International Conference of Brussels of 1896, as a " bad utopia ", stressing the importance of producing special bibliographies for " serious scholars ", and finally considering the production of better national bibliographies as the best tribute to international co-operation [3].

Although a complex system of reference literacy had been produced to help to reach and acquire scientific publications, co-operation was still seen as the result of efforts inside a limited community of scholars, at a local, national level, without adding much, from a theoretical and strategic point of view, to the methods and practices of the seventeenth century.

In a modern perspective, the conflict between OTLET’s and FUMAGALLI’s point of view could be solved in terms of different ways of projecting data interaction and gateways among systems, but, at the end of the nineteenth century, it revealed different approaches: transmission of specialised knowledge versus access to interdisciplinary knowledge.

The analysis of this century's theories on " documentary chaos " shows that the concepts of diffusion and access are respectively linked with centralised and decentralised information systems.

During the Conference on Scientific Information, organised in London by the Royal Society in 1948, the English physicist BERNAL proposed replacing the mass of scientific journals with a limited number of information centres at national and international level [4]. These centres ought

to collect and index all scientific articles, delivering full texts to users on demand. Ten years later, BERNAL made his proposal even more radical, and suggested that the information centres ought to acquire only the conclusions of research works in place of scientific articles [5].

The scientific journal would no longer be the main channel of information on search results. Depriving the scientific journal of its meaning and role, this proposal would restrict the possibility of full access to the system of scientific knowledge to highly specialised scholars. This proposal was highly centralised as few institutions would undertake the task of selecting and organising scientific information and failed to consider the danger in the reduction of information channels. It gained some followers in the years in which it was expressed and represents a first attempt to cope with the growing number and fast ageing of publications.

Moreover, it may have influenced all this century's activity inside the physical community, moving from the organisation of a central depot system inside the American Physical Society, and then embarking on a different methodology that led to the organisation of a wide network for information and communication.

Other scientific theories in the first half of the twentieth century were less radical, though the proposed methods to select information sources were likewise based on a system of filtering information. We may consider from this point of view BRADFORD's Law of Scattering, according to which, for each disciplinary field, the most meaningful articles can be found within a limited number of periodicals [6].

The identification of " core journals " moved from the need to identify groups of sources according to the principle of pertinence, hence to make information searches more effective. This led to the consideration of core journals as authoritative sources on which to found the selection of " quality " documents within special bibliographies, databases and citation indexes.

The way of coping with the documentary chaos and steering information to potential users turned out to be a limit to the access within a system of filtering: most interesting publications may be acquired by limiting the choice to specialised journals.

In 1973, MICKAILOV, CERNYI and GILIAREVSKY suggested that the only alternative way to cover exhaustively all publications of a disciplinary field was to establish an information service capable of dealing with all scientific-technological journals, and this was considered possible only within a highly centralised structure for the production and processing of scientific-technological literature[7].

Also in the same years, the possible options were to maximise specialisation and/or centralisation.

At the end of the Seventies, big systems of scientific and specialist databases started to be distributed at international level by host computers such as Dialog, Esa and, a few years later, the Italian Corte Suprema di Cassazione.

These systems made an important step forward in the diffusion of scientific documentation. The most relevant scientific literature and data were finally available in real time for a multitude of users located in different countries. But it was not possible for everyone to access these systems.

High costs, complex procedures and retrieval languages limited access to those particularly interested, generally highly specialised users, who often needed the help of information brokers to cope with the practical constraints of consultation procedures.

Beyond these characteristics, a very significant problem of access was considered in the " Rapport sur l'Informatisation de la Société " [8]. In this report, NORA and MINC stressed the great responsibility and power of the organisations that are in charge of selecting, organising and diffusing documentation for a wide community

of users. " L'information est inséparable de son organisation, de son mode de stockage. A long terme, il ne s'agit pas seulement de l'avantage que peut conférer la connaissance de telle ou telle donnée. Le savoir finira par se modeler, comme il l'a toujours fait, sur le stock d'informations. Laisser à d'autres, c'est à dire à des banques américaines, le soin d'organiser cette mémoire collective en se contentant d'y puiser, équivaut à accepter une aliénation culturelle ".

