How much of Library and Information Science Literature qualifies as research?

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ABSTRACT

There is an extensive amount of Library and Information Science (LIS) writing produced each year. While there is general awareness regarding the variety of journal literature, there is no certainty on the percentage of the collection that we can call research. This project is an important first step in answering the question. A content analysis of the LIS academic/scholarly journals at the Simmons College Library was conducted. The research level collection of LIS literature makes the library an ideal candidate for this study. The latest issue of each journal subscribed to for fiscal year 2012-2013 containing academic/scholarly content was analyzed. Each article was analyzed to determine: 1) if it was research or non-research, 2) the method used to collect data for the study in the article, and 3) the subject terms or key words associated with the article. 105 journal titles were identified out of 177 periodicals. In the 1880 articles analyzed from these, 16% qualified as research. Surveys were found to be the most popular research method used. This study

will benefit students, faculty, and staff with research requirements as well as librarians who guide patrons through a search for research literature.

Keywords

Content analysis, research methods, periodicals, library and information science research

INTRODUCTION

Research is a core component of academia. Both faculty and students must produce and consume research to satisfy requirements of tenure or graduation, and the Library and Information Science (LIS) field is no different. As part of an evolving field, LIS programs benefit from analysis and experimentation leading to new insights – or research.

While there is an understanding of the gradations of the vast body of literature published in the field, there is no certainty on the percentage of the LIS literature that qualifies as research for a given year (Nour, 1985; Jarvelin & Vakkari, 1990; Buttlar, 1991; Aharony, 2012). Past studies have tended to look at a limited set of LIS journals when investigating such work. There is also much speculation about the range of topics covered in LIS literature. Furthermore, there is a gap in knowledge of the methodologies most commonly used to conduct the research.

This content analysis provides a snapshot of the LIS periodicals collection at the Beatley Library at Simmons College. It is a small academic library serving the needs of all students in the college, including all those in the Graduate School of Library and Information Science (GSLIS). The purpose of this study is to determine what percentage of the LIS periodical collection available to GSLIS students, faculty, and staff qualifies as research. LIS databases and the LIS periodicals collection available through the Simmons College Library were both used to conduct this study.

While the larger research question is "*How much of LIS literature qualifies as research?*" the specific questions investigated in this study are:

- RQ1: *What percentage of the LIS periodicals subscribed to for the financial year (FY) 2012-2013 are journals with academic/scholarly content?*
- RQ2: *Of the journals identified, what percentage of the articles found in those journals qualify as research?*
- RQ3: *In the articles that qualify as research, what methods of data gathering are used for research?*
- RQ4: *What are the keywords associated with both the a) research articles and b) non-research articles?*

These questions are summarized in Figure 1 below:

