

# Artificial Intelligence in Subject-Specific Library Work Trends, Perspectives, and Opportunities

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## Article abstract

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# Artificial Intelligence in Subject-Specific Library Work: Trends, Perspectives, and Opportunities

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## ABSTRACT

*The general implications of AI for libraries are much discussed in library literature. But while this discussion takes place at the library-wide level, there are also important implications for subject librarians due to the specific uses of AI in different professions and areas of study. These are often overlooked as these specializations tend to publish in subject-specific journals. This article aims to address this research gap by providing a comparison and thematic analysis of this literature. Subject-specific library journals in the areas of law, health sciences, business, and humanities and social sciences were searched to identify relevant journal articles that discussed AI. 139 articles were identified and tagged with at least one category that reflected the nature of the discussion around AI. The following analysis showed that literature related to law had the greatest number of articles by far, though the publishing activity in all disciplines has increased significantly in the last 10 years. This article explores these trends to gain a more comprehensive understanding of the implications for subject-specific library work.*

**Keywords:** *artificial intelligence · liaison librarians · subject librarians · technology*

## RÉSUMÉ

*Les implications générales de l'IA pour les bibliothèques sont au cœur des débats dans les écrits en bibliothéconomie. Cependant, bien que cette discussion ait lieu au niveau de la bibliothèque dans son ensemble, il y a aussi des implications importantes pour les bibliothécaires spécialisés en raison des utilisations particulières de l'IA dans les différentes professions et domaines d'études. Ces*

*implications sont souvent négligées, car ces professions spécialisées ont tendance à publier dans des revues spécialisées. Le présent article a pour objectif de combler cette lacune de recherche en procédant à une comparaison et à une analyse thématique de ces écrits scientifiques. Des recherches ont été effectuées dans des revues spécialisées en droit, en sciences de la santé, en affaires et en sciences humaines et sociales afin de recenser les articles pertinents traitant de l'IA. 139 articles ont été recensés et étiquetés avec au moins une catégorie reflétant la nature de la réflexion autour de l'IA. L'analyse suivante a montré que les écrits scientifiques liés au droit comptaient de loin le plus grand nombre d'articles, bien que la quantité de publications dans toutes les disciplines ait considérablement augmenté au cours des dix dernières années. Le présent article explore ces tendances afin de mieux comprendre les implications pour le travail des bibliothèques spécialisées.*

**Mots-clés :** *bibliothécaires de liaison · bibliothécaires spécialisés · intelligence artificielle · technologie*

**A**RTIFICIAL intelligence (AI) is a prevalent topic in today's world; not just a theoretical concept, but also a practical tool that's being widely implemented. This popularity has led to extensive conversations about AI in both professional and academic circles. Libraries and librarians are not immune to the pervasive nature of this concept in contemporary discourse and have found that the rapidly developing field of AI has many implications for their profession, including those surrounding instruction, patron services, and collections, among others. These themes all emerge in various ways throughout the library and information science (LIS) literature.

For example, instructional librarians may discuss AI-driven research tools and how to foster researchers' algorithmic literacy (e.g. Wheatley and Hervieux 2022; Ridley and Pawlick-Potts 2021). Reference librarians may pilot methods of using AI for patron-facing interactions such as chatbots (e.g. Allison 2012; Kane 2017; Rodriguez and Mune 2022). Collections librarians may write about increased researcher demand for machine-readable resource formats, or about using AI to improve the discoverability of collections (e.g. Yelton 2019; Baba, Minami, and Nakatoh 2016; Brygfjeld, Wetjen, and Walsøe 2018). Librarians and library workers have also speculated more generally about the ethical ramifications of these new technologies and implications for the library worker of the future (e.g. Gasparini and Kautonen 2022; Arlitsch and Newell 2017; American Library Association 2019). In the past five years alone, there have been numerous studies published on the perceptions and perspectives of library workers in academic settings to better understand the impact and implications of AI on current and future job duties (Ali, Naeem, and Bhatti 2020; Cox, Pinfield, and Rutter 2018; Gujral, J, and Choukimath 2020; Hervieux and Wheatley 2021; Yoon, Andrews, and Ward 2022). Collection management, data curation, information literacy instruction, and reference services are commonly identified as areas in which AI tools may improve service and task efficiency. Results

of the survey conducted in 2018 indicated the importance of library roles in AI and positioned librarians to be able to help users navigate the ethical issues surrounding its use (Cox, Pinfield, and Rutter 2018) but three years later, only 22% of participants surveyed by Hervieux and Wheatley indicated interacting with AI in their daily duties (Hervieux and Wheatley 2018, 5). The majority expressed a sense of optimism about the future of AI rather than anxiety or fear of job insecurity, acknowledging the opportunity for library workers to complete further training on new technologies. These are just a few examples of how librarians are discussing and interacting with AI as both a theoretical concept and a practical reality that affects their professional practice.

As this discussion takes place at the library-wide level, there are also important consequences for subject librarians, who encounter AI uses specific to the patron groups supported by their specialization. Subject librarians are those who specialize in a professional or academic discipline such as law, health sciences, business, or the humanities and social sciences. They often publish in subject-specific journals and keep current in their field with subject-specific literature. As such, many librarians outside of these specialties may not regularly encounter this literature or have significant awareness about discussions taking place within these professional areas of practice.

This siloed professional nature of subject librarians can translate to an invisibility that permeates more general academic library literature on the topic of AI. For example, a recently published literature review of AI and libraries identified relevant articles by conducting searches that paired “artificial intelligence” with the keywords “academic librar\*” OR “university librar\*” OR “research librar\*” (Gasparini and Kautonen 2022, 5). This type of search strategy would not capture much of the work done by subject specialists. Indeed, a vast majority of the articles captured in the research that follows do not appear in that literature review. Furthermore, those librarians who do have a subject specialization may be unfamiliar with conversations occurring within areas outside of their own.

