Brief communications

An aid for total quality searching: developing a hedge book

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For the past several years, libraries have striven to provide total quality in client services. Mediated search services are no exception. With the increase of end-user systems, mediated services are challenged to provide superior products. Why would clients want a search analyst to perform a database search if they believed their own searches were as good or better? To meet this challenge, search analysts are looking for ways to measure quality and for tools and methods, not only as a means to improve their product but also to justify their services. As Humphries and Naisawald state, “On-line bibliographic search is one . . . service that is often accompanied by fees and surcharges, and needs to be justified in terms of cost and quality” [1]. They suggest that once existing services are evaluated and problems identified, solutions should be devised and implemented [2].

Although many components of the search process must be evaluated to determine the quality of the final product, this paper concentrates on one aspect: the development of appropriate vocabulary in strategy formulation. The backbone of any search process is the search strategy. If there are problems in this area, the final product will not meet the client’s needs. The search analyst must go beyond conventional controlled vocabulary strategies and develop comprehensive tools to expand and enhance search strategies. One such tool is a hedge book, consisting of “subject hedges,” which are lists of terms related to a particular subject used to supplement or replace controlled vocabulary and supporting documentation.

THE NEED FOR “HEDGES” IN THE SEARCH PROCESS

The use of a subject hedge can greatly improve the quality and accuracy of a mediated search on MEDLINE or any other database. Many analysts formulate informal hedges during a particular search process, but few establish and maintain formal hedge books. Developing and maintaining such a book is useful in several ways. First, it saves time. According to VanHorn, “It may take twenty to thirty minutes to compile a term list and verify its application to the question at hand. . . . If properly constructed, a hedge provides a fast, cost effective method of eliminating the repetition” [3]. The analyst does not always have the time to recreate a list of terms every time a recurring subject request is made. Also, if the list has to be recreated from memory for each request, essential terms may be missed.

The second benefit is that an established hedge not only preserves all important controlled vocabulary and text words but can also be expanded as it is used by different analysts. Every search is a learning experience. As the analyst scans the retrieval, useful headings or text words may be discovered and added to the hedge. This process provides all analysts with an increasingly comprehensive list. Third, an established hedge can be used as an interview tool, so clients can identify precisely those concepts truly relevant to their needs and eliminate those that are not.

Finally, hedges can be used as instructional tools in the continuing education of search analysts and in
advanced end-user educational programs. When a group of search analysts discusses search techniques, each analyst increases personal skills as well as provides ideas for the others. In the past, end users have been taught just the basics of searching, that is, database descriptions, controlled vocabulary, and use of the software. Use of hedges in the classroom can teach the end user creative searching techniques.

MAKING A HEDGE BOOK

Establishing a format

The first step in establishing a hedge book is to select a style and format for both the hedges and the book. At Loyola University Medical Center, search analysts have established a definite format. The hedge book is in notebook form, allowing easy updating. An index of hedges is placed at the beginning of the book and is updated as new hedges are added.

All the hedges and supporting documentation are placed in alphabetical order in a binder. Each hedge is typed in WordPerfect in an established document format and is one page in length (Table 1 provides an example). Each hedge contains three elements—Medical Subject Heading (MeSH) terms, text words, and journal titles. All hedges must include any appropriate MeSH headings with tree numbers (if applicable) and date of entry. Related MeSH headings also are indicated. Following the controlled vocabulary, primary text words are listed in alphabetical order. Secondary or supplementary text words follow, also in alphabetical order. A list of journal titles related to the subject is provided at the end. For example, all anesthesia journals are listed in the “Anesthesia Management” hedge. Additional documentation, such as photocopies of tree structures and review articles or book chapters on the subject, follows each hedge.

A copy of the hedge book is kept at the database information services desk and at each search station.

Identifying problem areas

The search analyst needs to identify areas where supplementary terms beyond the controlled vocabulary are required to produce searches of the highest quality. Criteria should be established for identifying a subject needing a hedge. One criterion is a lack of terms in the controlled vocabulary that accurately reflect the subject. There are two reasons this might happen. First, some subjects are too diffuse to be represented by a single term. For example, if a client requests information on “state-of-the-art” cancer therapies, the controlled vocabulary would not reflect the concept of state-of-the-art, and the analyst would have to rely on a list of text words such as current, new, and trends to retrieve relevant citations.

The second reason is that the controlled vocabulary may be too new to retrieve citations on a given subject from all years covered by the database. Using only the controlled vocabulary in such a case, the analyst would miss relevant papers. During the early 1980s, Acquired Immunodeficiency Syndrome (AIDS) was such a topic. Schifffman states that before the MeSH heading “ACQUIRED IMMUNODEFICIENCY SYNDROME” was established in 1983, a hedge of text words was the only way to retrieve citations on AIDS [4]. He also believes that “storing of hedges is a practical solution to responding to repeated search requests which cannot be retrieved via existing controlled vocabulary” [5].