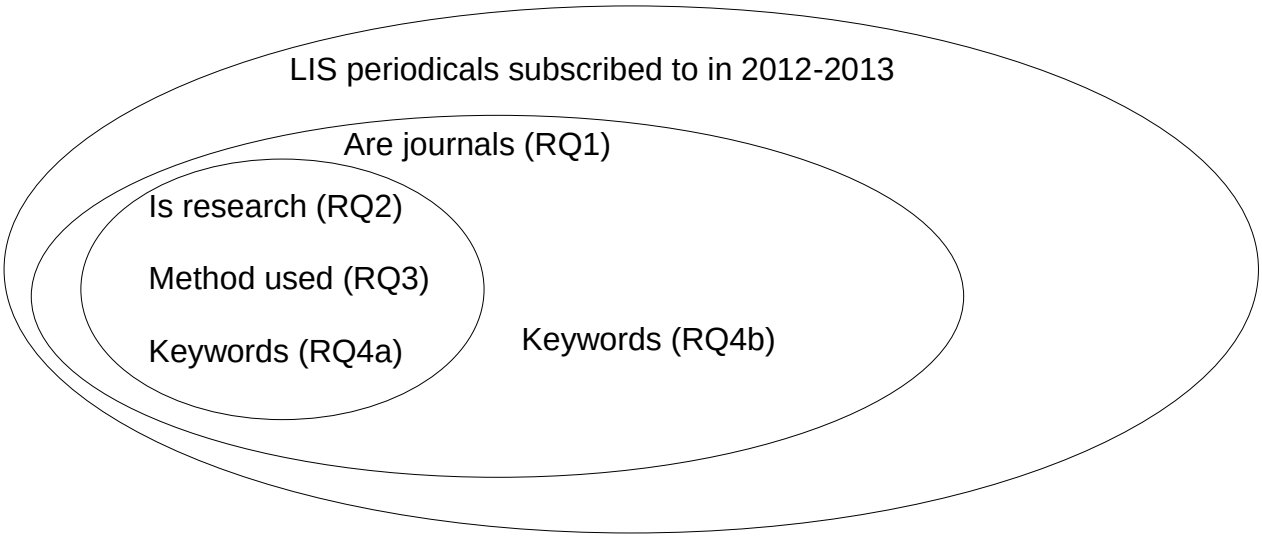

Figure 1 Summary of research questions

The results of this study will provide a more accurate estimate of the percentage of research in the LIS journals collection. This study also provides a snapshot of the topics covered and methods used in current research.

It is critically important that LIS students learn about and value assessment and evaluation. It is also worthwhile to evaluate the contents of the LIS journals to determine the quantity of research published. This study's findings could impact how LIS Librarians support LIS researchers. Librarians and established researchers mentoring new researchers will have a more concrete sense of the state of the literature, and how much of it is actually research. This improved understanding of the trends in research topics, keywords, subject terms, and methods could lead to an improved search experience, and better training for students getting acquainted with research and writing a literature review.

This study benefits both users and staff of the Library. Specifically, Library staff will have a clearer sense of how much the collection could fit the research needs of faculty, staff, and, students of the GSLIS program. Stakeholders for this study include LIS students with research requirements for completion of their degree and faculty with research requirements for tenure. Other stakeholders include librarians who help researchers find appropriate information resources.

The rest of the paper is organized as follows: In the next section, we will review past work in this area. This is followed by a detailed discussion of the methodology used. We then have the findings

and discussion addressing the four research questions. The paper concludes with directions for future work, and strengths and limitations of the study. We will now look at the literature review.

LITERATURE REVIEW

There have been a number of content analysis studies looking at LIS periodicals. These studies have primarily focused on the percentage of a collection that qualifies as research, the subjects covered, and methodologies used in LIS research (Nour, 1985; Feehan, Havener, & Kester, 1987; Jarvelin & Vakkari, 1990; Kumpulainen, 1991). While these studies provide valuable information regarding the trends of research literature, they tend to focus on analyzing articles from a list of core LIS research journals. Additionally, the content analyses focus on a limited list of journals with a research focus. These studies intentionally exclude all non-peer reviewed and non-refereed journals (Nour, 1985; Feehan, Gragg II, Havener & Kester, 1987; Kumpulainen, 1991; Jarvelin & Vakkari, 1993; Koufogiannakis & Slater, 2004). In each case, the list of core journals is compiled after analyzing multiple indices to identify titles that are included in more than one database or index. Feehan *et al.* (1987) also solicited feedback from library professionals as to their opinion of the core journals in LIS. All studies explicitly excluded international journals. Only Jarvelin & Vakkari (1990, 1993) included non-English international journals.

The total list of core journals thus varied from as little as 10 (Arahony, 2012) to 91 (Feehan *et al*., 1987). This indicates that there is no consistency in what qualifies as a core journal. Another factor briefly addressed by Jarvelin & Vakkari (1993) is the nature of the publishing industry. Core journal lists vary between decades because the core journals identified for one decade may cease to exist before another, and new core journals may emerge since the initial year of cross-decade studies (Jarvelin & Vakkari, 1993, p.131). It is therefore generally difficult to develop an unbiased,

consistent list of core academic/scholarly journals, even with cross referencing lists of indexed titles as a means of developing the core list.

While part of the fluctuation in the final estimate of the percentage of research in a core collection can be attributed to trends in the field, it is also due in part to varying methods of conducting research (Jarvelin & Vakkari, 1990). Related to this is the fact that even when only analyzing core journals, not 100% of these research journals are research (Nour, 1985; Feehan, Gragg II, Havener & Kester, 1987; Jarvelin & Vakkari, 1990; Buttlar, 1991; Kumpulainen, 1991).

The changing lists of journal titles selected for analysis also resulted in skewed results of the percentage of research literature found. Jarvelin & Vakkari found that as much as 54% of their sample qualified as research while Feehan *et al*. (1987) found that only 23.6% of the sample qualified as research. An inconsistency in journal titles further exacerbates the effects of a fluctuating publishing industry. This discrepancy makes it difficult to develop a sense of the field.