At the end of the Seventies, the way to cope with these problems was identified by making National Countries aware of the necessity to take the initiative in information management and to develop their own specialised databases. The desired objective was a balancing of information acquisition, organisation and dissemination at international level: the wide development of telematic systems that create the premises for new roles in information management and use was not yet foreseeable.

In the same years, the International Federation for Library Associations promoted the project-objective " Universal Availability of Publications ", to consider availability in all its aspects, at every level, including both the concepts of diffusion and access.

The project was considered to go beyond specific initiatives undertaken - interlibrary loan and universal bibliographic control – and was aimed at realising a " total service ".

Considering the latter wider meaning, CORNISH noticed that " UAP is a utopian goal and will never be totally achieved " [9]. Once again, a perspective centred on access is considered a utopia.

3. PERSPECTIVES IN THE DEVELOPMENT OF THE CONCEPT OF ACCESS

The present development of telematic networks has widened expectations towards a " universal service ".

The development of bibliographic systems and of meta/multi opacs and the broad possibility of obtaining text documents and unpublished documents -grey literature and grey information - through the Net suggest new ways to define primary and secondary documents and to consider the traditional documentary functions of reference, location and access to contents.

The risk of cultural hegemony highlighted by NORA and MINC also seems to be diminishing, since it is now easier for any individual or community to contribute to the enhancement of the " mémoire collective " in the form of networked learning.

In this respect, hypertextual links between network resources outline an ' open ' system which does not seek to be exhaustive, but which offers the possibility of grasping further information contexts. The resulting hypertext, inside and outside the resource considered, may refer to heterogeneous information typologies, and takes on a dynamic character as a result of the frequency of network documentation updates, the ' volatility ' of resources and the evolution of the presentation methods thereof.

The Web may thus be considered as a network of citations in which the traditional documentary units and respective citations are replaced by Webpages and relative hyperlinks [10].

Whereas bibliographical indices are retrospective, networked links are dynamic in so far as they cite information units linked in real time.

This theory evidences the trend to widen the subject of the research and considers the heterogeneity of information and communication resources linked on the net more close to a concept of interdisciplinarity than of specialisation.

New functions linked to scientific information have been identified by OECD STI Outlook " how ICTs affect the science system " [11]. This document is particularly interesting because it considers also what

is in the context of scientific publication, besides the traditional circle author-publisher, library-user. Besides, it also considers the way of producing scientific work and the relationships between scientific output and the whole society.

Among the new ways to perform scientific work, a particular role has been acknowledged to " collaboratories " centres "without walls" in which users can " perform their research without regard to geographical location, interacting with colleagues, accessing instrumentation, sharing data and computational resources, [and] accessing information in digital libraries " [12]. Three typologies of " collaboratories " have been identified by the authors: peer to peer, mentor-student and interdisciplinary, in which complementary research is carried out.

The concept of access is now addressed to a dynamic context of heterogeneous sources, in accordance with the general concept of " information society ", much more assuring than " l'informatisation de la société ".

The Information Society Forum, the principal advisory body to the European Union on the development of the information society, has defined the Universal service as the whole general needs and demands for information and communication in society for private and public interest [13].

The latest (forthcoming) annual report of the ISF is centred on the concept of inclusion: " We advise the European Commission to consider whether the best immediate hope for a liveable information society lies in resisting and defeating pressure to exclude the concerns of the European Way form the framework of global governence; and whether this is the best chance we have of leaving the information society to grow up into a society fit for all the people of the world, and their grandchildren " [14].

The new utopia, " a European way for the Information Society " now joins, without replacing them, previous utopias in documentation studies.

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