Research in health sciences library and information science: a quantitative analysis

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A content analysis of research articles published between 1966 and 1990 in the *Bulletin of the Medical Library Association* was undertaken. Four specific questions were addressed: What subjects are of interest to health sciences librarians? Who is conducting this research? How do health sciences librarians conduct their research? Do health sciences librarians obtain funding for their research activities? Bibliometric characteristics of the research articles are described and compared to characteristics of research in library and information science as a whole in terms of subject and methodology. General findings were that most research in health sciences librarianship is conducted by librarians affiliated with academic health sciences libraries (51.8%); most deals with an applied (45.7%) or a theoretical (29.2%) topic; survey (41.0%) or observational (20.7%) research methodologies are used; descriptive quantitative analytical techniques are used (83.5%); and over 25% of research is funded. The average number of authors was 1.85, average article length was 7.25 pages, and average number of citations per article was 9.23. These findings are consistent with those reported in the general library and information science literature for the most part, although specific differences do exist in methodological and analytical areas.

Health sciences librarianship has been a specialization within librarianship for nearly 100 years. This is evidenced by the founding of the Medical Library Association (MLA) in 1898, with incorporation following in 1934. Research activity among health sciences librarians, however, is more difficult to date. In an exchange of letters between Dr. George M. Gould and Major James Cushing Merrill cited by Colaianni [1], an implicit need for applied research is evident in the first of nine reasons given for forming the organization that would become MLA. Specifically, Dr. Gould mentions that "conference and acquaintanceship between medical librarians would encourage improved methods of library-work . . . whereby the world's medical literature would become more used by and more useful to the medical profession" [2]. While not really describing research activities, this goal of identifying "improved methods" is the same goal that today leads us to conduct research projects, particularly applied research.

This goal is now explicitly addressed in MLA's strategic plan as a commitment to ". . . improving health through professional excellence and leadership in research in health information science" [3]. With research now considered a primary mission of MLA, the question of how MLA's membership has responded to the issue of research arose. This study was undertaken to provide an overview of research activities of the past twenty-five years, as reported in our subdiscipline's primary journal.

Specifically, the purpose of this paper is to describe, analyze, and evaluate patterns of research activity as reflected in the reports of research published in the *Bulletin of the Medical Library Association* (*BMLA*). Four specific questions were addressed. First, what subjects have been of interest to health sciences librarians? Research topics are frequently used as a means of examining a discipline. The topics that practitioners of a field study and the methods utilized in studying those topics "affirm the basic organization, interests and maturity of that field" [4]. We are assuming that the same holds true for a subdiscipline, such as health sciences librarianship.

The second question focused on who has been con-

ducting research in health sciences librarianship. Is a health sciences librarian associated with one type of institution more likely to publish reports of research activity than a health sciences librarian associated with any other type of institution?

The third research question related to how health sciences librarians have conducted their research. Specifically, this study identified the research methods and analytical techniques described most frequently by health sciences librarian researchers.

Another aspect of how research has been conducted involves the more practical matter of funding. The fourth research question related to financial support for research activities.

In addition to these four questions, data were collected on several bibliometric characteristics of research articles written by health sciences librarians.

METHODOLOGY

Content analysis. Content analysis is used to "identify and record the meaning of documents and other forms of communication in a systematic and quantitative way" [5]. It is a methodology that originated in the field of communications and was then adopted by other social sciences disciplines. Content analysis provides a unique means of quantitatively assessing subject interests and methodologies over time.

Sources of research articles. Because they work within a specialized field of librarianship, health sciences researchers can publish in numerous high-quality journals. Previous studies examining the library and information science literature in general utilized rankings and impact factor as a means of selecting core journal titles from dozens of professional titles. Since its beginning in 1911, a single journal has been the predominant vehicle in which health sciences librarians have preferred to publish: *BMLA*. (The initial publication of the *BMLA* in 1911 succeeded several earlier titles, *Medical Library and Historical Journal, Bulletin of the Association of Medical Librarians,* and *Medical Libraries,* which date back to 1898.) More recently, *Medical Reference Services Quarterly* (*MRSQ*) has joined *BMLA* as a specialized health sciences librarianship journal; however, because this study looked only at articles reporting research findings, *MRSQ* was not examined. This decision was based on the perception of *MRSQ* as a practice-oriented (rather than research-oriented) journal, its relatively short publication history, and its exclusion from MEDLINE and Institute for Scientific Information citation indexes. A recent study of journal rankings in health sciences librarianship confirmed *BMLA* as first for number of articles published by health sciences libraries, as well as the most frequently cited health sciences library journal [6]. Therefore, *BMLA* was selected as the sole source of research articles for this study.

