Collection Development Using Interlibrary Loan Borrowing and Acquisitions Statistics

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ABSTRACT

Libraries, especially those supporting the sciences, continually face the problem of selecting appropriate new books for their users. Traditional collection development techniques include the use of librarian or user subject specialists, user recommendations, and approval plans. These methods of selection, however, are most effective in large libraries and do not systematically correlate new book purchases with the actual demands of users served. This paper describes a statistical method for determining subject strengths and weaknesses in a library book collection in relation to user demand. Using interlibrary loan borrowing and book acquisition statistics gathered for one fiscal year from three health sciences libraries, the authors developed a way to graph the broad and narrow subject fields of strength and potential weakness in a book collection. This method has the advantages of simplicity, speed of implementation, and clarity. It can also be used over a period of time to verify the success or failure of a collection development program. Finally, the method has potential as a tool for use by two or more libraries seeking to improve cooperative collection development in a network or consortium.

FEW HEALTH sciences libraries possess the financial or human resources to acquire every book which may be needed by their users. Librarians making acquisitions decisions must be selective, hoping that the titles they select will meet the needs and interests of their users. This is especially true in small libraries with limited budgets, such as hospital and small academic libraries with annual budgets of less than $20,000 for new monograph acquisitions. Without a systematic mechanism for collecting information about the current needs of users and relating these needs to acquisitions decisions, librarians must rely on subjective advice or generalized guidelines [1].

BACKGROUND

Traditional collection development techniques including the use of librarian or user subject specialists, user recommendations, and approval plans are valuable, especially in large libraries, but all have drawbacks in terms of systematically anticipating user needs. Subject specialists, no matter how knowledgeable about a field, will have biases and limitations. User recommendations provide no assurance that the requested titles will actually be used after being added to the collection. In fact, a 1980 British medical school library study suggests that titles recommended by faculty are subsequently used less frequently than those selected by other methods [2]. Even if user recommendations could be consistently relied upon, they are difficult to obtain from a broad and representative sample of the community served. Moreover, the library with a very limited budget cannot purchase many excellent recommended titles simply because of a lack of funds.

Approval plans rely on the judgment of a third party, the publisher or jobber, and generally are not available to the small library with a limited acquisitions budget. Once established in larger libraries, these plans tend to be inflexible and self-perpetuating. A 1974 review concludes that "there is clear evidence that . . . even when carefully monitored, approval plans still bring into the library significantly more unused material than do other methods" [3].

Recently, innovative attempts have been made to use the computer in the analysis of book selections. For example, the National Oceanic and Atmospheric Administration Environmental Research Laboratories Libraries in Boulder, Colorado have developed an elaborate method of correlating circulation and inventory statistics in each subject field of the collections as defined by classification number. A ratio of circulation to inventory over a period of time is used to help the librarians decide what subject fields need additional acquisitions [4].

The Bell Laboratories Library Network has implemented a selection policy which uses as its basis a series of computer-generated statistical reports. These reports specify for each Dewey subject class field and for each of the thirteen network libraries such things as circulation, predetermined "collection levels" (such as, representative, research, or comprehensive), number of titles held, number of new titles purchased, and dollars spent on new purchases [5].

However, even the designers of these elaborate automated systems acknowledge the impossibility of eliminating "the imperfections of the human mind" [4] and admit the need for experienced librarians with good professional judgment "to keep book budgets and acquisitions levels in harmony" [5]. Another obvious drawback of these systems for the small library is the time and computer resources needed to implement them. Even after implementation, the statistics generated tend to be complex and difficult to interpret.

Paul Mosher summarized the problem of collection evaluation succinctly in a recent article:

> . . . the best evaluation will normally involve the application of more than one technique and a comparison or combination of the resulting data. But the extent of one's means—the length of time available for evaluation will often provide external limits to the depth and length of an evaluation project, and these factors will have to contribute to the technique one chooses [6].

In this paper the authors will demonstrate a simple statistical technique which can enhance traditional collection development procedures, with a manageable degree of objective quantification. The method can be especially helpful for libraries with limited budgets and whose staff resources do not allow the time for elaborate analyses of collection strengths and weaknesses.

It should be emphasized, however, that the methodology described in this article cannot be used to identify specific book titles which should be added to a collection. Rather, the technique highlights subject fields of collection strength or weakness. After these have been identified, other selection techniques (such as lists of recommended books, textbook bibliographies, and publishers' catalogs, among others) will be needed to identify specific titles for acquisition.