Both Buttlar (1991) and Arahony (2012)'s studies produced valuable information about trends in authorship of research in LIS literature. Buttlar (1991) analyzed author information including geographic location, sex, occupation, and geographic location. Aharony (2012)'s most recent content analysis went beyond Buttlar (1991) and presented statistical descriptive analysis of research article keywords as well. While Aharony (2012) builds on the work of Buttlar, both authors limited the scope of their research by only including select journals. Buttlar (1991) limited the list to 20 LIS journals while Aharony included just 10.

A consistent theme throughout the studies is the need to define 'research' before undertaking a content analysis. Several content analyses (such as Nour, 1985; Feehan *et al*., 1987; Yontar & Yalvac, 2000) use a consistent definition of research as established by Peritz (1980):

Research is any "inquiry which is carried out, at least to some degree, by a *systematic method* with the purpose of eliciting some *new* facts, concepts, or ideas" (Peritz, 1980, p.251).

But, as Nour suggests, even a highly accepted definition is "criticized for its lack of rigor" (p.262). This definition is often critiqued as too broad and not specific enough to the field (Koufogiannakis & Slater, 2004). Still, this definition endures for its inclusion of its key concepts, 'method' and 'purpose', which allow a researcher to more easily distinguish research articles from other articles (Nour, 1985; Feehan *et al*., 1987; Yontar & Yalvac, 2000). Additionally, this consistent definition increases the external validity of the studies, even if their core journal lists vary drastically.

This definition has also been used in content analyses of international, non-English journals, further demonstrating its endurance and relevance (Kajberg, 1996; Yontar & Yalvac, 2000). Moreover, the use of the same definition ensures it will still be applicable to a collection that includes international, non-English journals. These international studies also varied in scope. Like the American studies, Yontar & Yalvac (1996) limited the journals included in the study. In fact, they focused on only one journal. Still, the study demonstrated that a consistent definition produced reliable data with high internal validity.

Conversely, Kajberg (1996) expanded his research to include all the Danish LIS literature published from 1957 to 1986. Unlike the American studies, the Danish studies included non-research as well as research journals, demonstrating that it is possible to conduct a content analysis that includes different types of journals. These two international studies further support the validity of Peritz's definition of research in analyzing international articles.

Finally, these studies confirm the importance of analyzing the content of both research journals and trade periodicals to develop a better sense of the amount of research that exists within the body

of literature. Furthermore, these studies prove that it is possible to analyze content across journal types spanning multiple years.

METHODOLOGY

This study aims to determine how much of the periodical collection for one fiscal year qualifies as research. In this study, there are no causal variables that will affect the final measure. The research questions and research model was summarized in Figure 1. For the purpose of this study, research is clearly pre-defined based on previous studies based on content analysis which also used Peritz (1980)'s definition.

This research was approached as a content analysis study of articles in LIS journals. The content analysis was completed with additional support from Library staff as necessary. Specifically, staff provided additional support in determining the scope of the project and providing access to e-resources. The LIS collection at the Simmons College Library served as the sample for this content analysis. A draft list of periodicals was used to determine the size of the collection.

The LIS periodicals collection for FY 2012-2013 year serves as the sample year. A list of LIS periodicals available to users for the FY 2012-2013 was first collected. For each periodical identified as a journal, the content of its most recent issue available for FY 2012-2013 was included in the sample in the study. These most recent issues of each available journal for the year were collected, classified, and analyzed. Article abstracts were predominantly used to determine: whether or not an article qualified as research, the methods used in the research articles, and author supplied keywords if they were available. When keywords were not supplied by the author of an article, the database keywords were collected instead.

There were no test subjects to choose from a population for this case study as it is approached as solely a content analysis of a collection. The study population was all LIS periodicals available at the Simmons College Library. The sample for the study included the latest issue available of each academic/scholarly journal subscribed to for FY 2012-2013. This method of sampling was chosen, both to manage the scope of the study, as well as to use latest articles to get the recent snapshot of what qualifies as research.

Periodicals list

Before conducting the analysis, a complete list of journal titles in the collection was compiled. For the purpose of this study, the authors focused on subscription LIS content for FY 2012-2013. This does not include open access journals or cataloged titles of content freely available online. This was a coordinated effort between staff across departments. A list of LIS periodicals compiled for a collection assessment project in 2010 was used to determine the scope of the project. Due to internal changes in workflows and staffing, using library systems to revise the list proved to be a challenge. The final revision of the list was dependent on both accurate catalog records and staff knowledge from years of professional experience.

