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Themes in Health Sciences Librarianship Literature, 2016-2020: A Keyword and Subject Analysis

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Themes in Health Sciences Librarianship Literature, 2016-2020: A Keyword and Subject Analysis

ABSTRACT

Previous investigations into trends in Library and Information Science (LIS) literature have revealed changes in the topics librarians publish on over time, with older studies highlighting classification and indexing, and information retrieval and more recent studies highlighting keywords such as internet, information technology, digital libraries, and again, information retrieval. No similar investigation has been conducted on current publication trends by health sciences librarians. This study analyzes the top themes on which health sciences librarians published from 2016 to 2020 by examining the frequency of keywords. Keywords and subject headings were analyzed from *The Journal of the Medical Library Association*, *Medical Reference Services Quarterly*, *The Journal of Hospital Librarianship*, and *The Journal of Electronic Resources in Medical Libraries*. A total of 8,806 keywords were downloaded for analysis and organized into 292 categories during taxonomy creation. The ten most frequent themes were: libraries, information, education, humans, demography, librarian, geographical locations, research, electronic resources, and technology. The study also found that data, psychiatry and psychology, informatics, and publishing were other key themes, indicating that health sciences librarians are publishing on a wide range of topics. Some keywords that appeared only once, such as telecommuting and flexible staffing, suggest emerging areas of research for librarians.

Keywords: publication themes; scholarship; health sciences librarians; keyword analysis

INTRODUCTION

Understanding the prevalent themes in health sciences librarianship literature informs professional practice, suggests areas of potential research or scholarly activity, suggests to authors relevant book topics, and provides emerging topic ideas for programming. The purpose of this paper is to determine themes in health sciences librarian publishing in the last five years by examining article keywords and subjects (hereafter “keywords”). Specifically, this project

endeavored to discover what topics health sciences librarians wrote and published about from 2016 through 2020. The authors sought to investigate what other health sciences librarians are publishing on to: (1) inform their own practice and research agendas, and (2) to share this information with other health sciences librarians in the hopes it would be of similar assistance.

Analyzing keywords and/or subject headings associated with published articles has been used more frequently in recent investigations of LIS literature, as opposed to content analysis, citation analysis, and other methodologies.^{1,2} Chen et al proposes that publication keywords can reflect the development of a discipline, and that author-supplied keywords can serve as a representative for research subjects within a specific field.¹ Prior keyword analyses of LIS trends from 1965-1985 found that many LIS publications focused on “classification and indexing” and “information retrieval”.³ Later studies revealed how LIS subject matters changed over time moving from information seeking and retrieval topics in the 1990s and early 2000s to communication, information technology, information seeking and retrieval in 2008 with most recent examinations highlighting terms such as internet, information and technology, digital libraries and information retrieval.⁴⁻⁶ Between 1971 and 2015 popular keywords included “bibliometrics,” knowledge management,” “social media,” “academic libraries,” “citation analysis,” “knowledge sharing,” and “information literacy”.⁷ More recently, the most frequently used author-supplied keywords in the LIS journals were “academic libraries,” “social media,” “information literacy,” “twitter,” and “bibliometrics”.⁸ When looked at as a whole over the past 35-40 years, the use of terms such as “information retrieval” decreased during this time as compared to previous studies, while use of the terms “information literacy,” “bibliometrics,” “citation analysis,” and “open access” increased.⁹ No similar investigation using keyword

analysis has been conducted on recent publication trends by health sciences librarians in multiple journals, which makes this study novel.

Keyword analysis comes with its own limitations, as journals typically do not describe how authors should provide keywords for their manuscripts. Some manuscripts have articles with associated subject headings from a controlled vocabulary in addition to author-supplied keywords. For example, while articles in MEDLINE (PubMed) may have Medical Subject Headings (MeSH) and articles in EBSCO databases like Academic Search Premier may have EBSCO-supplied subjects, other manuscripts have only author-supplied keywords that are not drawn from a controlled vocabulary.^{2, 7} Another limitation of keyword analysis is that not all journals provide the same number of keywords.¹⁰ Journals that publish a higher number of articles and use more keywords than the average journal can have a stronger impact on research findings.¹⁰ Further, keywords can be imprecise because authors often consider them as an afterthought when writing their manuscripts.¹⁰

METHODS

Journal Selection

To determine themes in health sciences librarianship publishing, the research team consulted with a statistician to determine the appropriate range of years from which to collect publishing data. The statistician determined five years of data was needed in order to identify themes. There is also evidence in the literature that a shorter time period captures a more precise snapshot of current themes.¹⁰

