



Is LIS Education Future-Ready? A 56-Year Analysis of Emerging Topics and Research Trajectories

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The LIS Education programs have seen significant changes over the last fifty-six years, which have impacted the LIS curriculum in several ways. The study aims to evaluate the evolving research trend and the growth of literature in LIS education and curriculum. Data were collected from the Scopus Database and processed using OpenRefine, VOSviewer, and SCImago Graphica. This study employed the bibliometric and topic modeling approach using the OpenAlex REST API service. The study involved 1296 bibliographic data on LIS education and curriculum, covering the period from 1968-2024. The findings, focusing on research productivity analysis, provide an overview of the most productive publishing channels, publishers, and country collaboration. In addition, it also offers an in-depth keyword analysis to identify emerging topics and includes topic modeling approach. The keywords analysis shows that a new topic, such as Web 2.0, Digital Curation, Research Data Management, etc., was brought to study every year. The emerging primary topics, such as “Information Literacy in Higher Education” and “Social Inclusion in Library Services for Newcomers,” etc. indicate the shifting research priorities and areas of growing interest in LIS. As a result, it is necessary to modify the LIS curriculum to reflect these current trends in LIS Education.

Keywords: LIS Research Trends, LIS Education, LIS Curriculum, Topic Modeling, Primary Topic, OpenAlex.

1 Introduction

Libraries are essential for spreading knowledge as information has always been communicated orally or in a documented form. Since the beginning, libraries have been a critical component of our society. However, teaching and learning-related library schools emerged considerably later. Research in several library and information science-related fields started as the field began to take shape. “LIS education” has been one of the most researched areas in Library and Information Science. Undeniably, technology and other advances in our society have had a profound and enormous impact on library and information science (LIS) education worldwide. In other words, LIS education has encountered drastic changes in the last couple of decades that have transformed the whole structure of LIS studies.

Users of advanced and modern libraries have considerably different needs than users of legacy and traditional libraries. To prepare library and information science graduates for the new political and social impacts on their field, new curricular emphases that align with the job market demands are also necessary. Abell, principal consultant at TFPL, noted that information professionals have an exuberance of new opportunities; if the profession fails to produce librarians equipped with the advanced skills to address these challenges, then the other domain professionals may take the lead.¹ The gap between the LIS curriculum and the employability skills professionals are looking for is a well-known issue that has received much attention in the literature.² Apart from meeting industrial needs, the curriculum should also meet international standards.

To ensure the ability to operate in a multicultural and global environment, a curriculum should incorporate knowledge and skills that are both international and intercultural. The Library and Information Science discipline must internationalize the curriculum to achieve standards in information sharing, development of information organization, and dissemination. Without an internationalized curriculum, no LIS school will be able to produce highly qualified professionals to ensure information standards in the national environment.³

The wide application of bibliometric analysis has proven its effectiveness in providing a thorough overview of a particular research field. However, there is a notable scarcity of studies focusing on year-wise trends in emerging topics within LIS education. This study conducts a bibliometric analysis of LIS education and curriculum along with a topic modeling approach from 1968 to 2024. Several studies have been conducted regarding LIS education and curriculum.⁴⁻⁸ However, no earlier study addressed the recent topic demand and used the topic modeling approach to frame the primary topics in the given field.

Evaluation of evolving topics after a certain period can provide valuable insights into the field's developing interests and research trends. Such analysis highlights new and significant areas of study and underscores the importance of incorporating these emerging topics into LIS curricula. By updating the curriculum to reflect current trends, LIS programs can ensure that students are well-prepared to meet the evolving demands of the job market and effectively address user needs. A systematic year-wise evaluation of emerging keywords in LIS education is essential. It reflects the field's dynamic nature and guides curriculum developers in integrating new and relevant topics.

2 Related Studies

Information technology and user needs drive continuous change in library and information science. Librarians continue publishing content about the practical challenges facing their profession. As the issues change, our literature reflects these current changes.⁹ To improve awareness of the current state and future possibilities of the work employment landscape, the market for LIS education, and employers' expectations about the graduates' skills, a systematic and comprehensive evaluation of the

graduates, curriculum, and job market should be proposed.¹⁰ The courses that the LIS schools offer should have a specialization. With this specialization included in their degree, students will be more receptive to employment offers when they enter the workforce. Once employed, these abilities will help them play a more decisive role as librarians within their organization.¹¹ The health sciences librarian acknowledged the value of cultural competency in their profession but stated they had never taken any courses or received prior training. They also assert that some soft skills, such as interpersonal skills, "cannot be taught in academic programs."¹² LIS programs teach imperative soft skills that stand essential for the field, but there is still a perceptible gap between the skills taught and what is needed.¹³ The literature inevitably changes as new technology impacts our profession. The advancement of tools and technologies by libraries and other information professions has necessitated further investigation of the fields. The assimilation of these assets shaped the trajectory of subsequent research and influenced LIS education and curricula to some extent.¹⁴ The preponderance of difficulties related to technology and interpersonal communication warrants attention. The rise of COVID-19 demonstrates how these cutting-edge technologies are necessary to enable the offering of library services to end users.¹⁵ It may stimulate further research on the advancement of service delivery while battling the pandemic.¹⁶ The curriculum developers should prioritize the core competencies of communication, management, and interpersonal skills. It is imperative to keep these abilities current to meet the market's demands.¹⁷ In order to equip information professionals for leadership roles, future occupants should be prepared with the most recent curriculum, emphasizing ICT skills.¹⁸