As part of the list revision procedure, each title was searched for in the library's catalog to record: the call number if the periodical was subscribed to in print, the last issue received, and the databases in which the content was indexed. Any titles that did not have a subject heading of LIS or a Z call number were excluded from the scope of this study. Each of those periodical titles were then researched in the Ulrich's Web Periodicals Directory to determine the publication frequency, serial type, content type, and whether or not it was refereed. A description of each periodical was also recorded.

A new list was retrieved from the library's integrated library system (ILS) using the fund code for LIS periodicals. An additional list was retrieved from a vendor's site. These lists were compared to the 2010 project list to confirm that all periodicals were accounted for and accurately categorized in the revision. The final list for this study was thus narrowed from the 251 titles initially compiled for the 2010 project to 198 titles that were cataloged specifically as part of the LIS collection.

Content analysis

The content analysis included all indexed content: research articles, full length feature articles, reviews, and any other content for which an index entry exists. The content analysis was prioritized by periodical type and content type. Periodicals were prioritized for analysis in the following order:

1. Journals: academic/scholarly
2. Journals: trade
3. Magazines: academic/scholarly
4. Magazines: trade content
5. Other (bulletins, catalogs, newsletters): trade or academic/scholarly

A data collection form was then developed to determine if an article met the criteria to qualify as research. This form was used to collect citation information for each article and to conduct the content analysis. It served as the measure to determine whether or not each article qualified as research based on the definition for this study. This form was developed using best practice from previous studies. Based on the definition of research used for this study, it was decided that research articles should contain: research questions, a literature review, method(s), data, and analysis or discussion. Along with these, identifying information about each article such as journal

title, volume, issue, year, article title, author name, etc. was also recorded (see Table 1). All this information was recorded using Microsoft Excel.

Table 1. Data Collection Form

Data	Where to find and how to enter
Journal Title *Volume* *Issue/Season*	Confirm from cover or database record
Year	Latest available for FY 2012-2013
Article Title	Copy and paste title of article to be analyzed
First author last name	Only the first author's information will be recorded
Does the article have: ▪ *Research questions?* ▪ *A literature review?* ▪ *Methods?* ▪ *Data?* ▪ *Analysis/discussion?* *Is it research⁺?*	Yes (1) or No (0)
Method	Select from list of codes. If "Other," supply method.
Keywords or subject terms	Copy and paste author supplied keywords or index subject terms.

⁺ Research is defined as any "inquiry which is carried out, at least to some degree, by a *systematic method* with the purpose of eliciting some *new* facts, concepts or ideas" (Peritz, 1980, p.251)

If the article qualified as research, a 'Method' field was populated to specify the type of data collection method used in the research study. The codes used for this field are listed in Table 2.

Table 2. List of Codes for the Method field in the Data Collection Form.

Code	Method	Definition (source)
c	Content analysis	"procedures for defining, measuring, and analyzing both the substance and meaning of texts or messages of documents" (Beck & Manuel, 2008, p.35).
i	Interview	uses "a qualitative approach. The interviewer asks open-ended questions and allows participants to respond in their own words". (Beck & Manuel, 2008, p.73)
f	Focus group	"session is conducted by an experienced moderator who leads participants in a discussion using a sequenced script of questions that address very specific, predetermined topics" (Beck & Manuel, 2008, p.75)
q	Questionnaire survey	"researchers ask questions in a fixed order with predetermined responses as choices" (Beck & Manuel, 2008, p.73)
o	Observation	"how people behave in their 'real world' settings…researchers quantify interactive behavior…by systematically assigning codes to behavioral events and they unfold over time" (Beck & Manuel, 2008, p.109)
u	Usability	"always product-driven and is not predominantly human-focused. It looks at how humans use something as a way of improving that device or process" (Beck & Manuel, 2008, p.110)
e	Experimental research	"testing or trying for the sake of discovery or proof" (Beck & Manuel, 2008, p.131)
b	Bibliometrics	"focuses on extrinsic facts about publications"; "concentrates upon those aspects of sources that do not require engagement with or interpretation of sources' content" (Beck & Manuel, 2008, p.165).
a	Action research	"focused upon practitioners solving problems at the local level" (Beck & Manuel, 2008, p.195)
cs	Case study	"takes a specific area or environment for its focus"; "the researcher needs to gather a wide variety of information about the case in order to get a well-rounded multi-dimensional view." (Beck & Manuel, 2008, p.91)
cl	Classroom research	"cumulative research conducted by practitioners in educational settings" (Beck & Manuel, 2008, p.215)
[Specify]		Other method not coded; Specify method

For most titles, an e-resource was used to retrieve an abstract and full-text article in order to conduct the content analysis; only 10 of the titles were analyzed in print either because the latest issue was not yet indexed or full-text access to articles in the most recent issue was not available online. In most cases, the abstract provided enough information to determine if the article qualified as research. The full-text article was also reviewed to confirm the preliminary judgment and to record information not found in the abstract.