Journals were selected using the following criteria. (1) The journal was an academic medical librarianship or hospital librarianship journal. (2) The journal included at least five years

of publications. (3) Citations from the journal contained keywords or subjects as part of their metadata. (4) The journal was indexed in a database that could export citations to EndNote X9 reference management software. (5) The journal was published in the United States to ensure consistency of language or nomenclature across selected journals

After reviewing seven health sciences librarianship journals, four journals met these inclusion criteria: The Journal of the Medical Library Association (JMLA), Medical References Services Quarterly (MRSQ), the Journal of Hospital Librarianship (JHL), and the Journal of Electronic Resources in Medical Libraries (JERML). JMLA and MRSQ are discoverable in the PubMed database, and JHL and JERML are discoverable in EBSCO Academic Search Premier database.

Citation Data Collection

Four members of the research team were each assigned a journal to pull citation data from. Citations for all article types were searched for and exported to EndNote X9 from each journal for the years 2016-2020 using PubMed's Single Citation Matcher (for JMLA and MRSQ) or EBSCO's Advanced Search (for JHL and JERML). The citations from each journal were then exported from EndNote to text files for each year to be analyzed using the citation output style called "Keyword," available from a Clarivate forum for EndNote. The Keyword output style is programmed to only display article keywords or subjects as part of the reference.

Data cleaning of the text files was performed in Microsoft Word to make the keyword data consistent. Specifically, special characters and punctuation were removed, and words in all caps were changed to sentence case. Once the data were consistent, a test run using the 2016 data was performed. The text files from each journal were opened and combined in Microsoft Excel

to create a master spreadsheet of the keywords. A pivot table was created to aggregate identical keywords and to determine the number of times each keyword was used.

At this point the expectation was to be able to identify themes. However, the test run revealed keywords that were plurals, synonyms, or abbreviations would need to be grouped together prior to the identification of themes. For example, 3D, 3d printers, 3D printing, 3-D printing, Printing, Three-Dimensional, Printing, Three-Dimensional/statistics & numerical data, and Three-dimensional printing were all separate keywords. It was determined that a controlled vocabulary would be needed to effectively place keywords into groups of like terms. The research team investigated using Medical Subject Headings (from the National Library of Medicine) and found that MeSH did not always include terms unique to the library field (for example “ask a librarian”). The Library of Congress’ LC taxonomy was also investigated but was found to be too broad. The decision was made to create a purpose-built taxonomy.

Taxonomy Creation

Whittaker and Breininger describe a seven-step approach to developing a taxonomy.¹¹ Beginning with determining the requirements for the taxonomy, the next steps are to identify concepts within the taxonomy, develop a draft taxonomy, review the draft taxonomy with users and subject matter experts, refine the taxonomy, apply the taxonomy to content, and finally to manage and maintain the taxonomy.¹¹ While presented as a linear workflow, researchers often must iterate through this cycle multiple times to reach a satisfactory product.¹¹ Our creation process broadly aligned with steps one through five. Applying and maintaining the taxonomy as noted in steps six and seven was not applicable to the purpose of the taxonomy for this research. All data from 2016 to 2020 were added to the Excel master spreadsheet. The keywords from the master spreadsheet were copied and sorted into tabs by alphabetical order. Keywords were

grouped to create a new taxonomy through consensus by the research team. Five rounds of taxonomy building took place, with one round characterized as one complete pass through the A - Z list of keywords.

Round one of taxonomy creation consisted of combining keywords as follows: singular and plural forms of a term; identical terms with different spellings; abbreviations; name variations of the same term. Keywords needing further discussion before being placed in a category were highlighted. In rounds two through four, each highlighted keyword was revisited, the team discussed the keyword, looked up unfamiliar terms or consulted MeSH as needed, and moved terms into appropriate categories; individual categories were combined to create broader topics. Any keywords still needing further discussion were highlighted for the next round. In round five, keywords were re-organized into a single A-Z list, and final reconciliation of keywords into categories took place.

When keywords were unfamiliar to the research team, Google was used to search for a definition. MeSH was also consulted when necessary to place keywords in appropriate context or group terms under an appropriate category. If a single definition could not be determined for a term, it was left uncategorized. Between each round, the overall data was assessed for taxonomy completeness, namely whether it was still necessary to continue grouping keywords into larger or broader categories to better facilitate identification of themes. Once the taxonomy was deemed complete, frequency of the categories' keywords were tabulated using Excel.