Data Available

The initial idea for this statistical technique grew from our conviction that in small health sciences libraries the number and subject distribution of recent book acquisitions and of books borrowed on interlibrary loan (ILL) are important measures of current collection strength and balance. Two previous studies, published in 1974 and 1981, attempted to use interlibrary loan analysis as a collection development tool [1, 7]. Several harsh critiques of the 1974 study published in 1976 provided useful models for our study [8]. Although an exhaustive analysis of collection strength and balance would have to include many variables [8] new book acquisitions and ILL borrowing can be especially useful indicators.

Acquisitions statistics are one of the best measures of collection growth and current strength in health sciences libraries. Although the subject distribution of monographs in an entire collection has been studied [9, 10], this approach does not recognize the importance of recent acquisitions to collection development efforts. This is especially true in scientific collections where the life of useful information is short [11].

Unlike many academic and public libraries where interlibrary loan services are restricted to certain classes of users, small health sciences libraries generally encourage all patrons to make use of this service as a way to insure that their users, as well as those using large resource libraries, have access to the entire universe of current biomedical information. The support of the Regional Medical Library Network and the help of many local courier and consortium arrangements also make this service relatively more quick and reliable for health professionals. Thus, ILL

borrowing should reflect more accurately the demand for materials not immediately available in small health sciences library collections, a very large proportion of which are current materials that cannot be purchased because of limited resources.

Both ILL borrowing and new book acquisitions measure the relative strength of, and demand for, current medical literature. This is especially true in the small health sciences library where limited acquisitions funds preclude adding every newly published title which may be requested by users. Large resource libraries, on the other hand, use ILL primarily to locate esoteric or out-of-scope materials.

Most health sciences libraries maintain careful records of the materials they borrow from other libraries, and regularly list new titles added to their collections as a current awareness service to users. In both of these cases, the librarians usually keep records of both the number and the exact titles of books purchased or borrowed. Thus, these indicators of collection growth and use are easy to measure and monitor.

Circulation statistics, if maintained by subject fields, are also an excellent measure of demand for materials in different parts of the collection. However, circulation statistics tell which books already in the collection have proven useful, not necessarily which new titles will be needed in the future. ILL borrowing in small libraries, especially of current, in-print titles, reflects unmet demand and thus comes closer to predicting the types of new materials which will be needed in these collections.

Methodology

In order to test the potential for using ILL and acquisitions data as measures of collection balance, the authors studied records for one fiscal year in one large academic library and two small health sciences libraries in metropolitan Kansas City.

The University of Kansas Clendening Library serves the schools of medicine, nursing, and allied health, a large research user group, as well as a 584-bed hospital. Clendening is one of seven resource libraries in the Midcontinental Regional Medical Library Program and serves as the only resource library for the state of Kansas. Purchases account for virtually all additions to Clendening's collection which includes more than 45,000 monographs. Clendening added 2,181 titles to its collection and borrowed 888 titles via ILL during fiscal year 1980.

The University of Missouri-Kansas City (UMKC) Health Sciences Library serves the schools of medicine, nursing, and pharmacy, as well as a 300-bed teaching hospital. The UMKC library added only 940 monographs to its collection and borrowed 357 titles during fiscal year 1980. Its book collection includes almost 13,000 volumes. Gifts and special-purpose grants account for a very large percentage of new titles.

The Medical Library of St. Luke's Hospital serves the professional staff of a 664-bed hospital as well as a school of nursing with 225 students. The library purchased 373 new books and borrowed 294 titles in fiscal year 1980. The monograph collection includes about 4,000 volumes. Few gifts are added because of space limitations and a policy of maintaining a collection with the best current monographs.

Each library's monthly lists of new books provided acquisitions data for fiscal year 1980 (July 1979 through June 1980). Gathering interlibrary loan records for books was a more tedious process because these requests had to be separated from other borrowing records for the same period at each library. The NLM classification number assigned to these books was an especially valuable item of information in the analysis. With each library's acquisitions list arranged in call number order, tabulating the number of new titles in each subject class was not difficult. However, subject classification numbers had to be assigned to many of the books borrowed on interlibrary loan because this information was sometimes missing from the records.

