INEORMATION RETRIEVAL OF SCIENTISTS AND ENGINNEERS

BY

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This paper deals with the information problem and the current information retrieval activities of scientists and engineers in the United States.

Information retrieval is a very popular term today. It is also known as information storage and retrieval, information science, or documentation. In fact, the activities of information retrieval is nothing new. It has been, and still remains to be the foundation of librarianship. The major function of librarianship and information retrieval is to locate information and make it available to those to those who need it. But information retriveal gives more emphasis on the needs of scientific and technical specialists and non-book information sources.

The increasing number of scientific papers and technical reports published since 1930 has made scientists and engineers realize the prooblem of information explosion. For example, a paper in chemistry is published somewhere in the world every minute, a report in physics every three minutes, a report in medicine, biology and electronics every five minutes.[1] At the same time, the growing demand for more specific bits of information cannot be met by traditional library techniques.

When a scientist or an engineer seeks information, he does so for one of the following basic reasons: 1. retrospective search or literature search (an exhaustive search through the past literature). 2. demand search or problem solving (a search conducted in response to a specific demand). 3. current awareness (to keep up with the current developments in a particular field).

Most scientists and engineers are engaged in project work. Many project teams spent a lot of time in literature search at the beginning but slowed down as the project started. The time spent in literature search has nothing to do with the performance of project teams. But

those teams with a better performance usually gather information more balancedly throughout the project instead of concentrating so much at the beginning. Standard reference sources such as indexes and bibliographies are useful for literature search.

Searching for a potential solution to a particular problem involves more demanding search processes. In this respect, standard reference works are important. Most scientists and engineers usually start with the closest sources available—colleagues, desk files, department files, etc. After these sources are exhausted, they may extend their search to the library. Textbooks, handbooks, and catalogs are generally agreed as the preferred sources in problem solving.

Since every new advance in science and technology can promote other accomplishments; and these accomplishments may lead to more new inventions. That is why major function of the technical staff in a company is to be aware of scientific and technical developments related to the company. In the past, this was not a problem. All they had to do is to scan a few major journals in their field of specialization. Today, the increasing number of journals published in all languages, the interdisciplinary nature in many fields of study, the explosion of scientific papers and technical reports, and the wide dissemination of preprints, drafts, and limited-distribution papers has made current awareness difficult.

As a matter of fact, the information problem of scientists and engineers is accessibility. The main point is how to make adequate sources available to them. The location of the library is important. A remote company library will not be used. It is suggested that a small library collection more accessible would be more useful than a large collection with problems of accessibility. According to a study of information habits of 94 chemists in an industrial laboratory, the more creative chemists with better performance in their jobs spent more time reading technical literature.[2] They visited the company library more frequently and examined a larger number of journals and monographs. Many other studies revealed that scientists and engineers in industry spent 10% to 20% of the time reading technical literature, but they spent much of their time talking about technical topics.[3] In industry, the emphasis is on products, not theory, so the information flow i:

mainly by oral channels (meetings and informal conversation) instead of written channels (writing articles, reports and reading literature).

What is the best answer to settle the problem of accessibility? At the moment, there is no answer. However, there are some suggestions for improving the current situation.

Today, there are various kinds of information services such as the tapes and files of Chemical Abstracts which are very specialized in scope and content. Selecting and using such services is often troublesome and expensive. A suggestion to improve the situation is to assign a few scientists and engineers in a company for a period of time to seek information, analyze literature and act as laison for their colleagues. They are called "technical intelligence analyst". The work of the technical information analyst would be to read and survey the literature of various specialized services which might be useful to his company. He would attend conferences and make occasional trips to see outside technology. In other words, he would be an advisor to his colleagues. He should see that others receive useful contacts which might be useful to them. However, there is one drawback. Some scientists and engineers are against the setting up of technical intelligence analysts formally and permanently. It is true that thay may learn a lot from this job but very few of them would like to stay in this job too long. It is generally agreed that librarians without any background in science and technology cannot meet the demand of this position. That is why there is a lack of science librarians and technical information specialists in the United States. Many library schools are trying to attract promising graduate student with this kind of background to satisfy the need.

Another problem lies in journal publishing. Existing journals often receive more manuscripts than can be published. New journals are announced every day and they are getting more and more specialized. There is a trend to use specialized terminology and notation in journal articles. If this trend continues, it would be more and more difficult to read outside one's highly specialized field. The cost for editing and typesetting one standard-size page of a technical journal is about US$100. Thus, if an issue contains 100 pages, the cost before printing is about US$10,000.[4] Their major source of income is from libraries and other

institutions. In recent years, there is a significant drop from individual subscribers. Many of them found that the number of articles published in their field is very few. Some claimed that they cannot read the articles outside their field the way they are written. Some said that if they want a copy of any article, they can easily get a xerox copy. In order to solve this problem, the idea of selective dissemination of information is recommended. Each subscriber would file a personal profile to a central agency which the interests are described by means of words and phrases. And he would be notifild of articees published within that profile. Xerox copies or microfiche cards can be ordered and journals would disappear. All manuscripts would be sent to a central agency to be made available to those interested. But the subscriber would never be exposed to subject areas other than those indicated in his profile. That is one drawback of this system.

Footnotes

1. Sarnoff, David. Education and the challenge of the future, address made at the Fall Convocation, Hendrix College, Oct. 12, 1965. Conway, Ark., Hendrix College, 1965, p. 11.
2. Hall. R. W. "Technical information habits of engineers", *Chemical Engineering Process*, v. 69, no. 3 (March 1973), p. 68.
3. *Ibid.*, p. 67.
4. Reid, R. C. "The archive journal", *Chemical Engineering Process*, v. 69, no. 8 (August 1973), p. 108.