User Attitudes toward End-User Literature Searching

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ABSTRACT

A survey to determine attitudes toward end-user searching was made at Loyola University's Medical Center Library using MEDIS, an online full-text and bibliographic medical retrieval system. One hundred forty-one completed questionnaires were analyzed for this report. Information was collected on user familiarity with computers, end-user training, system use, mechanics of searching, and attitudes toward future use. Computer familiarity was highest among the faculty users. Ninety percent of the respondents saw librarians as a crucial agent in training and in providing end-user assistance. Respondents identified five major reasons for using the system: helpfulness, convenience, time savings, rapid feedback, and presentation of needed information. Searching the MEDLINE database rather than the full-text database was the search method of choice. Continued use of both mediated and end-user searching was intended by most of the respondents. Survey results support a perceived need for end-user searching and confirmed recommendations of the Association of American Medical Colleges on medical information science skills.

ONLINE LITERATURE retrieval systems are not new. However, the inordinate number of products aimed at scientists, practitioners, and other health sciences personnel and the increasing use of such products is new. The expanding use of diverse commercial packages has created a $300 million-a-year online bibliographic industry and resulted in the phrase "end user" being applied to any direct user of an online database who does not have a degree in library science or extensive online training. To meet the needs of its end users, Loyola University Medical Center Library began offering MEDIS, an online full-text and bibliographic medical retrieval system, in April 1986. This paper discusses the institution's experience with MEDIS and the results of a user survey distributed to 245 users.

With a wide range of online medical literature search systems available, selecting the most appropriate system to meet library needs is difficult.

Fortunately, a sizeable body of literature on end-user systems in the library environment has been accumulated [1]. Arnold identifies major markets for end-user searching and discusses issues related to pricing and the involvement of intermediaries in the search process [2]. Haynes and others provide data on efficiency, cost, and ease of use of such systems by comparing seventeen permutations and combinations of software and vendors [3, 4]. One of the best general discussions on choosing an online medical database is provided by Marshall [5]. Singer found that a large number of physicians desired a database system that would help them keep abreast of new developments [6]. Kravitz reports on the strengths and weaknesses of MEDIS from the user's perspective and compared it to BRS/Saunders, Colleague, and PaperChase [7]. Perhaps, the most valid answer to which online system is best is "it depends"—on what type of information is needed, such as references, full-text, or other services like electronic mail and continuing medical education; service cost; equipment needed; and time necessary to learn the system.

Loyola Medical Center Library chose the MEDIS system because at the time of selection it offered access to MEDLINE, had full-text access to more journal titles and textbooks of importance than some other systems, did not require the purchase of additional microcomputers, offered a competitive, cost-effective library program, and provided a well-established user-friendly software package.* A simplified logging-on procedure,

*Although Mead Data Central is no longer targeting the medical marketplace, MEDIS continues to be available as a subsystem of NEXIS or LEXIS. MEDLINE is fully supported and will be redesigned for 1988. Some little used full-text materials have been removed from the current files (GENMED) and placed in archive files. Mead Data plans to add additional full-text files. Cost structure has also changed since this study was completed and MEDIS trainers are no longer available from Mead Data.

excellent display features, and the use of a high-speed stand-alone printer were also desirable advantages of the system. The willingness of Mead Data Central, the MEDIS vendor, to provide the library with additional terminals for end-user training was an added bonus.

The library information services staff were also interested in examining the extent to which specialized equipment contributed to use/nonuse of the system. MEDIS afforded this opportunity since it could be accessed using either a standard IBM PC or a specially designed terminal referred to as a UBIQ. The UBIQ has a modified standard keyboard incorporating unique function keys that facilitate end-user searching. These keys aid the recall process and reduce the number of required menu prompts. When the system became operational at Loyola, a UBIQ was placed in the library next to an IBM PC. The system was made available outside the library by placing a UBIQ and printer in the chief resident's office in the Internal Medicine Department and another UBIQ and printer in the Emergency Medicine Department at the Foster McGaw Hospital, Loyola University's primary teaching hospital.