All data was analyzed in Excel. Wordle.net was used to analyze the frequency of keywords as well as to create visualizations of these results.

FINDINGS

RQ1. List of journals

The final core list of LIS periodicals available at the Simmons College Library as determined by the catalog and staff included 198 titles. These include journals (123), magazines (34), newsletters (27), bulletins (8), catalogs (1), and unknown periodical types (4). The four titles with unknown content type did not have a serial type in Ulrich's.

Of the 123 journal titles included as part of the final core list, only 16 were excluded. Some of these journals were confirmed or suspected to have ceased (5 journals) or were only available in a foreign language not spoken by the author (1 journal). The majority of the excluded journals were either freely available online or were not available at the Simmons College Library for the sample year (10 journals). An additional five non-journal periodicals were excluded because they were confirmed or suspected to have ceased (4 journals) or were only available in a foreign language (1 journal).

The final list of all periodicals in the LIS collection that fall within the scope of this project includes 177 titles. Of these titles, about 57% (n=101) are journals with academic/scholarly content. See Table 3 for a complete list of titles included in the content analysis.

Table 3. List of Journals Analyzed.

1. Against the Grain
2. ALAN Review
3. Art Documentation: Bulletin of the Art Libraries Society of North America
4. Art Libraries Journal
5. Aslib Proceedings
6. Australian Academic & Research Libraries
7. Australian Library Journal
8. Behavioral & Social Sciences Librarian
9. The Book Collector
10. The Bottom Line: Managing Library Finances
11. Campus-Wide Information Systems
12. Canadian Journal of Information & Library Sciences
13. Cataloging & Classification Quarterly
14. Catholic Library World
15. Children & Libraries: The Journal of the Association for Library Service to Children
16. Collection Building
17. Collection Management
18. College & Research Libraries
19. College & Undergraduate Libraries
20. Community & Junior College Libraries
21. Education for Information
22. The Electronic Library
23. Focus on International Library & Information Work
24. Fontes Artis Musicae*
25. Government Information Quarterly
26. Indexer
27. Information & Culture
28. Information Development
29. Information Processing & Management
30. Information Retrieval (Boston)
31. Information Services & Use
32. Information Standards Quarterly
33. Interlending & Document Supply
34. International Journal of Information Management
35. Internet Reference Services Quarterly
36. Journal of Access Services
37. Journal of Documentation
38. Journal of Education for Library & Information Science
39. Journal of Electronic Resources Librarianship
40. Journal of Hospital Librarianship
41. Journal of Information Ethics
42. Journal of Information Science
43. Journal of Interlibrary Loan, Document Delivery & Electronic Reserve
44. Journal of Librarianship and Information Science
45. Journal of Library & Information Services in Distance Learning
46. Journal of Library Administration
47. Journal of Library Metadata
48. Journal of Scholarly Publishing
49. Journal of the American Institute for Conservation
50. Journal of the American Society for Information Science & Technology

51. Journal of the Medical Library Association
52. Journal of Web Librarianship
53. Knowledge Organization
54. Knowledge Quest
55. Law Library Journal
56. Learned Publishing
57. Legal Reference Services Quarterly
58. Library & Archival Security
59. Library & Information Science Research
60. Library Collections, Acquisitions, and Technical Services
61. Library Herald
62. Library Hi Tech
63. Library Journal *
64. Library Resources & Technical Services
65. Library Technology Reports
66. Library Trends
67. The Library
68. Libri: International Journal of Libraries & Information Services
69. Marketing Library Services *
70. Medical Reference Services Quarterly
71. New Review of Academic Librarianship
72. New Review of Children's Literature and Librarianship
73. New Review of Information Networking
74. Notes
75. OCLC Systems & Services
76. Online Information Review
77. Papers of the Bibliographical Society of America
78. Performance Measurement and Metrics
79. Preservation, Digital Technology & Culture
80. Printing History: The Journal of the American Printing History Association
81. Private Library
82. Program: Electronic Library and Information Systems
83. Progressive Librarian
84. Public Library Quarterly
85. Public Services Quarterly
86. Publishing Research Quarterly
87. RBM: A Journal of Rare Books, Manuscripts, & Cultural Heritage
88. Reference & User Services Quarterly
89. Reference Services Review
90. Restaurator
91. School Librarian
92. Science & Technology Libraries
93. Serials Review
94. Teacher Librarian
95. Technical Services Quarterly
96. Texas Library Journal
97. The Information Society An International Journal
98. The International Information & Library Review
99. The Journal of Academic Librarianship
100. The Library Quarterly
101. The Reference Librarian
102. The Serials Librarian
103. VINE. Very informal Newsletter on Library Automation
104. Visual Resources: An International Journal of Documentation
105. Young Adult Library Services *

