Printed versus electronic? No, printed coupled with electronic

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Successful development of research and higher education, of all national economy, as an indispensable precondition implicates the presence of qualitative, i.e., complete, correct and timely, information. As the result of intellectual activity, information may be considered as a commodity, it can be characterized by its quality. The library as an information supplier must ensure quality in considerable degree. Exactly providing qualitative scientific and technical information is the main task of all academic and research libraries. But the practical possibility of libraries realizing this task to a corresponding level in the traditional mode of action is at a critical point at present. There are several reasons of such a situation.

The amount of information has been increasing for a long time in line with the general development of science and technology. The natural course of things at present is subject to the influence of state research policy in many countries. The number of publications of any researcher is one of the basic indices of the quality of his research. There is particular attention paid to your publications when applying for a grant for your project proposal from governmental institutions or from different foundations. One of the main issues in the Curriculum Vitae of any professor or doctor is his publications.

As a result, the number of printed documents, such as books, periodicals, conference papers, patents, reports etc., increases exponentially during several centuries, this process has been especially swift in the last ten years. It is impossible at present to acquire all the documents you need, libraries are too short of money and of stock.
Correct subscription to periodicals is a practically unsolvable problem today. Nobody can foretell the appearance of new titles and change of subjects and emphasis in existing ones. Librarians cannot guarantee availability of the most valuable current editions, even if they are working in close cooperation with the academic community.

In addition efficiency in the use of acquired documents is low. It is an extremely hard to find relevant data in this "information haystack", as a result of which in each research library up to 40% of documents form "dead stock" which is never used. And, what is more, really only a small part of the information from each document is used, only some articles from journal and some sections from a volume are necessary. Even in such a small country as Latvia we need a very wide range of information, researches are taking place in many fields and subfields, but only several people work in each field.

At the same time new information technologies, based on electronic data processing, storage and retrieval systems, are developing rapidly. They ensure formerly unachievable possibilities of looking through large amounts of information in a short time, in selecting the necessary one according different criteria, and providing teleaccess and multiuser access to information sources.

The introduction of electronic technologies is not the first essential change in processing and storage of information during their long-term development, there were several others. Pictures on cave walls, records on stones and slabs were unique information materials, only one copy of them was made on improvised materials. The application of parchment changed the appearance of documents considerably, but they remained manuscript, i.e., single-copy documents.

The invention of paper and introduction of printing technology after that, much more radically changed the process, multi-copy editions became possible. Since printing of the first books in 15th century, technologies of polygraphy and masters preparation have improved uninterruptedly. But all innovations, including computerized text
processing, photocomposing equipment, offset and electroreprographic printing have not changed the basic principles of documenting.

But today we are taking part in the most drastic reorganization. New electronic information technologies, electronic documents, full text and bibliographic databases differ in principle from all previous information sources. You cannot read electronic documents in the traditional way, they are machine-readable only. Part of them you should not have in your stock, you cannot touch them physically and put on your shelves. You may not have documents in your stock, teleaccess provides for their use at a distance. You may not have your own copy, multiaccess allows simultaneous use of electronic documents by many users.

We need some transition period to understand these radical differences of electronic information technologies and their role in information availability, to get accustomed to their new properties, to become familiar with them. It is necessary for librarians, as well as for information users much more. It is clear at present to everybody that all mentioned long-term development and quantitative changes have led us to the necessity for some qualitative changes for up-to-date information storage, that qualitative information supply at present can be realized only by integrating the use of traditional printed documents and electronic information technologies.

But the role and tasks of each technology in a common information storing and retrieving process is not specified exactly yet. Therefore different, sometimes polar opinions are developing at present, starting from Only electronic documents are necessary, the age of printed documents is finished to Only the book is valuable, electronic documents are fiction.

To speed up the transition process, to try to find the optimum distribution of functions between both technologies first of all let us look at the transition process in detail.
During any transition from one settled state to another in any system - technical, social etc., including information ones, several conditions are possible. It depends upon so-called time constant of the system, i.e. from its inertness and from external influence to the system.

If the influence on stable equilibrium is gradual and not great, and a long transition time is assumed with respect to the time constant, asymptotic process is taking place and systems pass from initial settled state to a final one smoothly.

If you want to shorten the transition time you are increasing the external influence to system. Transition time diminishes, the process remains fluent as before but only until some critical limit, critical condition is reached. This critical transition time is the shortest for this present system, it depends only on the parameters of the system, i.e. its time constant, and is equal for any influence. You cannot make it shorter with further increasing of influence.

If the influence is larger than critical, oscillating process is taking place during the transition time. Parameters of oscillations depend from characteristics of the system and size of influence, but the transition time remains the same critical one. Instantaneous values of system’s parameters during transition time can fare exceed the values of settled states. The result is overload of technical constructions or tension in social and public processes.

Critical condition is the best one for change of state, but it does not always work. It is natural to yearn for earlier achievement of the final stage by increasing the influence, but in fact it leads to the beginning of extraprocesses only. Frequently the size of influence does not depend upon you; in this case your single possibility is to diminish the time constant of the system.