Free two-hour end-user training sessions were offered in April after implementation of a three-pronged marketing strategy: direct mailing to faculty, students, and residents; news releases in appropriate medical center and university publications; and posters prominently displayed throughout the library and medical center. Training classes were offered at different times of the day and on weekends in order to make classes available to the largest number of potential users. Classes were booked in advance and follow-up confirmations were sent to each attendee prior to scheduled classes. Classes were taught by vendor trainers, by the information services librarians, or by both librarians and vendor trainers. Two hundred forty-five users were trained on the system between April and August of 1986.

SURVEY METHODOLOGY

Approximately four months after installation of MEDIS, the library prepared a survey instrument for mailing to each registered user. Using Thurstone's technique of equal-appearing intervals [8], twenty statements concerning attitudes toward end-user searching were written. This technique uses a large number of statements expressing opinions concerning an attitude object collected from the literature, library staff, and users. All statements must express an attitude toward a single

object—software, use, training, features—which is then measured. The statements were printed on separate cards and given to a group of judges for rating on a scale of 9 points which represented steps on a continuum from favorable to unfavorable. From this process, technically referred to as a "self-sort," a Q value was determined for each statement using quartile deviation as a measure of central tendency. For weighting purposes, Lickert-type response statements were used. Twelve statements of fact were added to the questionnaire to aid in drawing a user profile.

The questionnaire solicited responses to five areas of interest and importance in evaluating end-user systems:

User familiarity with computers and information technology. Three items asked survey participants to rate their degree of experience with computers, and whether they knew of or had used other end-user information systems. Survey respondents who had used other end-user systems were asked to list the system they preferred.

End-user training. Four questionnaire items asked about librarian versus vendor training, how much training is necessary to start users on basic searching, and whether users desired advance training.

System use. Whether participants had used the system for research, education or patient care; how frequently MEDIS was used; and what terminals were used most heavily were determined by questions. Items were also included to determine what retrieval method (MEDLINE or full-text) was used most frequently and why users did or did not use the system.

Mechanics of searching. Search strategy, perceptions of ease of use, and perceived relevancy of literature retrieved were areas explored by five survey items.

Future use. Items about whether users would continue to use mediated searching (searching performed by library staff), intended future use of the system, and reactions to possible access modifications were included to assist library administration in planning improved systems offerings.

A prerequisite for MEDIS access is a two-hour training course designed to provide basic information about the end-user system. The library initially offered access to the system to medical center faculty, residents, nurses, students, and other direct users of the literature; courses were not open to clerical support staff. Registered MEDIS users formed the survey target population. Participants were grouped into four clusters according to their

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TABLE 1
PATRON RESPONSE PROFILE

Categories	# Surveyed	# Returned (%)	Experience with system			Frequency of use			
			2 mos.	3 mos.	4 mos.	1–5/wk	1/wk	1/month	No longer using
Faculty									
Dental	12	6 (50)			6		2	2	2
Medical	52	40 (77)	13	2	24	8	12	9	10
Nursing	9	6 (67)			6		1	2	3
Other	4	3 (75)			3			1	2
Fellows	12	10 (83)	9		1	3	5	1	1
Residents	49	21 (43)	7	5	9	10	7	2	2
Nurses	26	18 (69)	4		14		6	9	3
Res. assists.	14	11 (79)	7		4	3	3	2	3
Other	9	5 (56)			5		1	2	3
Students									
Dental	2	1 (50)			1		1		
Graduate	19	13 (68)	3		10	2	5	4	1
Medical	36	12 (33)	2			4	2	3	2
Nursing	1	1 (100)				1			
TOTALS	245	147 (61)	45	7	83	31	45	37	32

professions (Table 1). Surveys were coded to allow follow-up on non-respondents. A 61% response rate resulted in 141 usable surveys.

RESULTS

Familiarity with Computers and Information Technology

Seventeen respondents (12%) indicated that they were highly experienced in computer use, 90 (64%) indicated some experience, and 31 (22%) indicated no experience. The faculty held the highest level of computer experience. Despite the marketing efforts of end-user information systems vendors and increased availability of such systems, few respondents were experienced with such systems. Only six respondents (4%) had used other end-user information systems. BRS/Colleague and Paper-Chase were the most frequently used, and MEDIS was preferred.