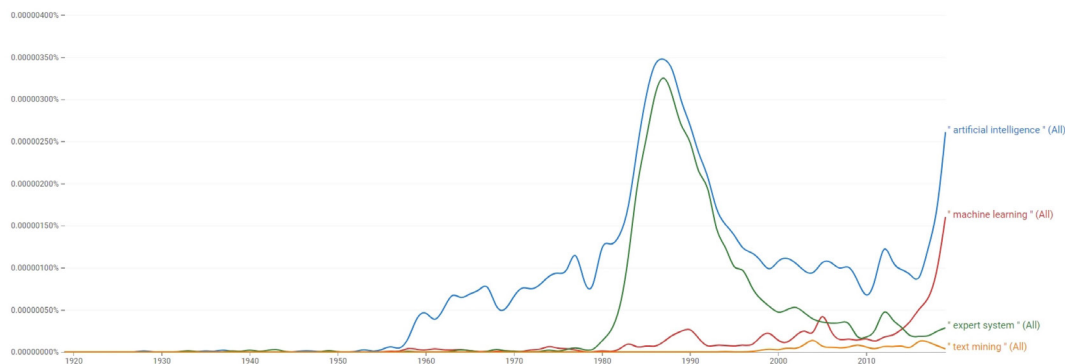
The goal in conducting this research is to mitigate this invisibility through a collaborative project that asks the following research question: how are subject librarians in law, health sciences, business, and the humanities and social sciences discussing AI and its implications for their professional practice? To do so, the literature written by or for these librarians was reviewed by searching articles published *only* in subject-specific journals. A thematic analysis was then conducted to analyze how AI was discussed within this identified body of literature. This method enabled the identification of similarities and differences between subject areas, and ultimately illuminated gaps and opportunities for collaboration between

librarians both within and outside of these disciplines. Among other findings, the results show that AI is a subject of much more intense and frequent discussion among legal information specialists than other subject specialists within this subset of the literature.

## What is Artificial Intelligence? A Note on Terms

While AI is not a unitary concept with a singular definition (Cox, Pinfield and Rutter 2019; Wang 2019), it can be described as any technology that attempts to replicate tasks associated with human cognitive abilities (Butterfield, Ngondi, and Kerr 2016). Intelligence refers to the system's ability to perform tasks using information or knowledge in choice-making by employing reasoning, pattern identification, interpreting commands, and making predictions. As such, use of the term over the years has not always referred to the same tools and technologies and has encompassed different terms over the concept's lifespan.

As an example, consider the trends exhibited over time with the four search terms included in the Google Books Ngram Viewer<sup>1</sup> pictured in *Figure 1*. The term “artificial intelligence” was markedly popular in the 1980s and has returned to a steep increase in usage since around 2015. “Expert system,” however, followed a similar trajectory in the 1980s but has since dramatically fallen off in popularity, while usage of the term “machine learning” has become a much more common term in the last decade. “Text mining,” illustrated in the same graph, does not emerge until 1997. At a broad level, this Ngram simply demonstrates how different terms that fall under the umbrella of artificial intelligence have become more common in publications in recent decades.



**FIGURE 1** Google Books Ngram Viewer depicting the occurrence of four terms in book published from 1919–2019: “artificial intelligence”, “machine learning”, “expert system”, and “text mining”. Source: books.google.com/ngrams

1. Google Books Ngram Viewer is a free tool that allows a user to select and compare the frequency of specified terms across the selected years. See books.google.com/ngrams/info for more information.

As information professionals' understanding of the field has developed in recent years, some have started writing about the topic with more specificity. This project captures the evolving nature of the term by not limiting the timeframe for articles on the topic, and by including several terms in addition to “artificial intelligence” (outlined in *Methodology*).

Readers familiar with this subject matter will already know that the relationship between the fields represented in the selected search terms is similarly complex. It is generally accepted that AI is a high-level term used to encapsulate various subgroups of technologies such as “machine learning” and “natural language processing.” However, the relationships between subfields are not always entirely straightforward. Some of these can be considered fields in their own right, such as “machine learning” in which machines mimic the cognitive function of learning by interpreting large data sets to extract meaning and patterns thus becoming more effective as more data is processed. “Natural language processing” is another subfield that refers to the ability of the system to decipher and respond to commands in natural, human language by assessing semantics, syntax and context (Haaxma-jurek 2021, 343-346). Adjacent and overlapping fields such as “data mining” and “text mining” are often used in conjunction with the term “artificial intelligence,” despite the fact that these are more accurately described as overlapping fields rather than subfields.<sup>2</sup> While data mining and text mining do not always specifically employ AI-driven technologies, these fields are often so intertwined (especially in conversations outside of computer science fields) that the authors determined that it would be more helpful to incorporate them into the searches than to exclude them entirely from the results.

## Methodology

The first step was to identify relevant journals to search in the LIS field. These journals had to be subject-specific to facilitate comparison between the quantity and topics of discussion in AI among subject librarians. A list of peer-reviewed LIS journals developed by LIS professionals (Berg and Hoffman 2022) served as the basis for identifying relevant subject-specific journals, in addition to the subject expertise of the authors as specialists in these fields.<sup>3</sup> This resulted in the identification of 20

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2. See, for example, the Venn diagram depicting the intersection of fields in Figure 2.1 in *Practical Text Mining and Statistical Analysis for Non-Structured Text Data Applications* (Miner 2012).

3. This means that some journals were not selected from this list. For example, one law journal was not used because, upon further investigation, the articles had little to do with libraries, its editorial board did not include librarians or library staff, and no articles appeared to be authored by librarians or library workers. This also meant that some publications were chosen that were not on this list, such as *AALL Spectrum*, which was added based on the authors' expertise.

subject-specific publications (see *Table 1*), including four in law, six in health sciences, eight in humanities and social sciences, and two in business.