* Indicates a journal with trade content, from Ulrich’s

RQ2. Articles qualifying as research

The content analysis of all journals in the LIS collection was completed. These included 105 journal titles out of a total 177 periodicals. Of the journals, about 96% (n=101) of the journals include academic/scholarly content. The remaining 4% (n=4) include trade content. The following preliminary results are based on the final list of 105 journals determined to fit the scope of this project.

The most recent issue published and available for FY 2012-2013 at the Simmons College Library served as the sample for this content analysis. Of the 1880 articles analyzed in 105 individual issues of each journal title, 16% (n=307) qualified as research according to the definition and data collection tool used for this study.

RQ3. Methods used

The definition of research methods used in this study was summarized in Table 2. Of the 307 articles that qualified as research, 45% (n=139) used only one type of research method, 36% (n=112) used two types of methods, 15% (n=46) used three types of methods, 2% (n=6) used four types of methods and 1% (n=4) used five types of methods.

Table 4. Frequency of method in the 307 research articles.

Method	Frequency	Percentage
Survey	117	21%
Other	109	20%
Case Study	73	13%
Content Analysis	71	13%
Interviews	48	9%
Experimental Research	41	8%
Bibliometrics	25	5%
Action Research	14	3%

Classroom Research	16	3%
Observation	14	3%
Focus Groups	9	2%
Usability	9	2%
Total frequency of methods in the 307 research articles	546	100%

Tables 4 shows the frequency with which each method was encountered in the 307 articles that qualified as research. Surveys were found to be most frequently used (21%) while focus groups and usability were the least used (2% each).

RQ4. Keywords

Research keywords. Keywords and subject terms were also collected for all articles for which they were available. Nearly all the research articles, 94% (n=290), also included keywords; only 6% (n=17) of the research articles did not have any keywords or subject terms. Seven of these articles were all only available in print in journals that did not provide keywords or subject terms for the print version of the issue; the remaining 10 were analyzed on a publisher platform that did not provide subject terms or keywords.

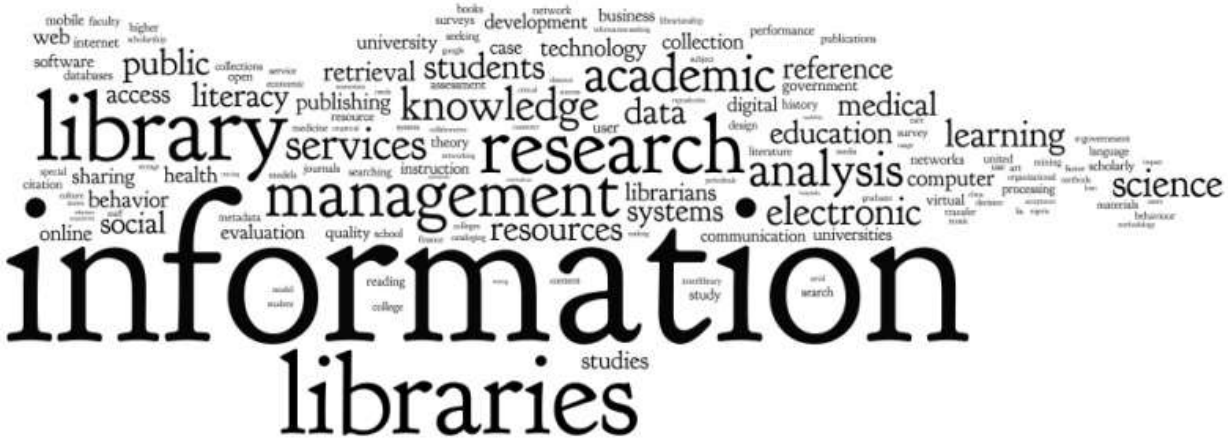

Figure 2. Research keywords word cloud.