Selection of research articles. Twenty-five years (1966–1990) of *BMLA* were examined. A MEDLINE search was conducted to retrieve citations and abstracts (when available) for all articles published from 1966 forward. Letters, obituaries, essays, editorials, and commentary were excluded. A total of 1,218 articles was retrieved.

These 1,218 articles were then classified as either research or nonresearch papers. Previously reported studies of research activity in library and information science provided the operational definition of research. The definition used in the first of these studies has been employed by subsequent researchers and was selected for this study to insure comparability and consistency [7]. This definition states that research is "an inquiry which is carried out, at least in part, by a systematic method with the purpose of eliciting some new facts, concepts, or ideas" [8]. Two research assistants examined the 1,218 citations. Using information contained in the titles, abstracts, and subject headings, each citation was classified as being research or nonresearch. If not enough information was found in the MEDLINE citation, the article itself was examined.

In content analysis, the best possible practice is to have the entire sample coded by more than one coder. However, spot-checking can be used to check for bias [9]. In the present study, the author checked a sample of the articles coded by both assistants to check for interrater reliability.

Of the total database of 1,218 citations, 363 (29.8%) were identified as representing research articles. These 363 articles constituted the complete population of research articles published in *BMLA* between 1966 and 1990.

This percentage of research articles, 30%, is similar to that reported in previous studies that examined samples from the general library and information science literature. Peritz, who examined journal literature over time from 1950 to 1975, found a peak of 31% in 1975 [10]. Nour found 24.4% in a 1980 sample [11], and Feehan found 23.6% in a 1984 sample [12].

Analysis of research articles. The full texts of the 363 research articles were then analyzed for content. One research assistant was responsible for all coding, with the author spot-checking approximately 10% of the research articles.

For each article, descriptive data were collected in addition to data available in the MEDLINE citation. These data included total number of pages, total number of authors, total number of references, and source of research funding, if appropriate. Institutional affiliation of the first author by institution type was

Table 1
Descriptive statistics for *BMLA* research articles 1966–1990

Variable	Number of research articles (n = 363) (%)
Year of publication	
1966–1970	45 (12.4%)
1971–1975	70 (19.3%)
1976–1980	92 (25.3%)
1981–1985	71 (19.6%)
1986–1990	85 (23.4%)
Broad subject classification (appendix B)	
Applied	166 (45.7%)
Theoretical	106 (29.2%)
Professional concerns	48 (13.2%)
General	42 (11.6%)
Related fields	1 (0.3%)
Automation	
Yes	97 (26.7%)
No	266 (73.3%)
Institutional affiliation	
Academic H.S. library	188 (51.8%)
Other	53 (14.6%)
Library school	47 (12.9%)
Hospital library	22 (6.1%)
Society library	21 (5.8%)
Government library	19 (5.2%)
Other library	13 (3.6%)
Funding source	
None	262 (72.2%)
Government	83 (22.9%)
Own institution	7 (1.9%)
Other	6 (1.7%)
Association	5 (1.4%)
Total number of authors*	
1	168 (46.3%)
2	120 (33.1%)
3	48 (13.2%)
4	19 (5.2%)
6+	5 (1.4%)
5	3 (0.8%)
Total number of pages†	
5–9	204 (56.2%)
1–4	86 (23.7%)
10–14	54 (14.9%)
15–19	12 (3.3%)
20+	7 (1.9%)
Total number of citations‡	
1–4	119 (32.9%)
5–9	100 (27.5%)
10–14	73 (20.1%)
15–19	44 (12.1%)
20+	27 (7.4%)

* Mean 1.85; median 2.00; SD 1.04.
† Mean 7.25; median 6.00; SD 4.43; minimum 2; maximum 41.
‡ Mean 9.23; median 7.00; SD 9.33; minimum 0; maximum 88.

also recorded. Institutional categories included academic health sciences library, hospital library, society or association, government, other type of library, library educator, and other.