Subject	PUBLICATION
Law	AALL Spectrum
	Canadian Law Library Review
	Law Library Journal
	Legal Reference Services Quarterly
Health Sciences	Health Information & Libraries Journal
	Journal of the Medical Library Association
	Journal of the Canadian Health Libraries Association
	Journal of Electronic Resources in Medical Libraries
	Journal of Hospital Librarianship
	Medical Reference Services Quarterly
Humanities & Social Sciences	Art Documentation: Journal of the Art Libraries Society of North America
	Art Libraries Journal
	Behavioral & Social Sciences Librarian
	Journal of Map & Geography Libraries
	Music Reference Services Quarterly
	Notes, the Quarterly Journal of the Music Library Association
	Canadian Association of Music Libraries (CAML) Review
	Fontes Artis Musicae
Business	Journal of Business & Finance Librarianship
	Ticker: The Academic Business Librarianship Review

**TABLE 1** Subject-specific LIS publications identified for searches.

Given the broad scope of artificial intelligence including its many subfields, those used in the search strategy were identified as most pertinent to the LIS subject specializations of law, health sciences, humanities and social sciences, and business. Terms including “computer vision”, “human-computer interaction”, “speech recognition”, “sentiment analysis” were excluded for this purpose. While “automation” is an important aspect of LIS work in the 21st century, this term was also excluded from the search strategy as it does not always necessitate the application of an intelligent system and could result in a misrepresentation of findings. In order to produce a comprehensive list of search terms and phrases (see *Table 2*), the Library of Congress Authorities was used as a reference for retrieving relevant articles within these selected journals (The Library of Congress 2019). Some of these search terms



and phrases are variations of one another, such as pluralization. Although at first glance it may appear that there is an overlap or repetition among some terms, these variations were necessary in certain databases in order to retrieve results. Searches were adjusted to reflect syntax and search functionality in each relevant journal database.

SEARCH TERMS AND PHRASES
Algorithm
Algorithms
Artificial intelligence
Computational intelligence
Data mining
Deep learning
Deep neural network
Deep neural networks
Expert system
Expert systems
Machine learning
Machine translating
Natural language processing
Neural network
Neural networks
Text mining

TABLE 2 Search terms and phrases.

Article searches were conducted on works published up to and including July 2022. The number of search results per term or phrase in each individual journal was recorded to identify and understand patterns or differences between the various subject areas. Each article was assessed in the results list and only those that included a non-trivial discussion or focus on AI were selected, which meant that articles where artificial intelligence or a related search term was only mentioned in passing were excluded.

For each selected article, the following information was entered into a spreadsheet: Subject, Year, Article Title, and Journal Title. On the same spreadsheet, the answers to the following two questions were also recorded:



# I. What is the main theme of the article's discussion of AI?

To understand the many ways AI is discussed in the subject-specific journals and to expose any patterns or trends in the subject areas, a thematic analysis was conducted of the selected articles. Thematic analysis is a very common method of analysis that involves identifying patterns of meaning from a dataset (Clarke & Braun, 2014; Braun & Clarke, 2006). An inductive approach was used (Braun & Clarke, 2006). The dataset for this analysis was the relevant paragraph, section, or the entire article (rather than automatically considering the entire article). This was an important distinction in order to avoid applying themes that were relevant to the entire article; for instance, an article about reference might mention AI only in the context of assessing services, instead of as a technology that could facilitate the reference interaction itself. The authors carefully reviewed the relevant section of each article and assigned codes using a spreadsheet. Codes were based on response to the specific question: in what context is AI being discussed in relation to libraries or librarianship in this article? This stage was also used to de-select some articles that had previously been selected, after considering more carefully the context in which the keywords appeared.

Subsequently, the authors generated potential themes from these codes. For instance, an article that included codes such as “curriculum development”, “digital literacy”, and “data literacy” was assigned the theme “Teaching AI” because these concepts were related to incorporating AI into teaching practices. An article that was coded with “privacy concerns” and “open access systems” was assigned the theme “Ethics” because it was concerned with the ethical questions surrounding the use of AI-driven systems. Theme assignment was an iterative process. “Discovery” was initially conceptualized as a single theme, but later split into two to capture the distinction between the use of AI *within* systems versus the *user's experience* of discovery using the system. Another example was the discussion of how big or small a theme could be (see Braun & Clarke, 2006). “Assessment” and “Collections” are two examples of themes where the authors saw little discussion in the subject-specific literature but felt compelled to include as themes because they capture an important aspect of AI and libraries that may be more heavily discussed by librarians outside of these specializations. Their absence in the literature may therefore reveal important information about the dataset.

<b>TAG NAME</b>	<b>DEFINITION</b>	<b>EXAMPLES</b>
<b>ASSESSMENT</b>	Using AI to evaluate library programs or services	Qualitative or quantitative assessments of library instruction; library contributions to business analytics and competitive intelligence programs
<b>COLLECTIONS</b>	The library's role in facilitating access to data, platforms, or other resources in their collection for use in AI projects	Product comparisons for acquisition purposes; discussion of how to optimize the library collection for machine-readability
<b>DISCOVERY: INDEXING</b>	Effects of AI on the findability of information through classification or organization of information	AI-generated indexing of documents; comparisons of AI- and human-generated subject classifications
<b>DISCOVERY: USER EXPERIENCE</b>	Effects of AI on findability or usability of information from a user perspective	Critiques of AI-driven search engines in research databases; discussions of process improvement for time-consuming tasks like document review
<b>ETHICS</b>	Ethical considerations, such as privacy and bias, that are introduced by or concern the use of AI	Discussion of bias in algorithms; philosophical examinations or discussions of professional responsibility
<b>LEARNING AI</b>	Resources and discussion about LIS professionals interested in learning about AI	Educational materials meant to help librarians understand AI
<b>REFERENCE</b>	AI as an intermediary between the library and patrons	Descriptions of AI chatbots used in a library environment
<b>ROLE OF LIS PROFESSIONAL</b>	Opportunities and threats that AI poses to LIS professionals	Examinations of the LIS professional's future and current relevance
<b>STATE OF THE INDUSTRY</b>	Overview of the state of AI, or of a particular subset of AI technology, in the industry or profession	Surveys of how AI is being used in a specific profession; explanations of different AI subfields
<b>TEACHING AI</b>	LIS professionals teaching about or with AI	Ideas for teaching; class outlines; sample activities

**TABLE 3** Article tags with definitions and examples.

Since any one article may include discussion of more than one theme, multiple tags were assigned to individual articles where applicable. This was achieved by creating a second spreadsheet with duplicate articles, which preserved the original list without duplicates for analysis of results by date and search term as well as to account for the number of unique articles recorded. A final review solidified these results into ten themes, which were then defined alongside examples of how they might be captured by the literature (*Table 3*).

