

# The Role of the Medical Librarian in SDI Systems\*

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## ABSTRACT

Many ongoing selective dissemination systems designers assume that the librarian can be omitted from active participation in execution of the master plan. ISI's four years of experience with *ASCA*® service have shown that librarians must be an integral part of the system and engage in an active dialogue between users and the machine. Specific examples of how librarians can best serve the information needs of scientists using SDI systems are examined. It is the basic contention of this paper that the librarian should serve as an intermediary between users and the numerous new information media. In this manner the librarian can filter and translate the requirements of individual scientists to conform with the inherent limitations of all machine systems while exploiting their capabilities to the fullest.

**D**OES the medical librarian have an active part to play in the operation of selective dissemination systems? Obviously, for readers of this journal, the answer is yes. For life scientists or physicians, however, this seeming truism would need considerable documentation. However, nearly four years' experience with ISI's *Automatic Subject Citation Alert (ASCA)* has clearly established that a librarian or information scientist is an integral part of an SDI system.

Let me continue with another truism. The biomedical library is changing from an archive into a center for the dissemination and retrieval of information. Therefore, *ipso facto*, the function of the medical librarian must also change, or he will disappear into history.

Over 100 million years ago, the dinosaurs ruled supreme, but, in terms of geologic time, the dinosaurs suddenly disappeared because they lacked adaptability. Let us hope that the medical librarian, like mankind, is more adapt-

able than the dinosaur. Surely librarians, like all others in our rapidly changing world, must not only adapt to a vastly changed society but also to the computer, which merely symbolizes the changes to come.

The professional medical librarian can make this change from manual to machine systems quite readily because he is supposed to be equipped to serve as an intermediary between the biomedical research scientist and the library. This is not true of the data processors.

Librarians have been answering reference questions for a long time. Reference work involves a basic mental process, not yet susceptible to computer algorithms, which requires the unique translation capability of the human mind. Every SDI system involves a series of reference questions, but the systems by which these questions are now processed sometimes make possible quicker answers or answers in greater depth. This was possible before the advent of the computer, but the use of computers has created economic conditions which permit the user and the librarian to think in terms of such speed and complexity.

The librarian, in his new role, will still be a middleman between the user and the bibliographic machine. Indeed, the librarian will bridge the gap between the old world machine and the new world machine, especially for the old world user who, incidentally, still usually controls the budgets.

We should remember that, in most cases, the research scientist or clinician is not psychologically oriented to perform the reference librarian's traditional function as the translator. Therefore, particularly among the old world scientists, if the librarian is missing, the results obtained from an SDI system, as we have often seen in MEDLARS and *ASCA*, can be disappointing. The effectiveness of modern SDI systems is dependent upon a type of self-discipline for which the clinical scientist is not usually

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prepared. The reference librarian is by training more systematic.

In contrast to clinicians or engineers, the laboratory man is a seeker of systematic knowledge but *seemingly* operates in a randomized manner. His thoughts are fleeting. He is apt to be working on several experiments simultaneously or changing them from week to week. Unlike the clinician, the more systematic research worker takes an active interest in bibliographic problems. He is more apt to insist on a dialogue with the librarian who is providing the SDI service or do it himself. The physician, by temperament, will disdain such dialogue but probably needs it most. The laboratory man not only exploits serendipity, but also proclaims it. The clinician does not like to think of discovery in terms of mere chance.

During the past three years, researchers in almost every discipline, but especially biomedicine, have been utilizing the *ASCA* system (1, 2, 3). Several thousand scientists have used the *ASCA* system which is now called *ASCA IV*. The *ASCA* magnetic tapes are derived from the *Science Citation Index*® (4, 5), and now cover over 300,000 current articles per year and involve about 10 million indexing terms. The high rate of subscription renewal for *ASCA* and *SCI* convinces us that we are on the right track, but one must always study the user's changing needs in order to anticipate future trends.

In all SDI systems, it is necessary for the user to construct a "profile." The scientist must tell the system what he is interested in. The computer, in turn, will "answer" with a list of current articles that may be of interest. The computer obtains these answers by comparing the user's profile terms or attributes with those of the individual source documents. This is the underlying premise of all SDI systems.

But there is often an enormous semantic obstacle to overcome in translating the "simple" question of the user into terms that the indexing system can "understand." It is not merely the problem that the user and the machine speak two different languages. Often it is difficult for the user to tell anyone exactly what he wants. The scientist is not always prepared to dig for the right *questions*. There has to be an intermediary. The librarian is the most logical choice.

In the *ASCA IV* system, at the present time, there are thirteen types of questions. These are

(1) Cited Reference questions, (2) Cited Author questions, (3) Source Author questions, (4) Organization questions, (5) Source Journal questions, (6) Cited Journal questions, (7) Word questions, (8) Word Phrase questions, (9) Initial Stem questions, (10) Floating Stem questions, (11) Terminal Stem questions, (12) Negative questions, and (13) Combination questions. Every type of question can be used in any positive or negative combination. In the *ASCA IV* system, there is also an essentially unlimited variety of so-called Boolean questions possible. In actual practice, such complex questions are rarely needed in *ASCA*, but they are needed in other SDI systems because of the basic system design of those systems.

As in any SDI system, if you construct the right *ASCA* question, you get the right answers, *if answers are available*. If you ask the wrong questions, you may get a lot of "noise." However, what is one man's noise is another man's music.