Each article was classified according to research methodology. Because it is preferable to use categories tested in previous studies of a similar nature [13], the eleven research methods described by Feehan were used [14]. These eleven research methods were bibliometrics, content analysis, delphi, experimentation, historical, observation/description, operations research, secondary analysis, survey research, multiple (two or more categories listed previously), and other (for those articles that fit none of the ten categories). Definitions for each of these methods can be found in appendix A.

Articles were also classified by subject. Again, to allow for comparison across studies, a classification scheme from a previous study was used [15]. This scheme contains twenty-five categories. These can be found in appendix B. These twenty-five categories can be compressed into five broad subject areas, also identified in appendix B. Finally, because of the important changes resulting from automation over the past twenty-five years, a second, more general, subject classification was made: each article was classified as to whether it described an application of automation.

The analytical techniques used in the articles were classified into the following four categories: quantitative descriptive, quantitative inferential/predictive, nonquantitative descriptive, and nonquantitative inferential/predictive.

All data were coded and entered into a machine-readable file. Analysis of the data was performed using SPSS/PC+.

FINDINGS

Subject. The frequency distribution by broad subject area indicates that research in health sciences librarianship is concentrated in applied areas (Table 1). Various applied topics constitute 45.7% of all articles, similar to the 50.5% identified in the 1984 general literature. Theoretical topics were the subject of 29.2% of all articles, over double the percentage (13.0%) identified in the general literature of 1984.

A breakdown by specific topic shows that all twenty-five subject categories (appendix B) except book selling are represented (Table 2). However, more than half (54.5%) of all articles fall into six specific subject categories: collections, information dissemination/retrieval, education for librarianship, systems, networks, and organization of knowledge. These six categories represent three of the five general classifications (applied, theoretical, and professional).

Over a quarter (26.7%) of all research articles dealt with some aspect of automation. This compares well to the 28.5% identified in 1984 as dealing with some aspect of automation, particularly given that the *BMLA* figure covers twenty-five years. This distribution is heavily concentrated in applied topics, but a substantial percentage fall into the theoretical category (Table 3). An obvious trend is apparent when the data are collapsed into five-year divisions. There is a con-

Table 2
BMLA research articles 1966–1990—research topic by specific subject area

Subject area (classification number, appendix B)	Number of articles (%)
Collections (4.5)	54 (14.9%)
Information retrieval (3.6)	39 (10.7%)
Education for librarianship (2.2)	30 (8.3%)
Systems (4.4)	28 (7.7%)
Networks (4.7)	24 (6.6%)
Organization of knowledge (3.5)	23 (6.3%)
Libraries and society (1.2)	19 (5.2%)
Information science (3.3)	17 (4.7%)
Technical services (4.3)	16 (4.4%)
History of libraries (1.1)	15 (4.1%)
Users	15 (4.1%)
Structure of knowledge (3.4)	14 (3.9%)
Public services (4.2)	13 (3.6%)
Administration and management (4.1)	12 (3.3%)
Communication (3.2)	11 (3.0%)
International librarianship (1.3)	8 (2.2%)
Status (2.3)	6 (1.7%)
Other professional concerns (2.5)	6 (1.7%)
Organizations (2.1)	4 (1.1%)
Buildings (4.6)	4 (1.1%)
Ethics (2.4)	2 (0.6%)
General theoretical (3.1)	2 (0.6%)
Publishing (5.1)	1 (0.3%)
Total	363 (100.0%)

sistent increase in the percentage of articles dealing with automation from 17.8% in 1966–1970 to 40% of all research articles published in 1986–1990.

Institutional affiliation. The second characteristic examined was the institutional affiliation of the first author. Table 1 includes the frequency distribution of institutional affiliation, indicating that a majority (51.8%) of first authors were working in academic health sciences libraries. Library school faculty, hospital librarians, librarians associated with society or association libraries, and government librarians were responsible for considerably fewer research articles. While not measuring identical variables, this finding is indicative of a trend found in a regional survey that "hospital librarians in nonacademic settings reported research activity least frequently" [16].

Data breaking down MLA membership by institutional categories is not available; however, Landwirth cited a 1987 MLA Editorial Committee survey that found that 24% of *BMLA* readers work in academic institutions, 54% in hospitals, and 32% in other types of institutions. This distribution is not consistent with the findings of the current study nor with Landwirth's findings that 66% of all articles submitted to *BMLA* are written by academic health sciences librarians and 20% are written by hospital librarians [17].