Although we did not do a detailed analysis by year of publication for this study, in reviewing the ILL requests for the three libraries, it was apparent that over half of the requests from the two small libraries were for current materials within the core subjects of medicine and nursing. This contrasted with Clendening Library's requests which were often for out-of-print, esoteric, and out-of-scope titles needed by the extensive research community within that institution. Thus, in order to focus our study on the subject fields where interlibrary loans would have the greatest impact on collection development, we limited our analysis to books purchased and borrowed within the field of medicine, that is, the Ws of the NLM classification schedules.

Using these data for the subject field of medicine, we plotted a line on a graph for new book acquisitions and for books borrowed on interlibrary loan at each library. The points on these lines were

simple percentages of the total acquisitions and borrowing for each classification field. The lines show subject fields of acquisition strength and weakness in relation to ILL user demand.

RESULTS

Figure 1 shows a graph in the subject fields of clinical medicine covered by class numbers W through WZ at Clendening Library. At this large resource library with an approval program and a monograph budget large enough to purchase most materials requested by its users, the percentage of new acquisitions (the dotted line) matches or exceeds the percentage of books borrowed in almost every subject field. Even without considering date of publication, it is remarkable how well the general pattern of purchases parallels the pattern of ILL demand in these subjects at Clendening. There are only a few fields such as hematology (WH) and dentistry (WU) where it would appear that Clendening might need more purchases to balance ILL demand. It also appears that the relative ILL demand for books in pediatrics (WS) and nursing (WY) may not warrant the somewhat larger number of books purchased in these subjects.

Figure 2 shows statistics for the same subject fields in the same year at the UMKC library. At this small academic library there are many subject fields where the percentage of ILL demand exceeds the percentage of new acquisitions (especially respiratory system [WF], gastroenterology [WI], and endocrinology [WK]). New acquisitions at the UMKC library exceed ILL user demand in the general fields of medical profession (W), public health (WA), cardiovascular system (WG), pediatrics (WS), and nursing (WY).

Figure 3 shows the same two sets of statistics plotted for the same period at St. Luke's Hospital library, which has an acquisitions budget comparable to that of the UMKC library. The lines again illustrate imbalances between relative ILL user demand and acquisitions. New purchases in nursing (WY) exceed the relative ILL demand for these materials. St. Luke's users often requested titles in other fields of clinical medicine and yet the library purchased few or no books in many of these fields (especially the musculoskeletal system [WE], hematology [WH], radiology [WN], and pediatrics [WS]).

Basically, these three graphs illustrate the degree of correlation between the subject distribution of new books in medicine added to these collections and the same subject distribution of books borrowed for users on interlibrary loan. Where the two lines are far apart, the libraries may

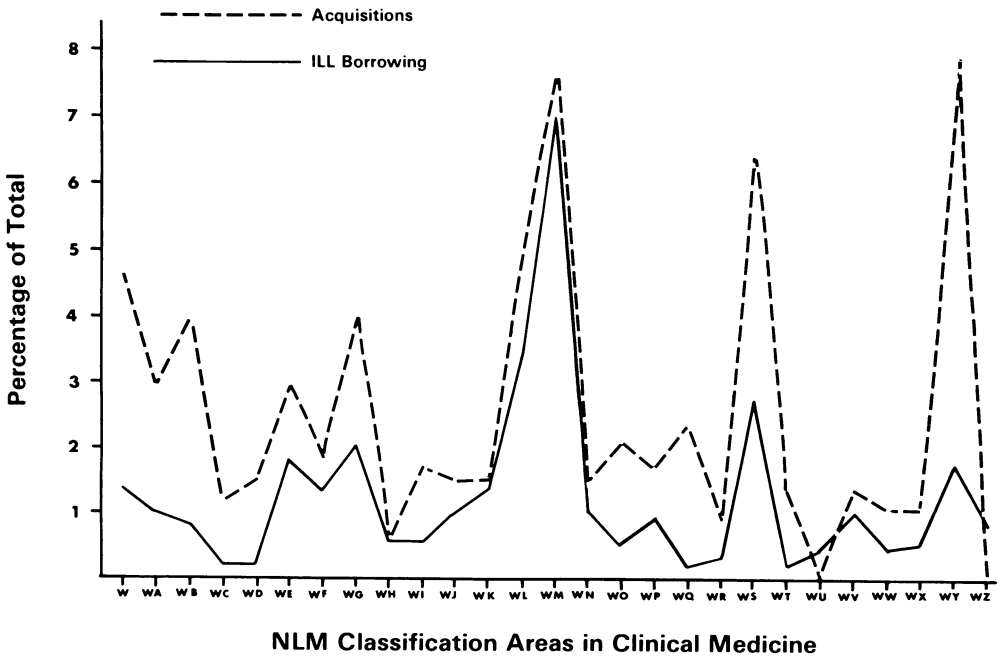

FIG. 1—Subject distribution of new acquisitions and books borrowed on interlibrary loan for fiscal year 1980 at the Clendening Library.

