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Computerisation of the supply of medical literature and information

In a recent article in the Dutch Medical Journal (Nederlands Tijdschrift voor Geneeskunde[1]) I discussed the problems and opportunities that go side by side with using computers in searching and retrieving medical literature and the provision of information.
In this article I refered to the roots of bibliographic control that occurred in medicine: the bibiographies made in the 16th - 18th centuries by Boerhaave, Von Haller and Ploucquet. The resulting works were made for personal use, as well as for knowledge transfer: guides to the literature, guides to medical knowledge, for teaching purposes and to keep up with the scientific developments.
These bibliographies emerged from the urge to keep control over the overwhelming (this was already a problem in the 1600s!) number of scientific publications that appeared with the introduction of the printing press (cast).
The founder of the National Library of Medicine, the Index Medicus and Medline, John Shaw Billings, had the same reasons to start the publication of the catalog of the Surgeon's General Office: it was of great (military) importance that there would be access to the vast amount of medical knowledge available. The political and military enterprise needed the best information available.

The number of publications worldwide was too high for any individual to keep up with. Larger institutions like libraries and scientific associations (the forementioned Surgeon's General Office, the American Chemical Society) but also academies and societies took there responsibility to publish journals in there disciplines, quite often including a current bibliography of relevant publications (Zentralblätter, but also in the national medical journals like the Nederlands Tijdschrift voor Geneeskunde).
For this audiance, the EAHIL workshop in Budapest, the name of Otlet must be known for the global enterprise of Universal Bibliographic Control. We,

1. Bakker S. Automatisering van de medische literatuur- en informatievoorziening. Ned Tijdschr Geneeskd 1997;141(1):33-38

librarians, have learned from these ambitious enterprises set up at the beginning of this century, aiming at collecting and making accessible all that was published and that was of scientific interest. Notwithstanding their success, even in those days it was impossible to keep up with the publication rates. But more than that: it was necessary to agree on standards of bibliographic records and content descriptors (keywords, thesauri, classification codes). Many rather succesful and yet no longer used classification schemes were introduced: DDC, UDC, Dewey, Bliss, Ranganathan, to name a few.
In medical publishing and bibliography there was a strong German enterprise, and many physicians and researchers (we have to remember that the kind of research we know today emerged only some 100-150 years ago, but came to flourish with the chemical industry at the end of the 19th century and with the founding of hospitals and upcoming of laboratory and hospital medicine). For economical and political reasons the availability of the German publications was hindred, which created the need in at least the Netherlands to start the Medische Referaten in 1947, shortly after continued as Excerpta Medica.

Important economic and logistic reasons made it necessary to 'wait' for the invention of computers to continue the production of the Current Catalogue (of the National Library of Medicine) and of the Quarterly Index Medicus.
It is in this same period that Eugene Garfield invented the computerisation of the literature databases, later to be known as the Science Citation Index, which makes use of references to cited literature to retrieve related and relevant articles.
Although invented in order to improve and speed up the process of preparing the printed catalogues and bibliographies, the computerized database turned out to be useful for searching and retrieving (first in batch processing, later by interactive online information retrieval). In combination with telephone, terminals and modem connections the distance between host computer and terminal could be overcome.
The success of computerized and subject related access to journal articles is made possible by the integration of bibliographic techniques, subject and domain specific knowledge and computer technology.

We all know that the international bibliographic databases, like Medline and EMBASE, provide insufficient coverage of the 'peripheral' medical literature. By peripherality I mean, being either non-english or not being in the hard core of scientific communication. In many countries, also in Hungary, a national

medical bibliography is and was published, facilitating the local communication and exchange of medical knowledge and experience.

Even the English language general medical journals (Brit Med J, Austral NZ Med J, SAMJ/SAMT) but more specific the non-english journals (Munch Med Wschr, Dtsch Med Wschr, Presse Med, Ned Tijdschr Geneeskd) do cite substantially from the highly valued and therefor high impact journals like the N Engl J Med, Lancet...)(personal observation SB).

The medical profession is facing again the problem of how to keep up with the overwhelming number of publications and the overload of available information in many forms by many media.