Exactly such a situation in information is happening at present. Only printed documents existed at the initial stage. It is now in transition to the future stage when electronic documents will take their place. Electronic technologies are developing very rapidly
and their influence on the general process is strong, much stronger than the inertness of the process allows for critical transient condition. The oscillating process is taking place as a result, and the first phase is maximally radical, only electronic documents are necessary, the age of printed documents is finished.

Disappointment comes after a while because printed books and journals have some advantages and attractiveness. In the traditional and conservative method of approach, electronic technologies are of little importance; this prevails during the second phase. Such opposition meets with variable success and gradually decreases, taking place all the transition time, until the final stage, with some distribution of functions, is reached.

As a result the thesis "Printed versus electronic" is present during all the transition period, it follows from objective regularities, and it is quite normal at present.

The transit period is started in different libraries at different times, local conditions in libraries are different also, therefore the phases do not coincide. Extraprocesses are more or less pronounced, but there are general regularities. This process is actual in libraries all over the world at present. It has started in Latvia and other Eastern and Central European countries later than in Western countries, but it seems that all problems are not solved to date, and putting these problems on the agenda of IATUL Conference is the witness to such a situation.

What is to be done to shorten the transition period, to smooth over contradictions, to hasten the stable stage when functions between printed and electronic technologies will be in optimum correlation and another thesis "Printed coupled with electronics" will be widely used?

First of all it is necessary to determine the optimum final stable stage, i.e., the correct balance between printed and electronic technologies. To do this we have to understand how to exploit the advantages of both technologies during information assimilation and how to associate them for joint performance of tasks.
The process of information assimilation includes two different principle components - information search and its learning. First of all, it is necessary completely to separate both components and after that to choose the optimum technology for each.

For a long time both components formed a single whole - examination of documents, selection of necessary materials and their learning. This method became ineffective when the amount of information increased considerably. First, bibliographic indexes were issued in the last century to help specialists to search for information, it was the first step to separate this process. For some time the indexes fulfilled their functions quite well, but today even indexes are too large for effective use. Computer searches ensure qualitative changes and new possibilities in this process. Bibliographic and reference data bases, search and retrieval systems, make it possible to manage effectively the process of information search. Mentioned above are the advantages of electronic technologies - effective and quick sorting of large amounts of information according to different parameters, multi-user and teleaccess are both very useful first of all for information search.

In many cases these databases contain other valuable information in addition to standard bibliographic description of documents. Keywords and thematic indexes, information about authors and institutions, citations all help in the information search.

The best databases are supplemented with qualitative, detailed abstracts, frequently written by authors of the corresponding documents. Abstracts provide a good chance to decide whether you need this document or not. In many cases it is possible to understand the content of a document by abstract only, without reading the full text. Therefore, use of such databases gives a possibility of diminishing the number of necessary full text information materials also.
Only a search by bibliographic databases covers all editions and ensures a complete notion about problem you are interested in. Practically, it is the single possible way to look through publications in different multiitem Transactions, Proceedings etc. For these reasons it is impossible to imagine an up-to-date research library without a developed CD-ROM and on-line service; the traditional functions of a scientific library are widened at present having available these services for bibliographic and reference information search.

Therefore, CD-ROM and on-line bibliographic databases with abstracts, e.g., Science Citation Index with Abstracts, Medline, ABI Inform, Compendex Plus etc. are the main sources for information searching at present. Without computer searches many items will not be retrieved, many documents will replenish "dead stocks".

In such a manner specialists locate full text documents - articles, papers, patents, reports etc., which are of interest to them. Usually a researcher simultaneously uses several pages, several articles and several journals or books: he needs information from more than one screen. His computer is occupied often by calculations and data, especially during work in the laboratory and the researcher compares this data with information he has read. Traditional paper technology is remaining the main source for full text information at present.

At the same time ways of delivering documents to end-users may be different, especially for periodicals, patents and other most dynamic and operative documents. Electronic documents and their hard copies are used widely in addition to traditional printed ones. Different delivery systems for separate documents by mail or fax, via the information network develop rapidly. Their basic principle is that it is possible to order exactly those documents you have retrieved from a search (articles, papers, patents etc.) and provide an access to information which is not on the library shelves.

Document delivery systems are a substantial addition to the traditional subscription to periodicals, etc. In such a manner you can provide really necessary articles instead of paying a subscription to potentially suitable periodicals, instead of the greater or lesser
probability of receiving information you need together with useless items. It means, that it is possible to reduce the number of periodicals in stock, to subscribe to full sets of most widely and frequently used journals only and to provide necessary articles from a much larger number of journals than you can subscribe to for the same money.

We are sure that document delivery has good perspectives in future, especially for smaller countries. An integrated service - computer search of information and document delivery systems, should be one of the main activities in every research library.