## 2. Does the article focus on a specific tool or multiple specific tools?

The possible answers to this question were: yes, no, multiple. This question aimed to tease out the distinction between articles that commented on a specific product, tool, or resource versus those that spoke more generally to the technology and its implications for library workers. For example, some journals included a significant number of product reviews, which mentioned the technology as a method of understanding and critiquing a search engine or subject index.

## Limitations

Several limitations to this methodology may affect the outcomes recorded and discussed below. First, thematic analysis is a highly biased method of analysis in which the researcher makes active choices to construct themes (Clarke & Braun, 2014). The authors' differing experiences working in libraries and with AI certainly informed the analysis; in particular, all three authors are instructional librarians with limited experience in more technical areas such as metadata and discovery systems. As a result, the themes likely skew towards the public-facing aspects of librarianship and may not show a sophisticated understanding of areas that may be categorized as technical services in some institutions. Due to the high number of articles retrieved in law, these themes were also likely biased towards themes emerging from that body of literature. The only step taken to control for this was that the initial review of each area was done independently by the relevant subject specialist from the research team; therefore, codes were identified by one researcher before comparing them to the larger dataset.

The decision to focus on a select number of subject areas within which the authors currently work means that this study does not capture the full discussion of AI in subject-specific library journals beyond these four areas or within the more general LIS journals including subject-specific articles within them. However, this was intentional and has proved advantageous by allowing the dialogue of AI in the selected areas to be more comprehensively examined.

Another limitation is that the databases used to access the library journals electronically were not identical. This is because not all the subject-specific journals were accessible through a singular database or vendor given the range of the subject areas. This may have had slight implications in the search functionality and the way the results appeared. The search strategy employed was intentionally simplified to capture articles where artificial intelligence in its various forms was discussed within the journals selected for inclusion, but an advanced search strategy in an LIS-specific or multidisciplinary database may have yielded additional results. Finally, there were certain limitations implemented to ensure consistency between the searches. Search

results expanded beyond only academic articles to include the following: product reviews, resource reviews, editorials, and reports. However, the following were excluded: book reviews, table of contents, indexes, and conference abstracts.

## Results

The results were visualized in order to better identify themes and uncover commonalities across the subject areas. A total of 139 relevant articles were identified in 20 journals between all the subject areas. 88 relevant articles were identified in law library journals; 25 in health sciences; 22 in humanities and social sciences; and 4 in business (see *Figure 2*).

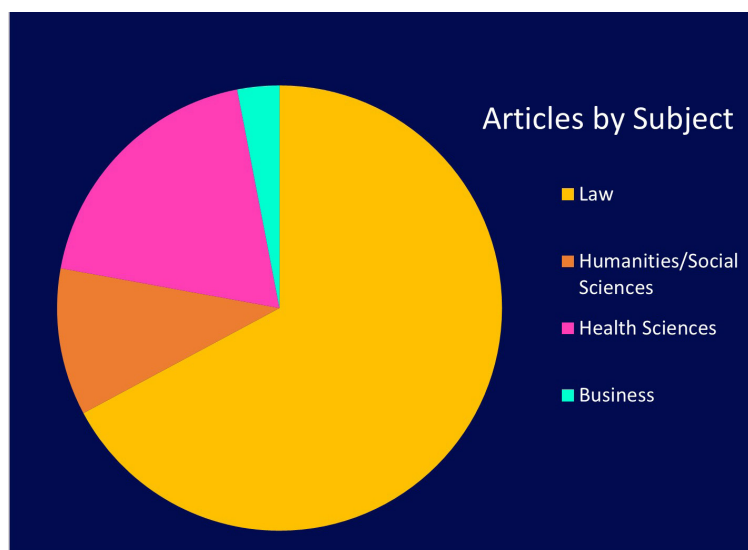


FIGURE 2 Number of relevant articles identified by subject area.

### *Articles by theme*

The articles were analyzed and given one or more tags meant to identify the theme of their content or discussion about artificial intelligence. Tags with the largest number of articles included: Discovery: User Experience (35 articles), State of the Industry (31), Discovery: Indexing (26), Ethics (19), and Role of the LIS Professional (18). Tags with the fewest number of articles included: Collections (2), Assessment (4), Learning AI (6), and Reference (10). See *Figure 3* for theme tags by subject and *Figure 4* for theme tags broken down further by subject.

Since law represented most of the identified articles, tag trends followed a similar trajectory to the general trends listed above. Tags in law with the largest number of articles included: State of the Industry (17 articles), Discovery: User Experience (14), Ethics (13), Role of the LIS Professional (12), and Discovery: Indexing (11). Tags with the

fewest number of articles included: Collections (2), Assessment (3), Learning AI (6), and Reference (7).

For health sciences, the article tags differed more strongly from the general trend described above. Over 50% of tags applied to health sciences articles were Discovery: User Experience (15). Zero articles were tagged with Assessment, Collections, or Learning AI.

In humanities and social sciences articles, Discovery: Indexing was the most used tag (11 articles) followed by State of the Industry (8). No articles were identified for the following tags: Reference, Learning AI, Collections, and Teaching AI.

Only a handful of articles were identified in business, including Discovery: User Experience (2 articles), Reference (1), Role of LIS Professional (1), and State of the Industry (1). No articles were tagged under the remaining categories.