From information system design and management in the 1970s to scientific communication, information retrieval, information management, and user education by 2015, the focus of LIS has shifted.¹⁴ During the 1960's, 1970's and 1980's LIS education was primarily focused on technological aspects and library automation processes.^{19,20} As time passed, a shift has been seen in information storage and retrieval research with a major emphasis on catalogue and library databases.²¹⁻²³ From 1995 to 1999, most articles were about finding and retrieving information, then bibliometrics. Bibliometrics grew in popularity

in subsequent times, surpassing 75% between 2005 and 2014.²⁴ From 1999 to 2001, research on information services gained popularity, focusing mainly on automation and virtual libraries, and the literature spanning 2000 and 2001 witnessed a substantial increase in the prominence of user education. Due to the surge in the popularity of continuous skill development required for the job market, professional education is gaining significant traction as a trending topic in LIS.²⁵ Throughout the studied time, the most notable changes were the rise in research on information-seeking and scientific communication and the decline in interest in library and information service functions.^{26,27}

Research studies that use content analysis to identify advancements in LIS have created their classification systems or used other researchers' classification schemes.^{6,24,26} The other fields that continue to embolden the research in LIS education include Medicine and Health care.²⁸

Topic models are now effective tools for condensing and comprehending an unstructured collection of words, images, sounds, and videos from various fields.²⁹ Latent Dirichlet Allocation (LDA) has emerged as a key topic modeling technique in recent years. It is a technique that allocates document themes based on the phrases used in the documents.³⁰ Topics have blossomed as a result of new digital setups and technological advancements. The topic modifications would become more rapid as more the digital environment is introduced to LIS.³¹

3 Research Questions

The current paper aims to assess the development of library and information science education literature pertaining to its curriculum from 1968 to 2024. The following research questions are the main emphasis of this study:

RQ 1: What is the current research trend in LIS education, and how are these trends changing gradually?

RQ 2: Who are the most collaborative countries, journals, and publishers in LIS education?

RQ 3: What emerging topics should be integrated into the Library and Information Science (LIS) curriculum to meet the evolving demands of the job market?

4 Research Methodology

This study attempts to map publications in LIS that directly deal with library and information science

education and its curriculum development. The present study employs bibliometric analysis and a topic modeling approach to assess the LIS education trend and its impact on the LIS curriculum (Figure 1).

4.1. Data Collection

The data used in the study was extracted from the Scopus database, a comprehensive database for bibliometric analysis. The Scopus database was used for this research due to its extensive coverage of academic literature. Its comprehensiveness and frequent updates make it an essential resource for identifying emerging research trends and gaps in the literature. The period considered in this study is 1968-2024 (March 7, 2024). Publications were retrieved with the help of Boolean Operators (AND, OR, & NOT) using the keyword search within the title, abstract, and keywords fields. Furthermore, only articles, books, book chapters, and conference proceedings were considered in English. With this approach, 1354 publications were identified. The major keywords used in data retrieval are "Library Science," "Library and Information Science," "Library and Information Science Education," "LIS Curriculum," etc. The following search string was used for data collection:

TITLE-ABS-KEY("Library Science*" OR "Library and Information Science*" OR "Library and Information Science* Educat*" OR "Librar* and informat* educat*" OR "LIS Educat*" OR "(lis) Educat*" OR "librarian* educat*" OR "educat* Librarian*" OR "educat* for librarian*" OR "educat* in librarianship" OR "Library and information science* studies educat*" OR "LIS educat* study" OR "LIS educat* Studies" OR "educat* in library

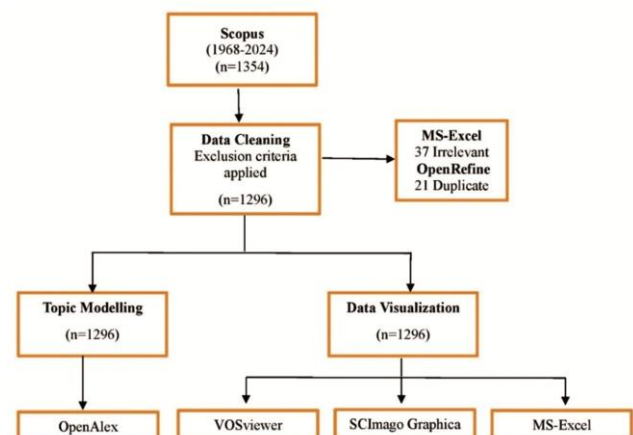


Fig. 1 — Data Cleaning and Research Process (Source: Generated by Authors)