End-user Training

Registered MEDIS users were asked to characterize both the amount and usefulness of information presented in the training sessions. Participants were also asked if they felt trainers provided by Mead Data used the sessions as a sales opportunity for their product. The amount of information presented was satisfactory to 112 respondents (80%),

judged excessive by 3 (2%) and insufficient for 25 (18%). Respondents indicated a general satisfaction with the classes for basic training, but a desire for advance training was expressed. A total of 137 (97%) found the information either highly useful or useful. Respondents felt classes taught by vendor specialists tended to emphasize heavily the full-text retrieval files and accompanying search methods, but were not perceived as being heavily sales oriented.

System Use

The librarians' value as an end-user system resource was strongly supported. Independent searches, with librarians available for assistance when necessary, were preferred by 114 respondents (81%). No assistance was preferred by 21 respondents (15%) and 6 (4%) preferred mediated searches. Only 2 respondents (1%) preferred manual searching (printed indexes).

Because Loyola Medical Center is actively involved in research, it was not surprising that 69 respondents (49%) used the system for research support. Other uses included education/teaching (23%) and patient care (17%). Seven users (5%) were experimenting simply to gain personal knowledge about end-user systems and 3 (2%) used the system for browsing the literature. MEDIS was

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used by 70 respondents (50%) for literature review, by 66 (47%) for quick references, and by 47 (33%) for comprehensive literature searching. Seventy-eight participants accessed MEDLINE approximately 80% of the time rather than using full-text retrieval.

Of the four terminals available, the most heavily used was the library UBIQ, accounting for 64% of total search activity. The library PC accounted for 28%, and two terminals outside the library accounted for approximately 8% of use. These figures represent the users' perceptions of how and where they used the system. Actual use records verified the accuracy of perceptions of how the system was used (80% MEDLINE), but indicated terminals in the hospital actually handled 10% of the total search activity, while the library PC handled 25%. Library records also indicated a greater amount of full-text searching on terminals outside the library than those located within the library.

Approximately 1% of the respondents indicated system usage of more than 5 times a week, 20% used the system 1 to 5 times a week, 33% used it less than once a week and 26% less than once a month. Residents used the system most frequently, followed by medical faculty and students, who used the system about equally. Thirty-two respondents (23%) were no longer using the system. This drop out rate is slightly less than that reported by Collen in another study of MEDIS use [9]. Training was a key factor influencing frequency of use and continued use. Of the 93 respondents who were trained by vendor specialists alone, 13 (14%) were frequent system users [1–5 times per week] while 26 (28%) stopped using the system altogether. Of the 7 users trained by information services librarians, 3 were frequent users. One respondent in this group had
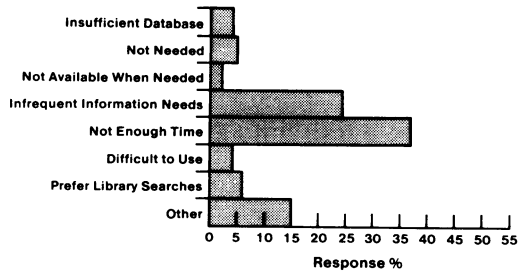

FIG 2.—Reasons for Non-use of System

stopped accessing the system. Among the 41 trained jointly by the vendor specialists and the librarians, 16 (40%) were frequent users while 5 (12%) had stopped using the system.

Major reasons for use of the system were: helpfulness, convenience, ability to save time, rapid feedback, and presentation of needed information. Underwriting of system costs by the medical library was also a reason for using the system, especially by medical students who otherwise could not afford to access the system.

"Not enough time" was the reason listed by 52 respondents (37%) for not using the system and was reported equally across all user groups. The next most frequently mentioned reason for non-use as noted by 34 respondents (24%) was the infrequent information needs of the user. Other reasons for non-use included insufficient database, not needed in work, inconvenient access, difficulty of use, availability of mediated searching.