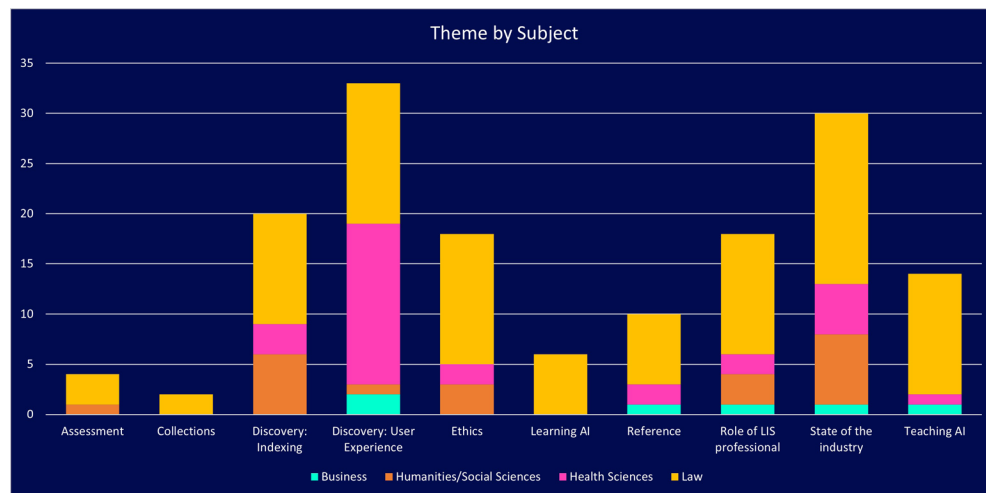


FIGURE 3 Theme of article by subject.

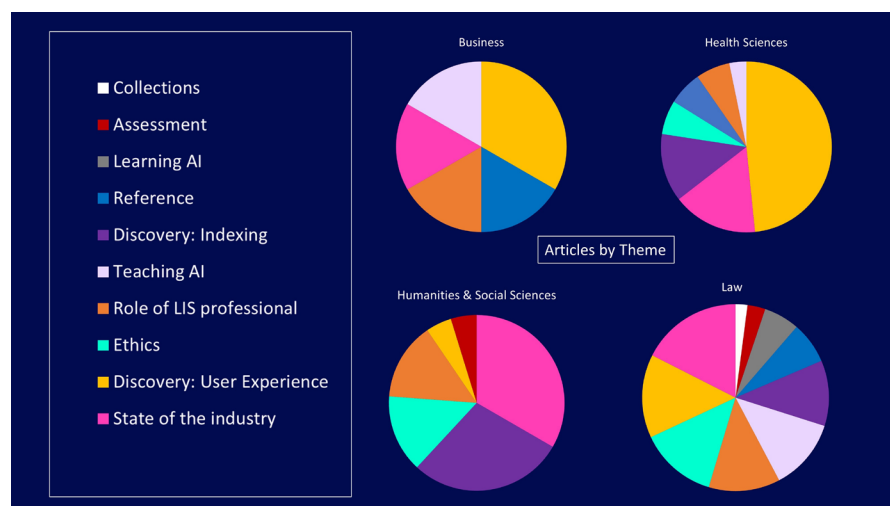


FIGURE 4 Further breakdown of articles by theme within each subject area.

### Articles over time

Articles mentioning AI and related search terms have increased dramatically in recent years (see *Figure 5*). This increase across subject areas is evident starting around the beginning of the 2010s, with an even more distinct increase in the years since 2017. A slight decrease of articles in 2022 is almost certainly because this research was conducted in July 2022 and therefore does not include articles published for a substantial amount of that calendar year.

Some trends are also observable over time by subject. Notably, AI and related terms have arisen in law library journal literature with some consistency since 1988. In comparison, we did not find substantial discussion of these concepts in other disciplines until 1999 (business library journals), 2002 (humanities and social sciences library journals), and 2005 (health sciences library journals).

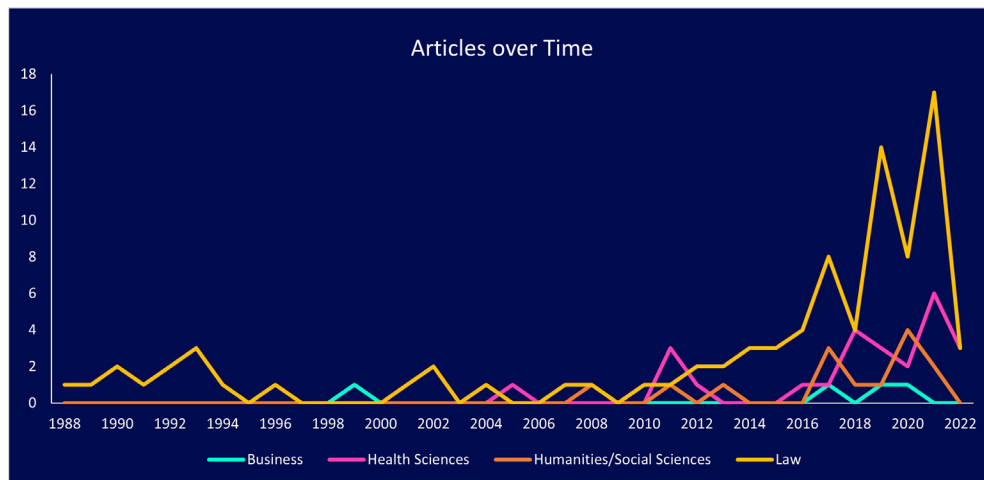
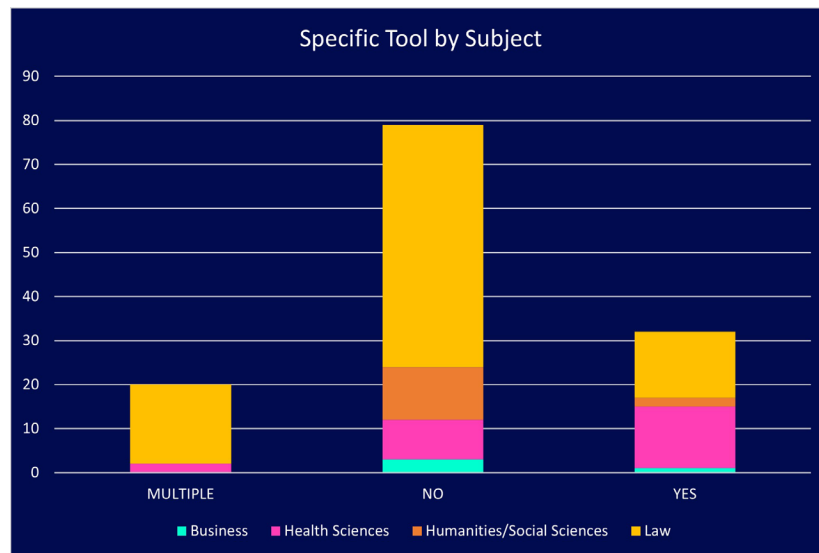


FIGURE 5 Articles over time.