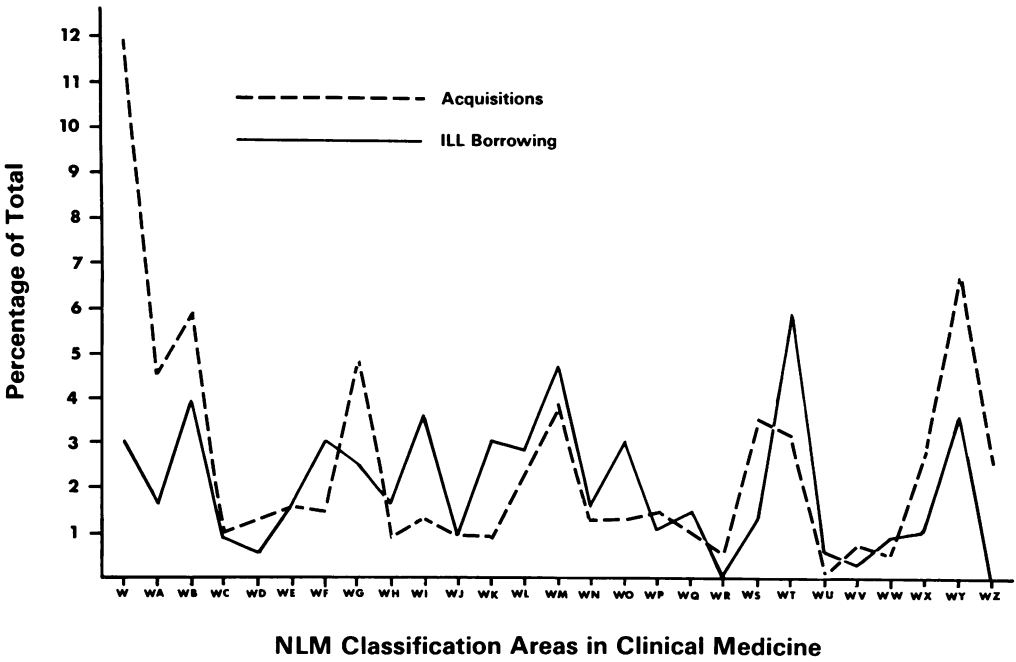

FIG. 2—Subject distribution of new acquisitions and books borrowed on interlibrary loan for fiscal year 1980 at the University of Missouri-Kansas City Health Sciences Library.