A second criterion suggesting the need for a hedge is when a subject is not within the realm of standard medical terminology. For example, “popular” names for medical conditions are not reflected in the controlled vocabulary. Dolan states that search requests often deal with “popular or newsworthy topics” for which no controlled terminology has been established [6].

Table 1
An example of a hedge for “cytokines”

<table>
<thead>
<tr>
<th>MeSH headings</th>
<th>Also consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cytokines (91) D24.611.350$ (see attached tree structure)</td>
<td></td>
</tr>
<tr>
<td>Epidermal Growth Factor—Urogastrone (82)</td>
<td>Transforming Growth Factors (89)</td>
</tr>
<tr>
<td>Fibroblast Growth Factor (84)</td>
<td>Platelet-Derived Growth Factor (84)</td>
</tr>
<tr>
<td>Cytokine$</td>
<td>Epidermal with growth with factor$1</td>
</tr>
<tr>
<td>Monokine$</td>
<td>EGF</td>
</tr>
<tr>
<td>(Interleukin or IL) adj</td>
<td>Fibroblast with growth with factor$1</td>
</tr>
<tr>
<td>IL1; IL2; IL3; IL4; IL5; IL6; IL7; IL8; IL9; IL10</td>
<td>FGF</td>
</tr>
<tr>
<td>Interferon$1</td>
<td>Hematopoietic with cell with growth with factor$1</td>
</tr>
<tr>
<td>Lymphokine$1</td>
<td>Insulin with like with growth with factor$1</td>
</tr>
<tr>
<td>Lymphocyte with activating with factor$1</td>
<td>IGF adj (I or II)</td>
</tr>
<tr>
<td>Macrophage with (migration or activating) with factor$1</td>
<td>Platelet with derived with growth with factor$1</td>
</tr>
<tr>
<td>Suppressor with factor$1 with immunology</td>
<td>PDGF</td>
</tr>
<tr>
<td>Journals</td>
<td></td>
</tr>
<tr>
<td>Cytokine (92)</td>
<td>European Cytokine Network (90)</td>
</tr>
<tr>
<td>Cytokines (93)</td>
<td></td>
</tr>
</tbody>
</table>

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A third criterion is that the controlled vocabulary is either not specific enough or, on the opposite end of the spectrum, is too broad for retrieval of relevant citations. As Schiffmann points out, in some cases databases may not have a term, a “descriptor code,” or a grouping that describes the subject accurately or completely [7]. Analogs of a drug often fall into this category. They usually are indexed under the parent drug and do not have their own MeSH heading.

Once a need for a hedge is identified—say, in the case of the subject of cytokines—the analyst can begin to develop the hedge and find supporting documentation. The analyst starts by consulting all MeSH tools—Annotated Alphabetic List, Tree Structures, Permutated Medical Subject Headings, and List of Journals Indexed in Index Medicus. First, the analyst selects all appropriate MeSH headings from the Annotated Alphabetic List. The MeSH heading “CYTOKINES,” with an entry date of 1990, is listed in the Annotated List. The analyst checks the position of the heading in the Tree Structures to determine whether any other or all terms within the tree might be used. The MeSH heading “CYTOKINES” can be exploded. All cytokines, such as interleukins and interferons, are listed under the broader heading. The entry dates of headings in the tree structure should be copied down if appropriate. The relevant part of the tree structure should be photocopied; relevant headings should be highlighted and placed in the hedge book immediately following the hedge. Table 1 shows how the heading “CYTOKINES” is listed, along with the tree number.

The next step is to determine all the appropriate text words for each of the cytokines. Major textbooks, dictionaries, and review articles on the subject should be consulted to help identify text words that might be used to locate relevant citations. In many cases, a good review article or book chapter will provide a useful list. If such an article or chapter is found, it should be photocopied and placed in the hedge book. The format for the text words should be consistent from hedge to hedge. At Loyola, search analysts chose BRS free text searching format (used in Table 1).

Finally, the List of Journals Indexed in Index Medicus should be consulted for any appropriate journal titles. These titles are added to the hedge (also in BRS format). For titles selected for indexing in Index Medicus after 1966, the date should follow each title.

MAINTAINING THE HEDGES AND HEDGE BOOK

There are two basic steps in maintaining a usable, current hedge book. First, each time an analyst uses a hedge, any term found during a search that would add to the hedge’s effectiveness should be added. Although all analysts add terms, one analyst should review all hedges on a weekly or monthly basis and transfer any additions to all copies of the hedge book. If many terms are added, the entire hedge should be updated and a new hedge printed.