RESULTS

A total of 8,806 keywords were downloaded for analysis. Following data cleanup and organization through the taxonomy creation process, the list of unique keywords was then

aggregated into 292 categories. Table 1 shows the number of the keywords in each taxonomic category and the total number of times those keywords were used. Table 2 lists the top five keywords in each category and the total number of times those keywords were used

[TABLE 1]

Table 1. Number of keywords in each taxonomic category and the total number of times keywords were used

[TABLE 2]

Table 2. Top 10 Categories and Top Five Keywords in Each Category

[TABLE 2]

DISCUSSION

Top Twenty-Five Themes

The top twenty-five themes reveal what health sciences librarians published on from 2016 to 2020. The top theme “Libraries” contained many keywords relating to a variety of library types. It is expected that librarians would write about libraries, especially academic or hospital libraries as the journals selected were focused on those areas. However, librarians are writing on a wide variety of libraries including medical libraries, hospital libraries, public libraries, special libraries, digital libraries, federal libraries, community health libraries, school libraries, joint-use libraries, pop-up libraries, and more. Librarians may want to consider collaborative projects or research with those in different types of libraries. While academic

librarians may not strongly identify as educators,¹² librarians are participating in and writing about education-related activities, as evidenced by the use of keywords found in the Education category, including: “Curriculum,” “Medical Education,” “Teaching,” “Patient Education,” “Library Instruction,” and “Teaching Methods”. The category Research also appears in the top ten, and reveals that librarians are publishing on such things as: biomedical research, qualitative research, cross-sectional studies, reproducibility of results, medical studies, research methodology, and retrospective studies. However, because keywords were dissociated from their articles in this study, it is unclear from these terms whether librarians are publishing about their own research studies or describing how they assist their users with their research. Finally, librarians are publishing on technology-related topics, with a strong emphasis on mobile technology, in particular mobile devices and applications. We expect this theme will continue to grow alongside the widespread use of technologies and the evolution of artificial intelligence (AI) The use of large language model AIs such as ChatGPT, has already impacted higher education and librarians working in medical education may be interested in researching these impacts, or developing AIs for use in librarianship.

The terms “social media” and “Twitter” were two of the top keywords in Winkler and Kiszl’s list⁸ but in this study, “Twitter” was only used twice as a keyword. By comparison, “social media” was used 22 times in this study and was the second most used word in the Communication category. “Information literacy” was another top keyword in Winkler and Kiszl’s list,⁸ and continues to remain a top keyword. “Information literacy” was used 62 times in this study. However, the term was combined into the category Literacy, which also included: “health literacy,” “computer literacy,” and “literacy.” During this post-pandemic era of widespread misinformation, we expect literacy-related terms to appear more frequently,

especially the terms “digital literacy” and “media literacy,” both of which did not appear in this study. Librarians who are experts in digital or media literacy may be interested in developing educational materials around these concepts or conducting research in these areas.

Based on the scope of the journals selected for this research, including *Journal of Electronic Resources in Medical Libraries* and *Journal of Hospital Librarianship*, it was expected that several of the top themes would include terms such as electronic resources, library collection development, and hospital libraries; our research proved this to be true. However, there were some unexpected categories in the top 25, including: “Psychiatry & Psychology,” “Data,” “Work,” “Informatics,” and “Publishing.”

The 113 individual keywords under the psychiatry and psychology category suggest that health sciences librarians are publishing about a wide variety of psychosocial topics such as “Self-help Groups,” “Psychological Burnout,” and “Motivation.” With burnout rates in medical students and physicians on the rise,^{13,14} health sciences librarians might consider more wellness-related programming and services to address user needs. Post COVID-19 pandemic it is likely that psychosocial keywords such as burnout and other terms related to work-life balance will appear more frequently in health sciences librarian publications and could be areas of future scholarship for our profession.

While “Work” as a category appears in the top 25, it is interesting to note that the keywords “Telecommuting,” “Flexible Staffing,” “Flextime,” and “Work-life Balance” are all mentioned only one time each. There is no mention of the term “remote work”. As librarians adjust to the post-COVID-19 work environment of remote and hybrid work schedules, it is expected that future publications will increasingly include these keywords.

Another theme from the top 25 categories is data. This category includes the terms “Bibliometrics,” a top term on Winkler and Kiszl’s list.⁸ In this study, the data category also includes terms such as “Data Curation,” “Data Security,” “Data Visualization,” “Big Data,” “Data Mining,” “Data management,” “Infographic,” and “Data Science.” As librarians prepare for the National Institutes of Health (NIH) 2023 Data Management and Sharing policy, data management has come to the forefront for librarians assisting researchers in complying with NIH requirements.¹⁵ As open science continues to change the research landscape, there may be opportunities for Data Librarians to support these initiatives. The MLA Data Caucus is already supporting librarians in this field by sharing information and resources in this area.