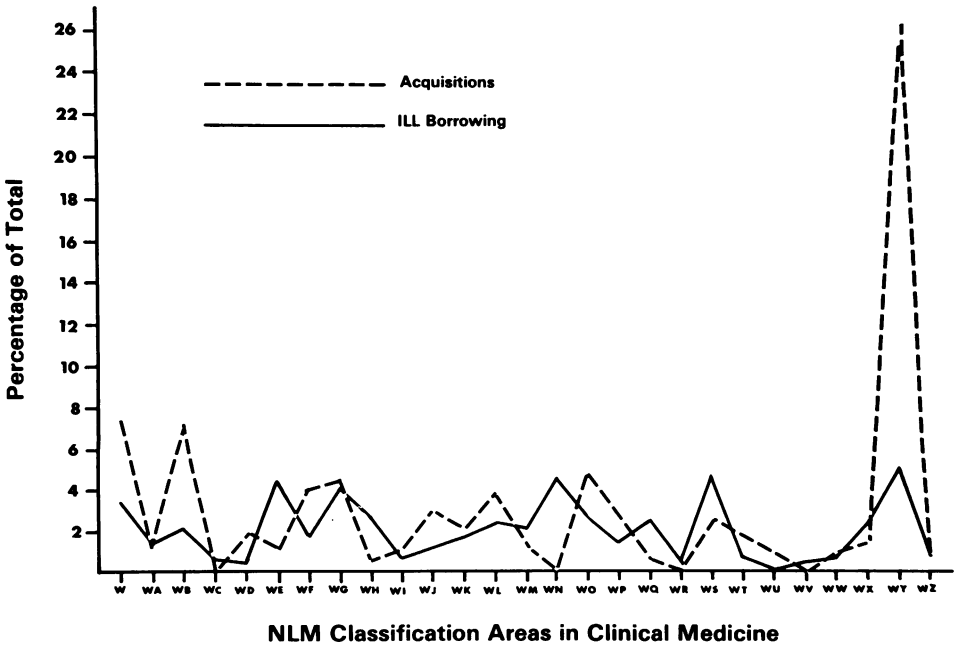

FIG. 3—Subject distribution of new acquisitions and books borrowed on interlibrary loan for fiscal year 1980 at the St. Luke's Hospital Medical Library.

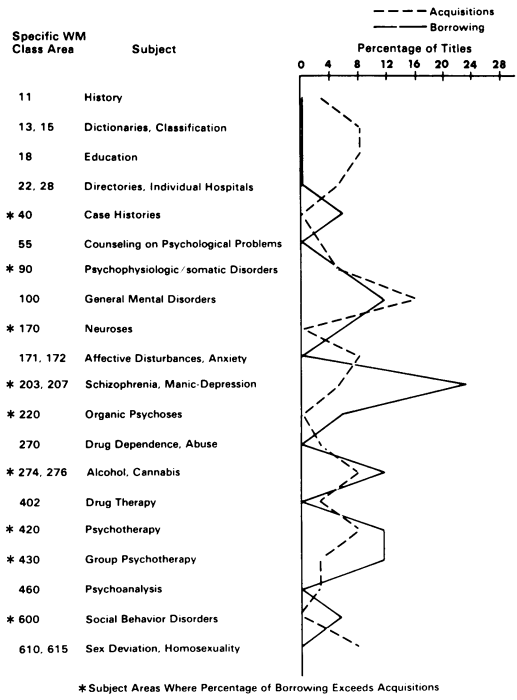

FIG. 4—UMKC book acquisitions and interlibrary loan borrowing in psychiatry (WM) for fiscal year 1980.

be buying proportionately too many or too few books. Of course, each library needs to interpret these discrepancies in light of its budget, collection development policies, and user needs.

Where areas of weakness or strength become evident, the same method can be used to graph acquisitions and ILL borrowing in very specific subject fields of the collection. For example, Figure 4 shows in detail the field of psychiatry (WM) at the UMKC Health Sciences Library. This was one of the subject fields where the relative percentage of ILL requests exceeded acquisitions. This graph indicates that users are requesting relatively more psychiatry titles than the library is acquiring in the specific subjects of schizophrenia and psychotherapy, as well as subjects such as neuroses, organic psychoses, and social behavior disorders.

Next, the possibility of directly comparing the balance of acquisitions and ILL borrowing at the three libraries became apparent. Table 1 gives an overview of the total number of book titles cataloged and added to the library collections at Clendening, UMKC, and St. Luke's for fiscal year 1980, along with the total number of books each library borrowed from other libraries during the same year. In terms of volume alone, the Clendening library is acquiring more than twice as many monographs as the UMKC library and almost six times as many as the St. Luke's library. However, by comparing the ratio of acquisitions to ILL borrowing, it is intriguing that the Clendening and UMKC libraries are acquiring proportionately about the same total amount of new material; that is, about two and one-half new books are added to these collections for every book borrowed from another library. St. Luke's library adds only about one and one-fourth new books for each title borrowed. The figures in Table 1 give some indication of the relative total size of these collections, but they provide no direct way to compare information about specific fields of subject strength or weakness in the collections.