Second, a thorough review of all hedges should take place as soon as the new MeSH is released each December. The analyst should check for new headings that need to be added to existing hedges; new subheadings or publication types that need to be added to existing hedges; changes in or deletions of older headings; changes in tree structures (the analyst should replace the old photocopies with the new tree structure); and new concepts for which a hedge should be developed. The new List of Journals Indexed in Index Medicus subject section should be compared with journal lists in all hedges, and new appropriate titles should be added.

USING THE HEDGE BOOK

Appropriate use of hedges significantly improves the eventual quality of an online search. Hedges are meant to be guidelines, not a list of terms that must be used in all instances. This is where an analyst’s expertise in searching comes into play. Analysts must learn to use each hedge creatively and judiciously, choosing terms that seem to retrieve the citations most relevant to the client’s request. Overuse or misuse of a hedge can reduce the quality of the mediated search.

The analyst also can use the hedge as an effective interviewing tool by showing it to the client at the time of the search request. Many times a hedge can help clients pinpoint the exact concepts they are interested in or identify areas relevant to their topic. A good example of this use of a hedge is a search on the word trauma. The MeSH heading for trauma is “WOUNDS AND INJURIES.” The tree structure listing all trauma terms includes such MeSH headings as “RADIATION INJURIES,” “BIRTH INJURIES,” and “NEEDLESTICKS.” If the client is an emergency services physician, his or her idea of trauma may not include those concepts. By showing the client the hedge at the time of the interview, the analyst can eliminate irrelevant terms from the search strategy and improve the quality of the search.

A hedge also can be used as an educational tool for the analyst and end user. If the public services staff holds regularly scheduled meetings, time during those meetings should be set aside to review one or two hedges. This procedure reminds all analysts of the existence of certain hedges. It also allows for discussion of existing terms and for suggested additions or improvements to the hedge. In an advanced end-user class, a discussion of the usefulness of hedges may improve the quality and relevance of citations retrieved by the students.
CONCLUSION

Medical libraries are faced with the challenge of improving all services and products in an ever-changing environment. Database searching has been the backbone of medical library services, and quality in this vital area must be improved continually, especially as end-user systems become more prevalent. Any method or tool that can help produce a total quality product should be developed and used. The development, use, and continuous revision of a hedge book can help a search analyst achieve the goal of the total quality mediated search. If this goal is met, clients will realize the value of a mediated search service dedicated to producing searches of the highest quality.

REFERENCES

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5. Ibid.
7. SCHIFFMANN, op. cit.

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Nursing informatics programs at the University of Maryland at Baltimore*

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Nursing informatics is part of today's nursing practice. Nursing informatics has been defined by Graves and Corcoran as a "combination of computer science, information science and nursing science designed to assist in the management and processing of nursing data, information, and knowledge to support the practice of nursing and the delivery of health care" [1]. No matter what definition is used, there is growing interest in how nurses can use computers and technology to provide better nursing care.

This paper describes the development of the nursing informatics programs at the University of Maryland at Baltimore (UMAB) and the Health Sciences Library (HSL) support of these programs. Nursing education at the UMAB prepares nurses for their changing responsibilities in informatics through the undergraduate curriculum, the graduate Nursing Informatics program, and a summer institute. HSL liaison librarians regularly teach undergraduate and graduate nursing students to use relevant information sources and locally mounted databases.

HISTORY OF NURSING INFORMATICS AT UMAB

In 1974, a survey conducted by the International Federation of Information Processing concluded that all nurses' training should ensure general knowledge of computers and that some nurses should participate in the development of hospital information systems [2]. Despite these recommendations, little had been done by the early 1980s to prepare nurses to use computers effectively. In her 1985 paper, Barbara Heller listed possible impediments to achieving computer education for nurses: few prepared faculty, resistance to learning computer skills, opposition to classroom change, limited curricular support material, and no consensus on what constitutes computer education for nurses [3].

To examine the curricular implications of computer technology upon nursing education, a task force of faculty and students was formed in 1983 by the dean of the School of Nursing at UMAB. The objectives were to validate the need for computer education in the nursing curriculum, identify the specific knowledge needed by graduates, and differentiate levels of preparation needed for undergraduate and graduate programs. The objectives were accomplished through a comprehensive literature review, interviews with faculty from nursing schools offering "prototype" computer courses, site visits to hospitals and health care agencies to observe computer applications, and a survey of UMAB nursing faculty and students [4].

Based on its findings, the task force established the need for computer education in a nursing degree program. Three modifications to the curriculum were proposed: creation of a requirement for an introductory computer course, development of a special elective or required course in computer applications, and integration of computer content into existing courses [5]. A combination of these suggestions was employed.