The activities of world leading document delivery centers - The British Library Document Supply Centre, Universitätssbibliothek Hannover und Technische Informations-bibliothek and several specialized centers as well, such as the successful creation and introduction of on-line network systems corroborate this confidence. The JASON system of libraries, situated in Nordrhein-Westfalen, is a great example of this thesis. The problem "Subscription versus document delivery", which often arises, is a component of the same complex problem Traditional information technologies versus new ones is a quite natural phenomenon during the transition period.

To reduce inertness of the whole information system it is necessary, in principle, to decrease the transition time. The presence of library automation systems, telecommunication and networking systems are indispensable but not sufficient for successful implementation of new technologies. Let us remember that each information system includes system operators and end-users also, i.e., librarians and patrons.

It is necessary to improve the skill of research library staff. Highly skilled staff working in research libraries, do not have to be conservative, they have to be able to follow the thread of current progress in informatics, after all they have to be able to make this process. To achieve it, training sessions must be organized for librarians regularly. Librarians must have regular contacts with colleagues, they have to take part in different professional and international information organizations' meetings, for
example, very useful for us is membership in IATUL, our cordial thanks to all its members.

Inertness of the whole information system depends on the participation of end-users also, no one service can be used if patrons are not interested in it. Council of the Library, which represents the corresponding scientific and academic community, must take an active part in strategic planning of information support; the library must act in accordance with the general policy in the country. There is some gap today in the field of knowledge and familiarity with advanced information systems between librarians and patrons; the latter have to learn and have to get accustomed with them more intensively.

Librarians, specialists in information support and end-users as well, must be informed about existing and new information products. Presentations of information vendors and their products give a first-hand acquaintance with them.

The wide spread of electronic technologies raise some more problems of a strategic nature. An integrated printed - electronic strategy means change and expansion of priorities in acquisition policy. The correct ratio between expenditure for books, subscriptions for periodicals and CD-ROMs, on-line service and document delivery systems, according to a pre-determined optimum balance, is very important for efficient spending of your budget. But we have to understand also, that today's optimum is not eternal. The qualitative change - the introduction of new information technologies in essence is done, but quantitative changes will take place in future as well as, electronic technologies are dynamic ones and develop very swiftly.

The optimum balance is different for different libraries, we must take into account the needs and habits of different researchers. It is well known that specialists in life sciences and humanities have different needs and a different approach to information. For example, researchers and specialists involved in natural sciences and high
technologies are very interested in CD-ROM and on-line services, while specialists in humanities and social sciences are quite indifferent to them.

Payment for up-to-date services is the topic for discussions also. Printed documents are acquired from the library budget, it is one of the main expenditures of a library. These documents are intended for common use in principle for many patrons, and their use is free of charge for any patron.

The nature of the new technologies is different. CD-ROMs are common use information sources, while part of them (on-line service, document delivery systems) are fully oriented to one specific end-user. And the question arises, who have to pay for these services, the end-user or the library?

On the face of it - it is a specific service for a particular end-user and he must pay for it as for any commodity. But if we look more deeply - it is the same acquisition of information materials in principle. It is not the principal difference between subscriptions for journals and the purchase of individual articles, between the use of bibliographic indexes, or CD-ROMs, and on-line search. The library must act as an intermediary in the process of information transmission in any case; the library exists to offer information to users, it is its main duty of course. From this point of view it should pay for these services from the library budget.

We are sure that such services must be given to patrons for a small extra charge, the prices for these services formulated with considerable discounts for patrons. The main part, 80-90% and more of the price, must be paid from the library budget. Particular payments from users are not a source of extra income or defrayment of expenses, but a disciplinary measure only, because all services must be used whenever it is really necessary.
And at last we have to answer a puzzling question: what is the role of a research library in this situation, is the essence of the library the same? Or maybe it is not a library anymore, as somebody says.

Let us proceed from the axiom that the main, definable task of a research library is to provide scientific and technical information for all its patrons. For this purpose all stages of information handling must take place in it - collection, processing, storage and, especially, effective search and supplying patrons with information in a form they need. The library has to act as an intermediary in the process of information transmission.

The physical information medium - paper, film or machinreadable magnetic or optical mediums do not change the basic principles. There is no essential difference in that the information may come from library stock or the library especially acquires it according to a patron's request and in that way virtually expands its stock. Both possibilities took place in the traditional library also, the second one was represented by interlibrary loan. This part is considerably expanded at present thanks to on-line services and document delivery systems.

But the main task and the essence of a research library are the same. The introduction of electronic technologies has not changed them. It is not a blasphemy with respect to the sacred basis of a library's role and does not convert the library into something else. Integrated information supply is a considerable step to improving the service to all patrons, to reach the basic objective of a research library, to create a really user-based library.

The integrated printed - electronic policy was proposed by the Latvian Academic Library for scientific and technical information ensuring in Latvia. It was approved by the Latvian Academy of Sciences in 1994. We are planning to move from "printed versus electronic" or "traditional technologies versus new" to "printed coupled with electronic" or "traditional technologies amalgamated with new" as soon as possible.