To facilitate this comparison, a method was needed to combine the statistics for acquisitions and interlibrary loans. Although many different calculations are possible, a relative percentage computation seemed preferable. This combines the acquisitions and ILL borrowing percentages for each subject field of medicine into points on a single line (Fig. 5), the collection balance indicator (CBI). When the collection balance indicators for the three libraries are plotted on a single graph,

TABLE 1

BOOK ACQUISITIONS AND INTERLIBRARY LOAN BORROWING AT THE CLENDENING, UMKC, AND ST. LUKE'S LIBRARIES
FISCAL YEAR 1979/80

Library	Number of New Titles Acquired	Number of Titles Borrowed	Ratio of Acquisitions to ILLs
Clendening Library	2,181	888	2.46
UMKC Library	940	357	2.63
St. Luke's Library	373	294	1.27
Total	3,494	1,539	

$$\text{Relative Percentage} = 100\left(\frac{A_W}{A_T} - \frac{B_W}{B_T}\right)$$

$A_{(subj.\ W)}$ = New acquisitions (number of titles) in this subject area

A_T = Total new acquisitions (number of titles)

$B_{(subj.\ W)}$ = Number of titles borrowed on interlibrary loan in this subject area

B_T = Total number of titles borrowed on interlibrary loan

FIG. 5—Collection balance (relative percentage) computations for each subject field at one library.

differences and similarities in the relative strength and weakness of these collections in each subject field of medicine stand out clearly. Figure 6 shows the collection balance indicators for fiscal year 1980 at the Clendening, UMKC, and St. Luke's libraries. Where the indicators go above the "zero" horizontal midpoint, acquisitions are relatively strong; where they fall below this line, acquisitions are relatively weak compared to ILL borrowing.

Finally, after considering this graph, the possibility of combining the data for all three libraries into a combined collection balance indicator (CCBI) appeared feasible. After adding together the raw numbers of book acquisitions and interlibrary loans for all three libraries in each subject of medicine, we then used the same relative percentage computations (Fig. 7). The result is a single line which shows the balance of acquisitions and ILL borrowing for these three libraries (Fig. 8). In actuality, the Clendening, UMKC, and St. Luke's libraries are not formally working together as a network or consortium. However, if they were, this kind of combined analysis could be very useful as a guide to cooperative collection development.

$$\text{Combined Relative Percentage} = 100\left(\frac{CA_W + UA_W + SA_W}{CA_T + UA_T + SA_T} - \frac{CB_W + UB_W + SB_W}{CB_T + UB_T + SB_T}\right)$$

CA_W, UA_W, SA_W = New acquisitions in this subject at Clendening, UMKC, and St. Luke's libraries

CA_T, UA_T, SA_T = Total new acquisitions at Clendening, UMKC and St. Luke's libraries

CB_W, UB_W, SB_W = Number of titles borrowed on interlibrary loan in this subject at Clendening, UMKC and St. Luke's libraries.

CB_T, UB_T, SB_T = Total number of titles borrowed on interlibrary loan at Clendening, UMKC and St. Luke's libraries.

FIG. 7—Combined collection balance (relative percentage) computations for each subject field at all three libraries.

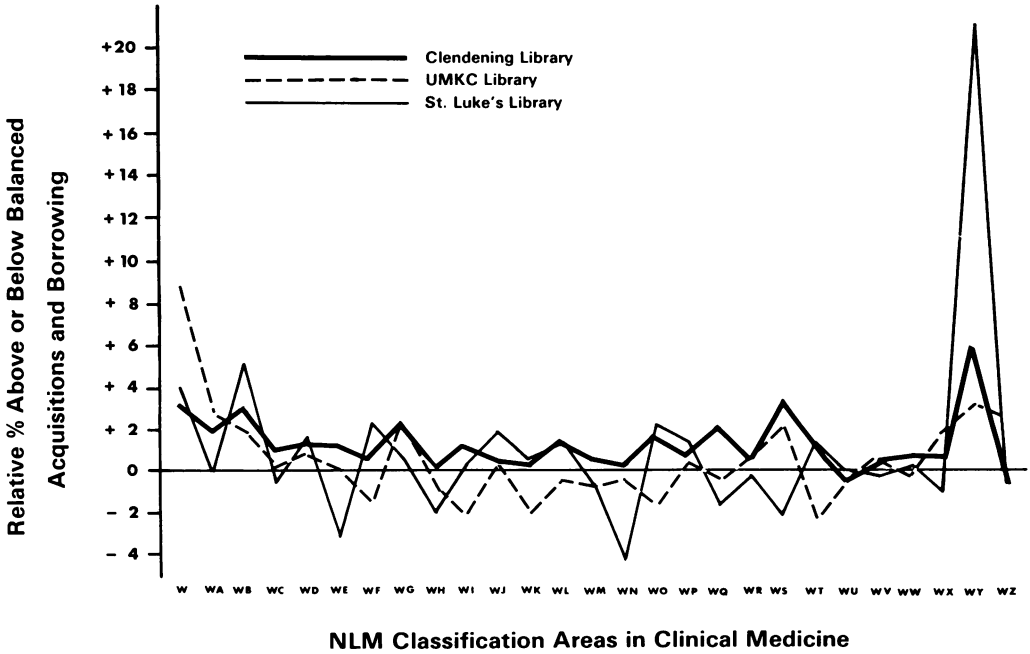

FIG. 6—Collection balance indicators for the Clendening, UMKC, and St. Luke's libraries for fiscal year 1980.