It is known that the practicing physician makes use of different kinds of information sources and data: patient related information (history, records, reports, lab-analyses, X-rays), prescriptions, guidelines, standards, protocols, meta-analyses, reviews, case reports and original research papers. Not even mentioning the data related with meetings, appointments, schedules, referral and dismissal letters etc. Physicians do report to value highly the reading of medical journal articles.[2 3 4] As so many of the information systems and data used by physicians are stored in computers, it is self-evident that there is an urge for using computerized literature systems.
In the Academic Medical Centre of the University of Amsterdam we have for many years already the service of the Clinical Librarian: during rounds the librarian visits the clinical department and discusses on which subjects, which questions and problems are to be solved and answered by searching the literature. The same afternoon photocopies of the 4 or 5 most relevant articles found by searching the bibliographic databases like Medline and EMBASE,

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2. Stinson ER, Mueller DA. Survey of health information professionals' information habits and needs. Conducted through personal interviews. JAMA 1980;243:140-143.

3. Covell DG, Uman GC, Manning PR. Information needs in office practice: are they being met? Ann Intern Med 1985;32:34-49.

4. Williamson JW, German PS, Weiss R, Skinner EA, Bowes 3rd F. Health science information management and continuing education of physicians. A survey of U.S. primary care practitioners and their opinion leaders. Ann Intern Med. 1989;110:151-160.

are brought to the physicians desk and he/she can take into account the literature information when making decisions about the clinical interventions. Only the direct, in real-time searchable and instantaneously available information is used in this clinical service: with more computerized information sources available, a different approach will be made: first making use of protocols and guidelines, than the Cochrane database (clinical trials and meta-analyses and reviews), the Best-Evidence sources (Best Evidence of the Journal of EB Med and the ACP Journal Club), and finally the bibliographies like medline and EMBASE.
The use of information from the literature can only be succesful in clinical settings when the answers ARE found and the information DOES fulfil a need. Barriers of time, distance, costs, and effort must be as low as possible, otherwise these source swill not be used, because of mounting problems instead of solving them.

With Internet available, many people think that this will be THE solution to the information problem. Everything is there, anyone can go out and find it. The Inernet Web Browsers (like Netscape and the Explorer), make easy use of the linking of documents; the linking of scientific publications by citing and cited references is very well suited to be implemented on the Web.
The many parties playing a role in the scientific information chain, journal publishers, database producers, information providers, CD-ROM publishers, subscription agents, library consortia and computer companies, they all try to reach and serve the end-user better by combining technologies and linking information sources, especially including the full-text of journal articles. It is my believe that the many sources on Internet, the lack of organization and standardization, the high-quality and ever-changing equipment needed, the many formats, all invented to make things easy, do very much complicate life. I am still not convinced that busy clinicians and health care practitioners will find the time and energy, to train themselves to become experienced Internet surfers and to retrieve trustworthy, reliable, relevant, precise and pertinent information from the net. Especially in clinical practice there will be a need to make use of the intermediaries, like clinical librarians.

But even if physicians do their searching themselves, if they do make use of the virtual library and join the virtual community, how and with whom will they communicate? What kind of community will there be?

The contextual and ethical dimensions of a society, the social aspects of scientific communication are neglected in todays premises of electronic communication and Internet sources.[5]

If we all keep on chasing the virtual goodies, without signposts or a mental map we will get lost in cyberspace. Scientific discours depends on common reference frames and making use of a common language. Common information sources and a common information infrastructure will turn out to be essential elements in structuring knowledge and the growth and development of science.

I dare to say that the real problem in data gathering, information management and knowledge acquisition of the near future is not so much the problem of copyright, access, ownership nor format, but the cognitive barriers. The social, cultural and esthetic context will be crucial to the potential effect of information. The scientific community, organizations, associations, publishers, editors, AND librarians must cooperate and find a solution to the organizational problems of the electronic sources. The organization of readership and structured communication is the only way towards consensus and the advancement in (medical) knowledge.

5. Lyman P. Digital documents and the future of the academic community. Paper presented during "Scholarly Communication and Technology", conference organized by the Andrew W. Mellon Foundation at Emory University, April 24-25, 1997. <http://arl.cni.org/scomm/scat/lyman.html>