Research method. By far the most frequently used research method was survey research, accounting for

Table 3
Research related to automation

Broad subject classification (appendix B)	Articles addressing automation (n = 97) (%)
Applied	53 (54.6%)
Theoretical	41 (42.3%)
Professional concerns	3 (3.1%)
General	0
Related fields	0

Year of publication	Total articles	Articles on automation	% of total articles
1966–1970	45	8	17.8%
1971–1975	70	16	22.9%
1976–1980	92	21	22.8%
1981–1985	71	18	25.4%
1986–1990	85	34	40.0%

41% of all articles, followed by observation in 20.7% of the articles (Table 4). Bibliometrics (13.8%) and operations research (12.1%) were the next most frequently used research methods. All other methods were reported in fewer than 10% of the articles.

These findings differ considerably from the findings of previous studies. Feehan found that historical research was the most popular method (23.7% of the 1984 general library and information science sample), followed by survey research, observation, and the use of multiple methods (20.3%, 17.0%, and 14.6%, respectively) [18]. A different distribution was also reported by Nour in the 1980 general literature [19]. While she reported a similar high percentage related to use of survey research methods (41.5%), the second- and third-ranking methods were theoretical/analytic (21.2%) and bibliometrics (10.9%). Peritz used different categories, but a general comparison is possible. She found that 38% used survey methods, 18% historical, 17% "information system design" methods, and 14% theoretical/analytic methods [20].

These findings suggest that, while survey research consistently ranks high as a research methodology, a

Table 4
Use of research methodology

Research methodology	Number of articles (%)
Survey research	149 (41.0%)
Observation	75 (20.7%)
Bibliometrics	50 (13.8%)
Operations research	44 (12.1%)
Historical	24 (6.6%)
Content analysis	6 (1.7%)
Experimental	6 (1.7%)
Secondary analysis	4 (1.1%)
Multiple	2 (0.6%)
Other	2 (0.6%)
Delphi	1 (0.3%)
Total	363 (100.0%)

variety of other methods are also used (and have been used over the past twenty-five years) in library and information science research in general, as well as in health sciences library and information science research.

Analytical technique. The most common analytical technique used was quantitative descriptive (303 articles, 83.5% of all articles). Quantitative inferential analysis was described in seven articles (1.9%). Nonquantitative techniques were not nearly as popular: nonquantitative descriptive analyses were done in fifty articles (13.8%) and nonquantitative inferential analyses were done in only three articles. Descriptive techniques (both quantitative and nonquantitative) were preferred; they were used in 97.3% of research articles. Only 2.7% used inferential techniques.

A study of all types of library and information science journal articles found a substantially higher percentage of inferential statistics use (11.1%) [21]. This may be explained by the training and environment of the researcher. In the previous study, only 5.8% of the articles written by academic librarians used inferential statistics, a figure closer to this study's 2.7% finding. Because the categories used in both studies are not comparable, this figure might have been considerably larger had the category included hospital librarians, society librarians, and government librarians. The previous study distinguished between academic librarians and faculty members only. It found that the most likely group to use inferential statistics was faculty from other (non-information and library science) disciplines, followed by information and library science faculty. Faculty members represent a relatively small percentage of *BMLA* research article authors (12.9%). Most *BMLA* research article authors are academic librarians, who were much less likely to use inferential statistics in both studies.

Funding. Funding to support research activity was reported by 101 (27.8%) of the authors. Of this funding, 82.3% came from a government agency, and the rest came from the author's own institution, an association, or some other source. A study of articles in the *Journal of the American Society for Information Science* found that 38.2% of the sample (of 1970s articles) reported receiving funding [22]. This higher level of funding may be indicative of the greater availability of external funds for research during the 1970s, as well as the greater likelihood of receiving funding for theoretical and basic science research in our field than for the applied topics more frequently found in the *BMLA*.

Bibliometric characteristics. Total number of pages, total number of authors, and total number of citations were examined. Average number of pages and total number of authors are included in Table 1. No correlation existed between average pages per article or average number of authors over time, by institutional affiliation or by funding.