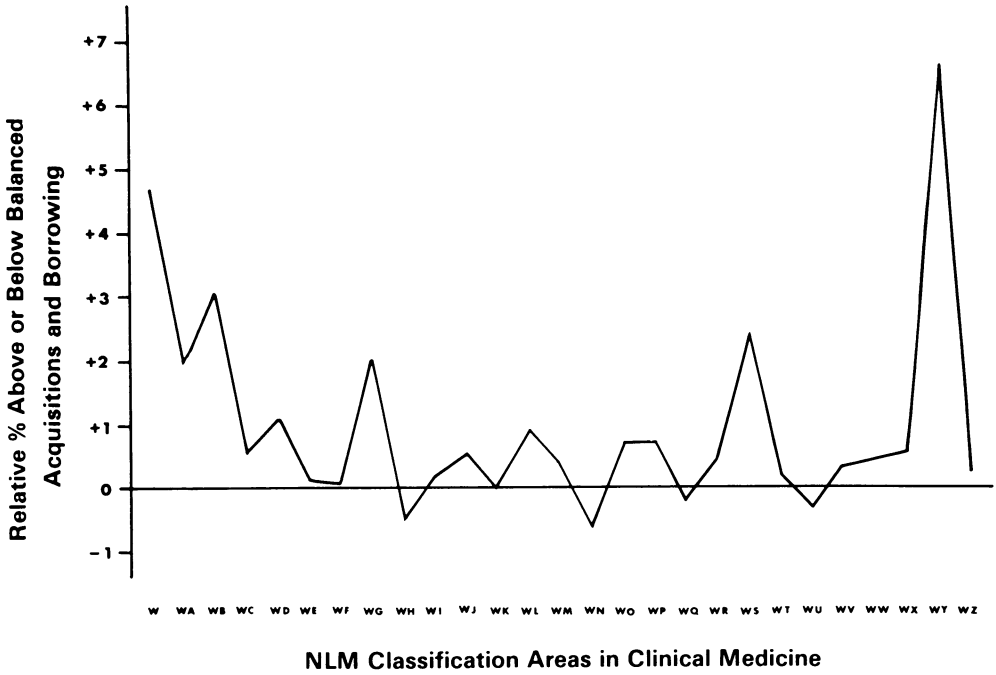

FIG. 8—Combined collection balance indicator for the Clendening, UMKC, and St. Luke's libraries for fiscal year 1980.

CONCLUSION

Whether for a consortium or an individual library, this statistical technique can enhance collection development decisions. One application would be to graph the data annually to measure the impact of previous collection development efforts and to help predict future user needs. To facilitate this evaluation and forecasting process, the librarian would need to keep records of new acquisitions by classification number and to record call numbers on interlibrary loan forms at the time of each transaction. It would also be helpful to tabulate ILL data monthly instead of attempting to sort through a year's collection of paperwork. If this process of analysis and prediction were performed consistently for a number of consecutive years, the library would have a measure of the validity of previous collection development efforts.

The basic principle of graphing collection growth or strength statistics along with use statistics by subject fields has potential applications in many different library settings. Some libraries may want to use other collection strength and use statistics instead of, or in combination with, ILL and acquisitions records. For example, this technique could be refined by including circulation or other use statistics in the calculations and by analyzing other variables, such as year of publication, for each title. However, the authors are convinced that the basic methodology and statistics chosen for this study can be useful in analyzing collection balance in the small health sciences library.

The most important advantage of this collection development tool is its simplicity. The librarian does not need to be a statistician to conduct the study. The only requirements are a willingness to organize data periodically, perform percentage computations, and graph the findings.

Professionals and students using health sciences libraries will continue to rely on interlibrary loan to supply some of their needs. The librarians in small institutions, however, need a method to evaluate these user needs in relation to their collection development efforts. This statistical technique can help where the resources for a more sophisticated analysis are lacking.

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