Also in the top 25 is the category “Informatics,” which is ranked 16th and includes such keywords as “Evidence-based Medicine,” “Medical Informatics,” and “Bioinformatics.” Ranked 23rd is the category “Publishing,” which consists of keywords related to the business practices of publishing, including “Editorial Policies,” “Editors,” and “Publishing Ethics.” Not included in this category are terms related to scholarly communication. There is overlap between “Publishing” and “Scholarly Communication,” and it is debatable that these categories should have been combined. “Scholarly Communication” was ranked 36th, indicating that not as many publications during the time period examined contained keywords in this category, compared to the category “Publishing”. The MeSH term for Scholarly Communication was introduced in 2018, which also indicates the emerging nature of that category. We expect “open access” and “predatory publishing” will continue to be popular keywords in future health sciences librarian scholarship. Terms for peer review also ranked highly in this category, and scholarly communication librarians may be interested in developing resources or education around the peer review process or advocating for changes in this process.

After the fifth round of aggregating terms together there were still 86 keywords with only one mention, for example “affinity group”, “awards and prizes”, “barriers”, “catalyst”, “complexity”, “cost of attendance”, “emerging roles”, “engagement”, “fluctuating demands”, “food”, “forms”, “handheld”, “head bands”, “household supplies”, “innovation”, “integrated”, “liaison program”, “life logging”, “meetings”, “mission support”, “monitoring”, “multisite”, “peer relations”, “roles”, “sanitation”, “sitting position”, “sketchnoting”, “success”, “tote bag”, and “zombies”. Such keywords may have resulted from article types other than original research. The journals from which keywords were pulled accept a wide variety of manuscript types. For example, in addition to research related papers, JMLA also accepts case reports, commentaries, and letters to the editor. The Journal of Hospital Librarianship contains columns such as “ReachOut Through Outreach,” and “Specialty of the House.” These columns provide additional opportunities for health sciences librarians who are interested in pursuing scholarly activities but who are not conducting original research.

LIMITATIONS

A limitation of this study was that keywords with multiple meanings were only placed into one category to avoid duplication. The keywords were also dissociated from the articles, removing the context from which the keywords originated, making it more difficult to determine the meaning of some words. In addition, only four journals were included in the study; since journals have specific aims and scopes, different combinations of journals would have revealed different results. Further, MeSH was not explicitly utilized to categorize terms during taxonomy creation. When MeSH was consulted, it was done inconsistently, which could have impacted the final themes. Some terms may have had MeSH headings that could have better aided their placement in the taxonomy, but because their definitions were known or well understood by the

research team, they were not looked up in the MeSH database. Further, the team did experience decision fatigue, which is difficulty in making good decisions due to the number of decisions needing to be made at a time. By the end of the hour-long sessions held weekly to discuss the organization of terms decision fatigue may have caused the team to miss or decline to combine some terms together, or to incorrectly categorize terms. Lastly, the research team was from a single university; partnering with librarians from other universities would have brought additional expertise and may have reduced decision bias.

FUTURE RESEARCH DIRECTIONS

Future research could: explore a wider range of journals; compare keywords from journals to each other; compare themes in medical librarianship to other library specialties; compare keyword analysis with other types of analysis; and compare different taxonomies, including the one created in this study, to other existing taxonomies. In addition, a longitudinal study could be conducted to see how themes change over time.

CONCLUSION

Keyword analysis plays a role in reflecting scholarly activity in a profession that continually evolves alongside changing technology. By examining keywords used in scholarly works, librarians can gain insights into the prevailing themes, emerging concepts, and areas of interest within their field. When determining how to enter the scholarly narrative, it is important to know areas that are already being discussed in the health sciences library literature. The top categories, and the keywords being used in those categories, helps illuminate what is already published. Librarians can explore these themes to find areas of scholarship interest to build upon, or gaps in the scholarship that need further exploring. This may help librarians to discover a

research or practice area in their specialty that aligns with their interests and expertise to pursue for their own scholarship.

DATA AVAILABILITY STATEMENT

The dataset associated with this article is available in the University of Central Florida institutional repository, STARS (<https://stars.library.ucf.edu/datasets/5/>).

DECLARATION OF INTEREST

The authors declare that they have no conflicts of interest. The authors report no funding is associated with the work reported in this article.

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