All citations were counted, with no distinction made between type of source cited. Authors of research articles in *BMLA* cited between zero and eighty-eight other sources. The average number of citations was 9.23. This figure falls between those found in two previous studies of the general library and information science literature.

Nour's survey of the 1980 literature found an average of 12.6 citations per article [23]. Peritz's longitudinal survey found an average of 8.7 citations per article in 1975, an increase from 3.9 in 1960, 6.9 in 1960, 7.2 in 1965 and 7.1 in 1970 [24]. This trend was confirmed by Nour. The present study of research articles in *BMLA* averages the number of citations over twenty-five years and is therefore not comparable to the other figures. However, Peritz's average of citations in articles sampled from 1950 through 1975 was 7.4, which reflects favorably on the 8.7 average identifed in the *BMLA* research articles published between 1966 and 1990.

In thirty-six articles (9.9%), *BMLA* authors cited no other sources. This percentage is lower than that found by both Nour and Peritz. Nour found 16% of research articles lacked citations, and Peritz found 21% over her 25-year longitudinal sample, and 16% for 1975 (the lowest percentage over the 25 years). All of these figures are surprising, particularly because these are studies of research articles. Peritz examined the articles with no citations in her study and found that the majority of them are reports on very simple investigations [25].

Individual publication patterns. Not comparable to any other figures, but interesting to note, is the frequency of publication by individual authors. Of the 363 articles, eleven were contributed by one (very prolific) author (as the first author listed). Six articles were written by a second author, 4 authors each wrote 5 articles, 3 authors each wrote 4 articles, 12 authors each wrote 3 articles, and 34 authors each wrote 2 articles. Two hundred and five individuals each contributed one research article.

CORRELATIONS AMONG VARIABLES

Because of the skewed distributions in all categories, tests for significant differences between means (using analysis of variance) were not feasible. In examining other relationships between variables with numerous categories, collapsing categories did not result in enough cell frequencies >5 to allow for statistical testing of observed frequencies (using the X^2 statistic).

CONCLUSIONS

Previous studies of the library and information science literature have found that the methodologies used and the subjects discussed are varied. This study of a subdiscipline's research literature confirms these findings. However, applied topics still dominate the literature. The percentage of articles dealing with automation continues to increase, but again, it is concentrated in applied topics.

Research articles published in *BMLA* describe use of less sophisticated research methods and analytical techniques than the literature in the field as a whole. While this is partially explained by the lower representation of faculty members publishing in *BMLA* (who presumably have had formal training in research methods as a requirement of doctoral study), it should be of concern to health sciences librarians. Quality and rigor of research is frequently used as a measure of a discipline's scholarly maturity. While health sciences librarianship reflects existing practices in library and information science as a whole, neither the discipline nor the subdiscipline exhibits the sophisticated research activities that can be found in other fields.

All well-planned and executed research on topics relevant to a discipline is useful and worthy of the resources expended in conducting and reporting it. This is true even if the research methodologies are less complex than those in other fields. But the findings reported here should be used as encouragement to broaden the scope of our research efforts in terms of both subjects addressed and methods used.