In most cases, a scientist will not take the time to study intimately the details of a given SDI system. For this reason, he often cannot tell the "right" questions from the "wrong" questions. Although he may be a specialist in his field, he is not completely equipped to translate the starting question into profile terms that will attain optimal results. The librarian generally serves many individual users and, therefore, can devote the time needed to understand the system better than any individual user. The average user of an SDI system does not even like to fill out a profile form. He expects the machine, somehow, to extract and compile profile information for him. Knowing the system in all its ramifications, the librarian can translate the requirements of individual scientists into the language of the system.

The key to proper question formulation is to find one or more existing publications which the user would agree to be relevant. Thus the librarian can first provide a preliminary retrospective survey of the literature. This information will help in formulating the profile. In many cases, if this preliminary search is not done, the results will be mediocre, if not disastrous, as the quality of retrieval is dependent upon the profile.

Any standard reference tool, including the *Science Citation Index* or *Index Medicus*, can be used to assemble a list of key cited reference

questions. These questions are vital in the ASCA system and provide an approach that is not available in other SDI systems such as MEDLARS. As part of the process, it is quite useful to employ the client's personal bibliography or those subsequent papers in which his work is cited. This is often the simplest place to begin, provided he has been and still is engaged in the same general area of research. It is also simple to note key papers which are frequently cited by inspecting the footnotes and bibliographies.

To augment his cited reference or cited author questions, a *word profile* can be constructed by utilizing the *Permuterm*<sup>®</sup> *Subject Index (PSI)* as a guide. *MeSH* can, of course, be used to suggest useful search terms, but insofar as ASCA is concerned, *Permuterm* provides the key information on frequency of occurrence or co-occurrence of terms. In addition, the frequency of terms in the user's own papers or others in his collection can be most helpful.

Recently I checked *PSI* for the term *fracture* and was surprised to find that there is a relatively small number of papers on bone fracture, even though there is a large number of entries in *PSI* for fracture or bone separately. Consequently, a combination question was selected.

In building the initial profile, the librarian can also note the key authors and set up so-called *cited author* questions. One should keep in mind the important distinction between *cited* authors and *source* authors and, in the same vein, the generic source approach which is possible by *organization*.

Many scientists, when building a profile, are not cognizant of the cost factors in constructing their questions. The librarian can help design a profile which produces the maximum relevant information for the lowest cost. Recently, I had the pleasure and honor of doing this for Dr. Adrian Kantrowitz, the famous heart surgeon, by showing him how he could reduce the cost of his ASCA service by eliminating much superfluous detail in his profile. Sometimes considerable economy can be achieved by a *source journal* question, and we even have journal editors who use *cited journal* questions.

The scientist tends to formulate a very detailed and specific profile which is not only more costly but often reduces his weekly output to

nil. While he cannot tolerate much noise in a retrospective search, he is apt to welcome a few peripheral items in a weekly report that only require two minutes to read. This becomes a form of browsing.

The librarian can not only help prepare but also monitor the profiles to find out if they need to be modified. If the profiles are not producing good results, the user will quickly become disenchanted, but if the librarian follows up, he can find out why the user is not getting enough or correct information and change the profile as needed. If he is getting too much, more specific terms will be needed or a *combination* question employed.

In the ASCA IV system, changes can be made at any time at no extra cost, provided the same number of search units is involved. However, user dissatisfaction can sometimes be traced to document accessibility. Many ASCA users now receive the articles identified by an automatic service called *ASCAmatic*. This is as yet a luxury for most users, but this is, in fact, what was recently described by Pierce of Bell Laboratories in *Science* magazine as the "personalized journal" (6, 7).

In the early days of our ASCA system, we received many orders from scientists who never filled out their profile forms. We would write them letters, send them telegrams, and telephone them; we would do almost everything within our power to get them to fill out their profile. Some of them would, but many would not. We had to do it for them. In many instances, I was disappointed to find that the librarian was either unwilling or unable to do this for him. This is unfortunate because these men could have become strong boosters for the library when budget time came around.

The user wants someone to help him. He does not want, in many cases, to talk directly to the machine. He wants to talk to a knowledgeable human being who can understand the capabilities and the limitations of the SDI system, who can help him construct and monitor the profile, and solve the problems of document acquisition, whether by Xerox, Original Article Tear Sheets (OATS<sup>®</sup>) or inter-library loan.

Years of ASCA service have proved this, and the experience of those who have provided continuing bibliographies with MEDLARS tapes has also shown that this function must be provided. Obviously, in those cases where the user

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himself is willing to devote the necessary time to profile preparation and updating, the results will be improved significantly. However, it is in the best interests of the user for the medical librarian to fill the need I have described. I am confident that medical librarians, both the old-timers and new-comers, will have the necessary motivation and adaptability.

There are several major advantages to the medical librarian that can be obtained in this new role. One is greater prestige. If the scientist must have his questions translated and filtered in order to optimize his use of SDI systems, he will develop greater respect for the librarian's specialized knowledge of these systems.

The second advantage will be monetary. The use of data processing equipment and techniques in libraries has already affected pay scales significantly. Computer systems involve investments running into millions of dollars. It is not surprising that the people who operate these systems are well paid. As a result of this and the changing function of the librarian, an increase in pay scales is inevitable. This will be accentuated by the limited supply of trained science and medical librarians. Obviously, \$10,000 a year library administrators cannot be expected to employ \$20,000 systems analysts and programmers. This rarely leads to a harmonious relationship.

For optimum design of SDI systems, the librarian must be an integral part. His primary function is to engage in an active dialogue with the user in order to exploit the system optimally. The librarian can ensure maximum utilization of data banks and information resources. Whether the system is one that is purchased outside the library, as is the case with ASCA or ISI magnetic tapes, or operated in-house, these general principles will apply. The rest is up to you.

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