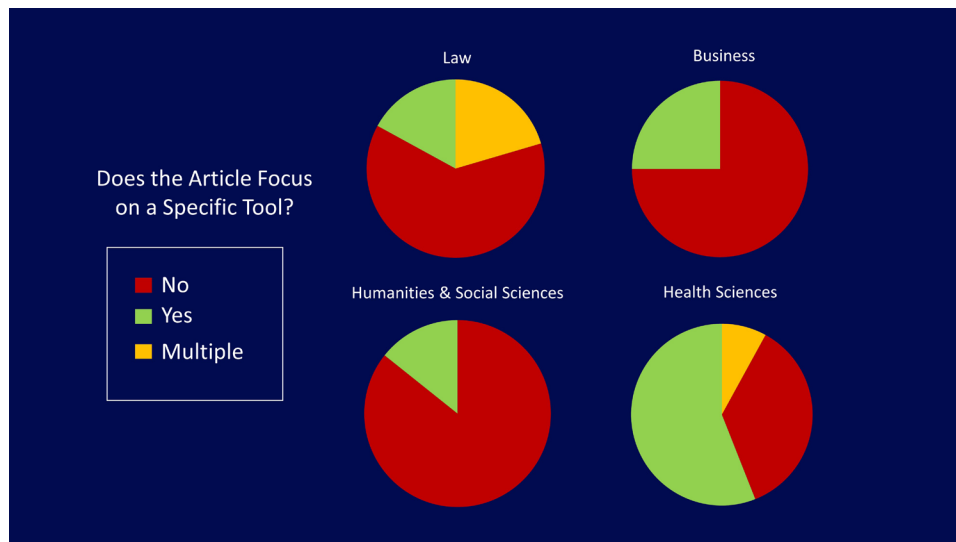
### Articles by focus on specific AI tool

Identified articles were analyzed to determine which articles discussed AI and related terms more generally versus in relation to a specific AI-driven tool. 86 articles (61.9%) did not discuss a specific tool as a major focus of the article, while 53 articles (38.1%) discussed either one or multiple specific tools (see *Figure 6*).

At a more granular level, this trend was diverse across subjects (see *Figure 7*). A greater portion of health sciences library articles focused on one or more specific AI-driven tools (16 articles, or 64%). In contrast, most law library articles did not have a specific tool as a major focus of the article (55 articles, or 62.5%). Very few articles in the humanities and social sciences or business focused on a specific tool (3 articles and 1 article, respectively).



**FIGURE 6** Breakdown of whether articles focus on a specific tool, multiple specific tools, or no specific tools.



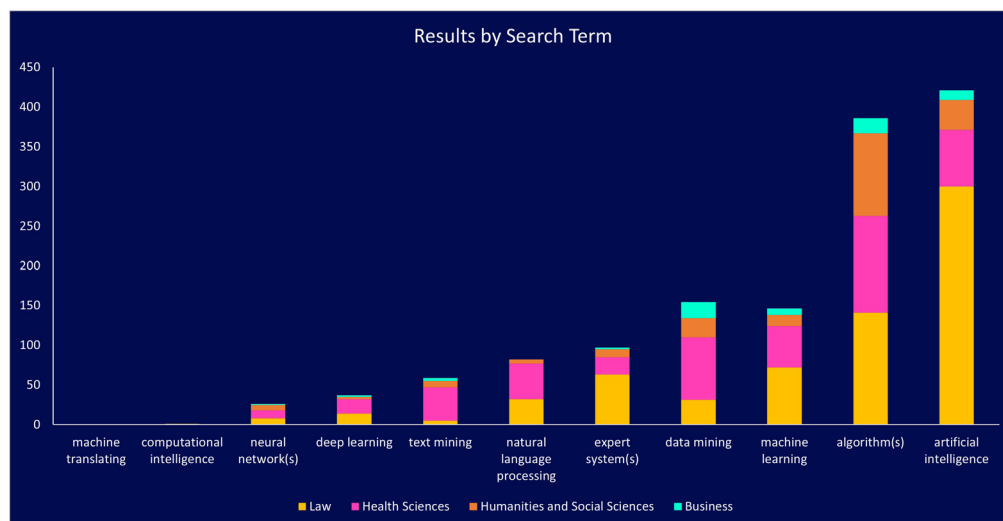
**FIGURE 7** Articles by focus on a specific tool.

### **Search results by term**

Search results were also recorded without limiting by articles that discussed these topics in depth (see *Figure 8*). The three terms with the highest number of results were “artificial intelligence” (429 search results), “algorithm” and “algorithm/algorithms” (415 results). “Data mining” (162 results), “expert systems” (162 results), and “machine learning” (151 results) also all had over 100 search hits combined across all subject journal searches. One notable difference between subjects is that the broad term, “artificial intelligence,” yielded the most results in law but was the fourth most popular term for articles in health sciences (behind “algorithms,” “algorithm,” and “data mining”).



Several search terms yielded zero or extremely few results across all subjects. These include “machine translating” (0 results across all subject areas), “computational intelligence” (1 result), and “neural network” (26 results).



**FIGURE 8** Results by search term (all results prior to filtering out articles without substantial discussion of the term).

## Discussion

There is a notable difference between the subject areas studied, which speaks to the varied nature of library work within these four disciplines. The most notable finding from the results is that law librarians and law library journals are much more actively engaged in discussing the uses of artificial intelligence than other subject specialists, though the publishing activity in all disciplines increased significantly in the last ten years. By far, the fewest number of articles using our selected terms and phrases were found in business librarianship literature.

Some of this difference between subjects may suggest the possibility that law librarians are more likely to publish in law library journals (versus, for instance, humanities librarians who may publish in more subject-neutral journals). This hypothesis may be further supported by the number of journals we were able to search in certain subject areas: for example, only 2 business journals were identified which may reflect a smaller amount of subject-specific literature in this discipline. However, this limitation cannot account for these results entirely. Note the difference in outcomes for the subject area with the next highest results: health sciences. Six different health sciences library journals were identified and searched, in comparison with four law library journals. Evidently, health sciences librarians *are* publishing in subject-specific journals, and so a lack of journal venues cannot account for the fact that AI is a much more prominent topic of discussion among law librarians. We

therefore can conclude that law librarians appear to be more involved than other subject specialists when it comes to interrogating these topics and their relevance to library work.