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REFERENCES

1. COLAIANNI LA. That vision thing. Bull Med Libr Assoc 1992 Jan;80(1):1–8.
2. GOULD GM. (119 South Seventeenth Street, Philadelphia). Letter to Surgeon J. C. Merrill. 1897 October 19. 3 leaves. As cited in Colaianni, ibid., 2.
3. MEDICAL LIBRARY ASSOCIATION. Shaping the future: the strategic plan of the Medical Library Association. MLA News 1987 Apr;(196):S1–S16.
4. FEEHAN PE, GRAGG WL II, HAVENER WM, KESTER DD. Library and information science research: an analysis of the 1984 journal literature. Libr Info Sci Res 1987 Jul–Sep;9(3): 173–85.
5. ALLEN B, RESER D. Content analysis in library and information science research. Libr Info Sci Res 1990 Jul–Sep; 12(3):251–62.
6. FANG ME. Journal rankings by citation analysis in health sciences librarianship. Bull Med Libr Assoc 1989 Apr;77(2): 205–11.
7. PERITZ BC. The methods of library science research: some results from a bibliometric survey. Lib Res 1980 Fall;2(3): 251–68.
8. IBID., 251.
9. ALLEN, op. cit., 258.
10. IBID., 254.
11. NOUR MM. A quantitative analysis of the research articles published in core library journals of 1980. Lib Inf Sci Res 1985 Jul–Sep;7(3):261–73.
12. FEEHAN, op. cit., 176.
13. ALLEN, op. cit., 257.
14. FEEHAN, op. cit., 183–4.
15. IBID., 184–5.
16. BURDICK AJ, DOMS CA, DOTY CC, KINZIE LA. Research activities among health sciences librarians: a survey. Bull Med Libr Assoc 1990 Oct;78(4):400–1.
17. LANDWIRTH TK. Your fair share [editorial]. Bull Med Libr Assoc 1990 Jan;78(1):69–70.
18. FEEHAN, op. cit., 180.
19. NOUR, op. cit., 268.
20. PERITZ, op. cit., 256.
21. ENGER KB, QUIRK G, STEWART JA. Statistical methods used by authors of library and information science journals articles. Lib Inf Sci Res 1989 Jan–Mar;11(1):37–46.
22. HARTER SP, HOOTEN PA. Factors affecting funding and citation rates in information science publications. Libr Inf Sci Res 1990 Jul–Sep;12(3):263–80.
23. NOUR, op. cit., 269.
24. PERITZ BC. Citation characteristics in library science: some further results from a bibliometric survey. Lib Res 1981 Spring;3(1):47–65.
25. IBID., 49.

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APPENDIX A

Research methods

Bibliometrics. The measurement of interrelated aspects of writing, publication, and usage, including citation analysis.

Content analysis. A procedure designed to facilitate the objective analysis of the appearance of words, phrases, concepts, themes, characters, or even sentences and paragraphs contained in printed or audiovisual materials.

Delphi method. Designed for use in refining judgmental data collected from a panel of selected experts. Delphi is a systematic approach to the generation of consensus opinions among a group of carefully selected and anonymous respondents.

Experimental. Studies in which investigators specify exactly or control the conditions that will prevail in the investigation. This category includes both field

experiments and those in artificially created environments.

Historical research. The collection, verification, and analysis of historical information.

Observation and description. Directed surveillance of an object or subject of an investigation including the recording of observed data. Case studies and systems analysis fall in this category. Survey research, because of its high occurrence rate, has been placed in a separate category.

Operations research. The application of scientific method to management operations to provide a quantitative basis for decision making. This method involves problem formulation, methodology design, data gathering, and model development.

Secondary analysis. Studies that re-analyze published data from other sources.

Survey research. Research based upon data measured directly through interviews or questionnaires.

Multiple. Research employing two or more of the methods listed above.

Other. Any research method not falling into one of the other ten categories.

APPENDIX B

Subject classification scheme

1. General. Used for studies that provide a broad overview of library science or its foundations. Articles that dealt with a specific subject were placed in categories 2–4.
1.1 History of libraries or librarianship
1.2 Libraries and society
1.3 International librarianship

2. Professional concerns. Librarianship as a profession, including such concerns as status, salaries, and education.
2.1 Organizations
2.2 Education for librarianship
2.3 Status
2.4 Ethics
2.5 Other

3. Theoretical. For articles that examine or attempt to formulate theories or principles that can provide a theoretical basis for library and information science. Application of theories from other disciplines to library and information science is included here.
3.1 General
3.2 Communication theory
3.3 Information science theory
3.4 Structure of knowledge or information: includes use of information in different situations or disciplines, knowledge structure of disciplines
3.5 Organization of knowledge or information: includes the creation or analysis of intellectual systems for the classification or arrangement of knowledge
3.6 Dissemination or retrieval of information: includes the study of information transfer and of user interactions with systems

4. Applied. Studies of information science or librarianship in practical situations.
4.1 Administration and management
4.2 Public services—the direct provision of services including reference and bibliographic instruction
4.3 Technical services: includes acquisitions and cataloging
4.4 Systems—systems used within or among libraries
4.5 Materials or collections: includes materials selection, collection development, and preservation
4.6 Buildings: includes physical characteristics of buildings and their furnishings
4.7 Cooperation or networks—all types of cooperative agreements between libraries including ILL
4.8 Library users—the behavior, attitudes, and opinions of library users or nonusers

5. Related fields. Any research not directly on libraries, library science, or information science.
5.1 Publishing—concerned with production
5.2 Bookselling—concerned with marketing
5.3 Other