Mechanics of Searching

The literature cites ease of use as a major consideration in selecting an end-user system [10,11]. Indeed, which end-user system is easiest to use is a topic of much debate. In this survey, only 7 respondents (5%) indicated difficulty using MEDIS but criticized the system's inability to forgive user errors. Seventy-two (51%) found the system difficult to use only at first while 62 (47%) found the system generally easy to use. Overall, 103 (73%) classified the system as "user friendly"** and 34 (24%) classified it as "very user friendly."

Determining a literature search's relevance to the user's needs is a complex task involving both subjective and objective elements [12] and is deserving of research in its own right. The intent of
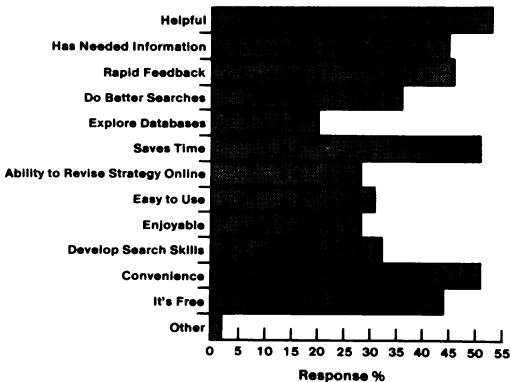

FIG 1.—Reasons for Use of System

**While some may argue that "user friendly" is an ambiguous term, the Q value indicated the judges were in relative agreement about the meaning of the term.

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this survey was only to determine end users' perceived attitudes toward the relevance of printed references, not to address comprehensively search relevance. When asked what percentage of references printed were highly relevant to research needs, 20 survey respondents (14%) indicated over 90% of the information printed was highly relevant, 35 (25%) found 75–89% to be highly relevant; 42% found 50–75% highly relevant, and 19% found under 50% of the information highly relevant.

Ninety-four respondents (67%) indicated they always prepared a search strategy before logging on the system; 3% never did, and another 3% occasionally prepared a strategy in advance. When asked about specific techniques such as modify, back modify, dot or stacked short cut commands, exploding "trees," segment searching, and special displays, no pattern for use of techniques emerged. Modified searches, dot or stacked commands, and special display techniques were used most often in searching the system. Most of these special techniques, not taught during the training classes, were later shown by librarians to eager or adept users. The highly idiosyncratic nature of searching and the fact that identification of a technique requires recall of search jargon may be two possible explanations for the diversity of responses to search technique items and may have been confounding factors.

Future System Use

During this survey, the library absorbed the costs for searching MEDIS, and provided basic training as well as individualized searching assistance and telecommunications access via three UBIQs and one IBM PC. Offering an end-user system in this manner placed a heavy financial burden on the library and a heavy work load on staff. Information about patrons' continued desire to use the system, willingness to fund usage, and perceptions toward required training were solicited to aid in fiscal and human resources planning.

Nearly 90% of the respondents indicated an interest in receiving advanced end-user training. Advance training in MEDLINE searching was desired by 58 respondents (41%). Training in system techniques was requested by 45 (32%), while 35 (25%) wanted a review of the fundamentals of searching. If the library continued to underwrite an end-user system, 118 (84%) would still continue use of mediated searches. Of the 141 respondents, 38 (27%) would continue to use mediated searching for complex searches, 32 (23%) to access other databases not available on MEDIS, 25 (18%) for

greater comprehensiveness, and 20 (14%) for convenience. If the library introduced charges for end-user searching, 116 survey respondents (82%) said they would also continue to pay for mediated library searches.

Eighty-nine (63%) indicated continued use if the library introduced charges for MEDIS. Additionally, 12 respondents answered affirmatively but qualified responses with "yes, but less often" (5) or "only if department pays" (7). Of the 87 respondents whose departments currently reimburse the library for mediated searches, 54 (62%) indicated departmental reimbursement to the library for end-user searches while 20 (22%) indicated non-reimbursement and 13 (14%) were uncertain of funding availability.