In the research articles, a total of 56 keywords appeared 10 or more times. The top ten words associated with the research articles appear between 28 to 143 instances in the keyword analysis. The top 10 ranked research keywords (starting from the highest ranked) and their frequencies are: information (143), libraries (78), library (66), research (56), management (49), academic (37), analysis (35), knowledge (32), services (32) and electronic (28). These top ten words reflect a concern with issues related to practice in the field. Figure 2 shows a word cloud formed using the complete list of research keywords. As seen from the word cloud, 'information' and 'libraries' are clearly the most important keywords.

Non-research keywords. Nearly all the non-research articles, 73% (n=1156), included keywords; only 27% (n=417) did not include any keywords. 120 keywords appeared 10 or more times in the non-research articles. The top ten words associated with the non-research articles appear between 63 and 439 instances in the analysis. The top 10 ranked non-research keywords (starting from the highest ranked) and their frequencies are: non-fiction (439), adult (160), libraries (155), information (150), fiction (148), library (137), books (129), reviews (124), book (68) and publishing (63). These top ten words are more closely associated with books and publishing rather than practice. Figure 3 shows a word cloud formed using the complete list of non-research keywords. As seen from the word cloud, 'nonfiction' is the most important keyword here.

Figure 3. Non-research keywords word cloud.

Shared keywords. Three keywords are shared in the top ten keywords of both the research and non-research articles: information, libraries, and library. These shared keywords are in the top three of the 10 most frequently used research keywords. In comparison, they are in the top six of the 10 most frequently used non-research keywords.

Of the 176 keywords that appear 10 or more times in either the research or non-research articles, just about 23% (n=40) of the words are associated with both research and non-research articles. About 28% (n=11) of those shared words are more often associated with research articles. These keywords are research, analysis, knowledge, medical, study/studies, data, students, retrieval, university/universities, health and web. Only one of the shared words 'communication' is equally associated with either research or non-research articles. 70% (n=28) of the shared words are more often associated with non-research articles. These keywords are libraries, library, information, digital, publishing, technology, electronic, librarians, collection/collections, services, computer, social, education, literacy, access, learning, development, management, science, systems, internet, online, software, academic, public, networks, resources and user.

DISCUSSION

RQ1. Compiling a final list of periodicals that fall within the scope of this project proved to be as time consuming a task as the actual content analysis. One aspect of this includes the ongoing challenges of maintaining records of an increasingly digital collection. While the majority of the journal titles subscribed to as part of the LIS collection are still available in print and cataloged to reflect this, searches in the catalog, the integrated library system, and vendor platforms yielded inconsistent results.

This challenge speaks to the continued importance of library staff. Staff have knowledge and experience that is not dependent on systems or technology to access. It was found that the best method to compile a complete list was to use the search results from the resource management tools in combination with staff professional knowledge of the collection. Further adjustments were made to the list as the content analysis was conducted.

Similarly, changes in access to library resources due to staff changes also affected the study. Advances in library technology and resource management tools have in fact allowed libraries to streamline workflows and procedures. Yet, staff time is still required to maintain these resources and innovate. As an example, during the course of this study, the catalog journal search functions and interface were updated. While these changes required the data collection procedures to be re-designed and re-implemented, they also did create a more direct link to indexed content that was of great benefit to patrons and staff.

RQ2. With such a significant portion of the entire periodical collection identified as journals with academic/scholarly content, 57% (n=101), it would seem likely that the majority of the articles would qualify as research. However, only 16% of the articles analyzed in this study qualify as

research. This number is lower than the 23% calculated by Feehan *et al*. (1987). Moreover, this finding of 16% does not include an analysis of the remaining trade periodicals in the LIS collection. Thus, a complete content analysis of the entire collection could in fact yield a much lower (likely to be single digit) percentage of the amount of LIS literature that qualifies as research.

RQ3. The survey research method was found to be the most popular research method in the articles analyzed. This is consistent with the findings of Hider & Pymm (2008), which determined that surveys were used in over 30% of LIS research. Of the 135 articles that only used one method, about 49% (n=66) relied on surveys to collect data. In comparison, the next most popular research method, content analysis, was used in only 15% (n=21) of the studies.