So why might law librarians be more interested in this topic than other subject specialists? One possibility is that law librarians may be more exposed to or interested in the topic because of the prevalence of AI in the field of law. In addition, a large percentage of LIS professionals in law are employed by a law firm or other corporate employer – 37% of the American Association of Law Libraries’ 2022 membership, for example – which may put these professionals in closer proximity to emerging technologies that often target corporations before entering the academic and public spheres (American Association of Law Libraries 2022). The topic is also prominent for academic law librarians, with a growing number of law schools providing offerings such as courses in AI, legal technology certificates, or legal technology laboratories (Janoski-Haehlen, 2020). Ellyssa Kroski, Librarian and Director of Information Technology at the New York Law Institute, provides some additional insight into the law library professional’s relation to AI: “Law librarians have been tasked with driving lawyers’ technology adoption since the early 1980s—long before PCs, the World Wide Web, and email became ubiquitous tools. Not only are they skilled at driving adoption, but more importantly, they understand where new technology solutions fit in lawyers’ workflow” (Kroski 2020). Kroski’s description points to multiple factors related to interest in the subject but highlights the unique position that law librarians occupy between infamously technology-resistant lawyers and a technologically advanced field. While further study would be needed to determine this, a quick comparison of searches with the broader law journal literature may reflect this unique position of library professionals. When compared with searches for “artificial intelligence” in more general law journals, the law library literature appears to be much higher. For example, searching in the *Harvard Law Review* retrieves 22 results, the *University of Toronto Law Journal* retrieves 6 results, and the *Canadian Bar Review* retrieves 2 results. This discrepancy is unsurprising, as much legal academic literature focuses on analysis of the law (e.g. the regulation of artificial intelligence) rather than the practice of law. However, this locus of information in the law library literature does suggest that law librarians see this topic as highly relevant to their skills and expertise.

These are all hypotheses about the source of law librarians’ interest in AI as a topic of study and professional practice. While it may be difficult to pin down the exact reason, the findings from this paper’s analysis do appear to reflect a high level of interest in this subject specialization that has already been documented. When asked in a AALL membership survey “What industry-related topics most interest you today?”, the number one choice by law librarians was “Artificial Intelligence/

Automation,” followed by additional adjacent categories such as “Evolving in the Digital Age” and “Technology” (American Association of Law Libraries 2022).

Given the high degree of interest in AI in law libraries, the high number of articles retrieved that discuss this emerging technology is unsurprising. Perhaps the more interesting question is: why are other subject specialists *not* talking about AI in subject-specific journals as much? The following sections will provide some discussion about each individual subject specialization and summarize the major themes of how AI appeared in their respective body of literature.

### ***Law***

Thematically, several major focuses are visible within the body of articles identified for law. The largest category, State of the Industry, included substantial discussion around the state of AI in the legal profession (Gediman 2016; Niedringhaus 2017; Sutherland 2020; Walters and Wright 2018; Lastres 2020), in law libraries specifically (Soares 2020; Baker 2017; Talley 2016), and regarding specific types of legal technologies that involve AI (Hook 2021; Nagel 1990; Callister 2020; Mart et al. 2019).

Discovery: Indexing as a theme has more articles focusing on the historical development of legal indexing as it has evolved from human to machine-generated indexing and metadata (Arredondo and Qadruddin 2020; Hanson 2002; Mart 2013), citation indexing (Ogden 1993; Whisner 2018), and implications for access to justice and access to legal information (Ching, Eiseman, and Nevers 2019; Martineau 2020). Of the articles focused on Discovery: User Experience, there was substantial discussion about how differences between algorithms in research platforms affect the accuracy of search results (Mart et al. 2019; Mart 2017a; 2017b; Maddigan 2015) and critiques of new vendor research platforms that incorporate AI (Knapp and Willey 2013; Wheeler 2011; Marks 2015; Steenken 2014; Shrager 2014; Peoples 2012). Interestingly, however, the number of articles that focused on one or multiple specific AI-driven tools was proportionately low compared to the literature in health sciences. This may simply reflect a more robust interest in discussing AI more generally in the field but may also suggest that law library professionals could find interesting examples of product assessments by delving into the health sciences literature.

### ***Health Sciences***

Healthcare is also a major industry targeted by technological developments, so it is surprising that this industry-level interest would not be reflected in literature for health sciences and medical libraries. AI is heavily used in healthcare technologies and clinical applications (CADTH 2018) and a topic of interest in knowledge syntheses

where health sciences librarians are developing the search strategies (Oh et al. 2021; Subramanian et al. 2021; Antel et al. 2022). However, the predominant discussion of tools within health sciences and medical libraries literature is in the form of product and resource reviews, which represent approximately 37% of all Health Sciences articles tagged for inclusion (Granikov 2016; Chambers 2019; Brody 2021; Fricke 2018; McGowan 2022; Kahili-Heede and Hillgren 2021; Minion et al. 2021). Many of these tools are designed to reduce the time burden experienced by users during the systematic review screening process or as an enhanced search engine using customized algorithms, machine learning, and natural language processing. While health sciences librarians may be promoting these tools or providing instruction on effectively using them, they do not appear to be frequently publishing their experiences or learnings beyond this context in subject specialist literature. Searching for “artificial intelligence” and “machine learning” in large journal networks like JAMA (13 journals) and BMJ (over 60 journals) resulted in at least double the number of hits per journal compared to the health sciences library journals. While further analysis is warranted, this snapshot may reflect how AI technologies are being both implemented and discussed across medical specialties compared to how health sciences librarians are encountering AI in their daily work (for example, helping users conduct searches about the applications of AI in healthcare rather than using it to perform searches or other related tasks).