Modification in system accessibility was explored in the survey. In response to the question, "If the library charged for the system during peak hours (9 A.M.–5 P.M., Monday through Friday) and absorbed the cost during non-peak hours, would you use the system during non-peak periods?" Eighty-three respondents (59%) indicated the arrangement as satisfactory. This item assumed availability of the same level of services during peak and non-peak hours. Fifty-one respondents (36%) expressed a desire to have the system software available on office or personal computers; users from the basic sciences research departments were especially eager for such an arrangement.

SUMMARY AND DISCUSSION

Participants experienced in general computer use but lacking knowledge and experience about end-user information systems need additional educational opportunities. Since the faculty group reported more experience with information technology than other groups, it may be assumed that experience with computers is gained from work-related activities. Students with computer experience at the elementary and secondary education levels and in undergraduate programs have not yet matriculated into the medical schools. When they do arrive, medical schools should be prepared for additional information management demands. Further, because end users are not familiar with end-user literature search systems as evidenced by this survey, libraries should be prepared to assume a central role in providing opportunities for specific instruction.

The importance of quality training by librarians is underscored by the fact that 127 respondents (90%) wanted librarians to be available when needed. When the user is trained by librarians or by

both librarians and vendor specialists, the use rate is higher and the dropout rate is lower than among users trained only by vendors. The survey results did not support the belief that only librarians should train end users because vendor trainers would use training sessions as a sales opportunity for their product.

Current literature cites the need for users to be more realistic about the actual capabilities of end-user systems and their limitations that inhibit widespread use, including the lack of comprehensive full-text files, costs, and the user-friendliness of the system. Interestingly, respondents did not list these as limitations. Instead, not having enough time and infrequent information needs were most often given as reasons for non-use. It is difficult to decipher the true meaning of these results, however, they may suggest that user friendliness and comprehensiveness are issues that have been successfully addressed by commercial vendors, at least as far as end users are concerned.

Because health professionals are quite busy and their information needs are too infrequent to maintain search skills, mediated searching by librarians and manual searching of print indexes will continue. At present, the primary value of end-user systems appears to be related to research, teaching, or quick reference needs, not for primary care or full-text retrieval. The low use of full-text retrieval and the high use of MEDLINE raise several questions about the real need for full-text online retrieval in a mid-sized medical center. Full-text retrieval was used most often when the library was closed, suggesting that researchers prefer printed volumes if they are at hand. End users want comprehensive stand-alone bibliographic databases such as MEDLINE.

Cost has some correlation with frequency of use, and it appears that users are not adverse to paying for an end-user system that meets their information needs. While this summary did provide some sense of which departments at Loyola would support MEDIS, it regrettably did not indicate to what extent departments would support MEDIS or other end-user systems. Students do not always have the resources to pay for such services. The medical library views the provision of online search services for such groups in much the same way it views its printed materials collection—a fundamental resource provided by the library.

Rather than diminishing the need for competent librarians, Loyola's introduction of MEDIS has actually increased the need. Demand for mediated searches did not decrease, as expected, but

increased by 7%. The general consensus among reference librarians is that both the complexity and variety of mediated searches have risen. More important, much more time is spent teaching classes and interacting with library patrons, who appear to have a new-found appreciation for librarians' knowledge and skills. Faculty and staff are also requesting more interlibrary loan items; many of these requests list MEDIS as a source of verification. Use has begotten use.

The data collected from this survey have been highly useful in determining whether and how MEDIS or another end-user system(s) will be offered at Loyola. Our perception that our patrons wanted access to an end-user system was supported by the overwhelmingly positive response to the system (716 annual connect hours). Preference was also shown toward use of specialized end-user equipment. In retrospect, we believe MEDIS was a good choice for the library at the time. Reference librarians who did not like MEDIS when it was first selected by the library now prefer it over other commercially available systems. Based on survey data, changes in system availability, and the emergence of what arguably might be better or more economic databases, Loyola's Medical Center Library now offers or is planning to offer a variety of end-user systems including MEDIS, GRATEFUL MED, PaperChase, and BRS Colleague. Some CD-ROM based systems also appear promising. Several search service options will be offered ranging from fully library-supported to full charge-back. Users may access the systems from the library computers or through their own personal computers. The answer to the question of which system(s) is best remains, "It depends."

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