To further emphasize the popularity of the method, and as seen in Table 4, surveys were used in about 21% (encountered 117 times) of all the research articles, including those that used mixed methods. Research methods that fell within the general category of 'Other' were the second most used i.e. 20% (encountered 109 times) of articles used some other research method that did not fit into any of the pre-defined methods in Table 2. Case study is the third most popular method used in 13% (encountered 73 times) of the articles with content analysis as a close fourth, used in 13% (n=71) of the articles. This supports Hider & Pymm's findings that surveys are most frequently used in LIS research (2008). It also indicates that much of the published work is based on case studies. Although these types of studies can provide valuable insights regarding best practice in problem solving, they do not always clearly state the adaptability of the results. Yet, as both Hinder & Pymm (2008) as well as this study demonstrate, it is clear that research methods are changing. The research methods that were pre-defined and coded for this content analysis (Table 2) were based in part on previous studies, as well as Beck & Manuel (2008). The resulting analysis revealed a significant portion of the research article methods were categorized as 'Other' since they did not

easily match any of the pre-defined terms. A revision of pre-defined and coded methods is recommended for any future studies of LIS research to further expand the other category.

RQ4. The list of top keywords demonstrates that the differences in keywords between research and non-research may not be as extensive as initially perceived. In general, the types of keywords associated with articles tend to be different for research (mostly practice and place) and non-research (mostly books and publishing). Yet, enough overlap exists with some of the major keywords associated with articles: information, library (as singular and probably referring to a place), and libraries (as plural and probably referring to generalizations about the profession). As a related example: web, online, and internet, are all associated with both research and non-research articles. However, the analysis demonstrates that only one of these words, web, is only slightly more often associated with research. It is of value for researchers to understand the nuance in how the shared keywords are associated with articles.

CONCLUSION

Future work

A number of researchers are carrying forward the work on analyzing various aspects of LIS research literature (Ngulube, 2010; Julien, Pecoskie, & Reed, 2011; Larivière, Sugimoto, & Cronin, 2012; Khoo, Rozaklis, & Hall, 2012; Matusiak, 2013; Gelber, 2013; Kumasi, Charbonneau, & Walster, 2013).

A complete analysis of the collection should include the remaining periodicals in the LIS collection at the Simmons College Library. This analysis has already demonstrated that there is much to be gained by evaluating the published work in LIS periodicals. A comparison of the research and non-

research articles could also further enhance researchers' understandings of what to expect when initiating a search.

A more in-depth comparison of the keywords recorded as part of the content analysis is also possible. The analysis presented has already demonstrated that there is much more to be understood regarding the distribution of keywords. A further analysis and comparison of the keywords in the research and non-research periodicals could improve search strategies for both librarians and researchers.

A possible future study could include a parallel comparison of future periodicals. As Feehan *et al*. (1987) suggest, this study could lay the foundation for replicated studies to capture a wide picture of LIS research over time. Additional analysis of research methods could also produce more evidence of the shift from a survey dominant field of research to one that is increasingly diverse (Hider & Pymm, 2008).

Strengths and limitations

The size and nature of the collection chosen for this content analysis are both a strength and a limitation of this particular study. Because the Simmons College Library supports a graduate program in LIS that is not only top ranked and well established, but also the sole program in the state of Massachusetts, the collection is quite extensive. It includes all research core journals, professional and trade periodicals, popular magazines, and newsletters. This provides the opportunity to develop a more accurate statistical analysis of the periodical articles that are published in the field.

At the same time, this also proves to be a challenge. A content analysis of an extensive, research level collection is time consuming. In an attempt to address this issue, only the most recent issue of each title available for the current fiscal year was analyzed for this study. This strategy, in turn, presents another potential limitation of the study. If the issue selected for a particular title is a special issue covering a new or special interest topic, this could potentially skew the results.

Another strength of this study is its timing. This content analysis is taking place at a time when resources are readily available in a variety of formats. It is more feasible to analyze the contents of an entire collection when there is instant access to materials online. Additionally, the availability of a variety of software and technology simplify the task of collecting, compiling, and analyzing the data.

The first phase of this study has already provided vital statistical data pertaining to the current state of LIS research and periodicals. The content analysis of just the LIS journals -- periodicals typically expected to contain a higher percentage of research -- has proven that users cannot rely on the publication type alone in order to find research. The review of the methods used to conduct research has also provided insights regarding the type of research conducted in the LIS profession. While the majority of the methods used are in fact questionnaires and case studies, there is some growing variety in the field. Additionally, the keyword analysis has demonstrated that understanding keywords or subject terms associated with research can affect a user's search.

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