The most prevalent theme overall within the health sciences was the impact of AI on Discovery: User Experience accounting for over half of the articles tagged. These articles discuss how AI is used to enhance or improve the findability of information through search capabilities (Nourbakhsh et al. 2012; Burns et al. n.d.; Granikov 2016; Moore and Loper 2011; Coghill and Reis 2021; Vardell and Moore 2011; Fricke 2018) or to improve the efficiency of screening and analysis processes using a particular tool (Chen et al. 2020; Minion et al. 2021; Chambers 2019; Kahili-Heede and Hillgren 2021; Bengtson 2011; Rahaman 2021).

Themes of Assessment, Collections, Teaching, and Learning were discussed least frequently in this body of literature. Given the role of the health sciences librarian in learning new tools and technologies to assist users and in teaching students, faculty, and researchers how to perform knowledge synthesis projects like systematic reviews (Spencer and Eldredge 2018) and the proliferation of tools that use AI to facilitate the process including Colandr, DistillerAI, and Pico Portal, it is noteworthy that the themes of teaching and learning are almost never present in the health sciences library literature. When these themes do emerge, it is often in a passive statement about the ways in which the profession might change to adopt these technologies.

## ***Business***

The most prominent theme in the business articles examined focused on Discovery: User Experience (Lohisse 2019; Solberg 1999). It was also found that, like law library journals, specific tools were not the focus in these articles. However, since the total number of relevant articles found using the selected terms within the two business journals was significantly low, this most likely does not accurately represent business librarians' conversations surrounding AI. When conducting searches within the two business journals before identifying relevant articles, it was found that the term "data mining" had the highest number of search results with 20 hits while "artificial intelligence" had about half the amount. This included discussion about how business libraries can support text mining projects at their institutions along with the understanding that the addition of functional roles in business librarianship and its time commitment need to also be considered (Anderson and Craiglow 2017). Unlike law libraries, this suggests that this role or need in business librarianship is not integrated in the same way. Conducting the same search for "artificial intelligence" in non-library business journals provides a much different insight: the *Journal of Business Ethics* yields over 1000 results, and the *Academy of Management Journal* yields over 400 results. This demonstrates that the business field is actively discussing AI, but it is unclear where LIS professionals are discussing these topics.

## ***Humanities and Social Sciences***

In the areas of humanities and social sciences, 8 subject-specific library journals were examined. 2 of these were art journals, 4 were music journals, 1 was a geography journal, and 1 was a broader social sciences journal. The major theme was State of the Industry followed by Discovery: Indexing and it was found that specific tools were not the focus of the articles.

In the art journals, discussions included using AI, such as computer vision, to automate the classification of images to support discovery and access (Prokop et al. 2021; Craig 2021). Similarly, in the music journals, there was a focus on how AI technology can be used to enhance the discoverability of musical information, including through the automated annotation of musical digital libraries (Oramas and Sordo 2016). In the geography library journal, discussion on AI was typically related to ArcGIS among other things. LIS professionals in humanities and social sciences are certainly publishing on AI, at least to some extent, in subject-specific library journals as seen particularly with arts, music, and geography but the absence of specialized library journals in other areas adds a unique layer to this study. It is important to understand that many of the subject areas that fall under the humanities and social sciences are interdisciplinary and this significantly impacts choice of journal for

publishing research. These findings reflect publishing practices in the field and recognize that technology-focused and other broad LIS journals or non-LIS journals may provide a more suitable space to publish on AI and other topics. Finally, research interests in the humanities and social sciences also include pedagogy and collection assessment and so subject specialists may likely opt to publish directly in these types of specialized library journals.

### ***Overarching themes and opportunities***

Across all disciplines, several trends are evident. Discovery: User Experience, Discovery: Indexing, and State of the Industry has the greatest overall representation in the literature. Far fewer *subject librarians* appear to be writing about the impact on collections, assessment, librarians learning AI, and reference services. Far more interest appears to exist in the subject librarian's role as intermediary between users and vendors or organizations that use AI (e.g. in search interfaces) than in the application of AI to library services and collections. This is an interesting distinction because it betrays a key difference between the use of AI *on* the library and the use of AI *by* or *in* the library. It is perhaps far easier for the subject librarian to react to technological advances implemented by vendors whose products are provided through the library than to advocate for the use of library budget on the development and implementation of potentially expensive inward-facing AI tools and services used for purposes like assessment, educational opportunities, and reference. As a result, there may be rich opportunities for collaboration in these areas. Subject specialists may consider seeking out relevant literature from the more general LIS literature and seek collaborative opportunities with colleagues in collections, reference services, assessment initiatives, and so forth.

Opportunities also exist for subject specific librarians to look to disciplines outside of their own for how AI is being used and implemented in library work, which could open pathways for interdisciplinary collaborations or professional development. Learning AI was only narrowly mentioned – only in law – which indicates that this could be an area for growth across the disciplines represented. Those working in the health sciences and humanities and social sciences can look to their law counterparts for ideas on integrating AI into their instructional sessions. In general, LIS professionals interested in incorporating aspects of AI into their professional practice should consider seeking out subject-specific literature that exists outside of the general literature, especially the literature related to law and, in the context of sample product/resource reviews, health sciences.



## Conclusion

It is evident from this analysis that AI is discussed in substantially distinct ways in subject-specific library journals. These findings may assist researchers in identifying subject-specific literature that may be of interest to those with an interest in AI outside of these specializations. It may further assist researchers with identifying comparative gaps in their respective body of subject literature that could be addressed through further research.

In addition, researchers may consider the utility of this type of methodology in comparing subject-specific bodies of literature, as it is difficult to identify the strength of these results without a more detailed understanding of its limitations. Would studies targeting a different topic within subject-specific literature yield different results? Or do these results tell us more about the publishing practices of different subject specialists than the actual substantive or thematic trends that have emerged? Further studies that target a different topic within subject-specific literature would assist in shedding light on this question.

This thematic analysis of how artificial intelligence is being discussed for and by subject librarians demonstrates the enduringly siloed nature of library work combined with the distinctiveness of the work undertaken across disciplines and specialties. While interdepartmental collaboration around learning and teaching about AI will be advantageous, one remaining question is how these endeavours can be effectively sought after and executed given the importance that is placed on subject librarians collaborating within their own areas and the varied autonomy afforded per discipline.

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