science*" OR "educat* for library and information" OR "educat* for Library and information science* professional*" AND "Library and Informat* science* Curricul*" OR "LIS Curricul*" OR "(lis) curricul*" OR "Library curricul*" OR "curricul* develop*" OR "Library science* curricul*" OR "Librarianship curricul*" OR "library and information* science* studies currucul*" OR "curricul* develop* in library science*" OR "Librar* curricul* develop* model" OR "LIS framework*" OR "curricul* design*" OR "curricul* map*" OR "curricul* evaluat*" OR "LIS Program*" OR " Syllab*" OR "course*" OR "curricul* plan*" OR "Library and information science* course*" OR "Librarianship course*" OR "pedagogy")

4.2. Data Cleaning

In this section, the abstracts and titles of each publication were manually reviewed, and those deemed irrelevant were omitted. For example, as "Library and Information Science" is a broader term, publications not covering one of the two dimensions, i.e., "LIS Education" and "LIS Curriculum," were deemed irrelevant for this study. A total of 37 publications were excluded. With this, the study included only publications that explicitly address the topic. A total of 1317 publications remained. Additionally, the research employed *OpenRefine*, the open-source data carpentry tool, to determine the duplication status in this data set.³² A total of 21 publications were found duplicates at this step and excluded for further analysis. After data cleaning, a total of 1296 publications remained for further analysis.

4.3. Topic Modeling

The present research used the OpenAlex REST API service for topic modeling ("https://api.openalex.org/works/https://doi.org/" + value).³³ This approach

was implemented to identify the primary topics for 1296 publications included in the research. The feature of OpenAlex is that it provides a broader coverage of the scholarly literature, and its data is open.³⁴ The newest available classifications from CWTS, which offered an ideal labeled dataset suitable for model training, served as the foundation for our approach. The acronym "CWTS" in OpenAlex refers to the "Centre for Science and Technology Studies," commonly recognized for its contributions to bibliometrics, scientometrics, and research evaluation. OpenAlex refined the multilingual BERT model and incorporated it into a more comprehensive deep-learning model that utilizes other data, including the journal name and citation graph features. The end product is a model that can precisely forecast subjects using the title, abstract, citations, and journal name. Four steps have been involved for the topic modeling namely, Cluster the citation network, use a Large Language Model (LLM) to get labels and descriptions, and then use this label data to train a deep learning model that can build up a topic using the title, abstract, citations, and journal name. In the last step, a topic is assigned, and each topic will belong to one subfield, which will belong to one field and one domain.³⁵

4.4. Data Visualizations and Presentation

The study used MS Excel, VOSviewer, and SCImago Graphica for data analysis, data visualization, and data presentation.

5 Data Analysis and Results

5.1. Growth Pattern of Publications during the Specified Period

Annual numbers of publications and citations are plotted in Figure 2. The chronological distribution of publications from 1968 to 2024 (March) is presented in the Figure 2. The entire time is segmented into six

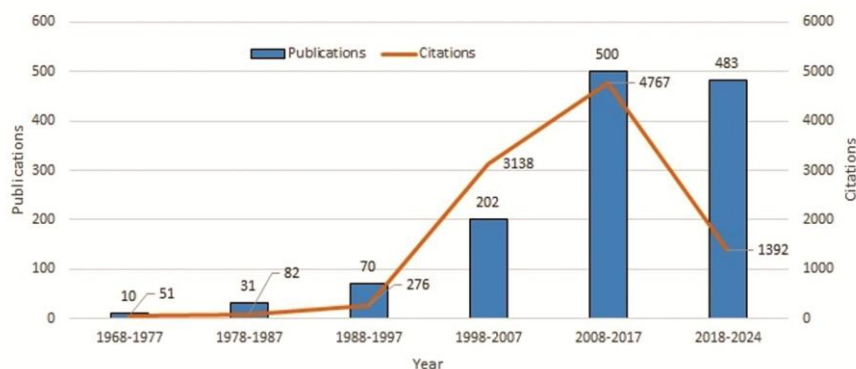


Fig. 2 — Growth Pattern of Publications (Source: Generated by Authors)

significant phases. A total of 1296 publications were found, and 9706 citations were received during these phases. It has been noticed that only 0.77% of documents were published during the first phase (1968-1977), which received 0.53% citations. Subsequently, in the phase 1978-1987, a slight increase of 2.39% in publications and 0.84% in citation count was seen. A moderate improvement was experienced in the third phase (1988-1997), as 5.40% of publications appeared to receive 2.84% citations. Meanwhile, the fourth phase (1998-2007) experienced a slight bump in growth. The authors contributed 15.59% of publications and 32.33% of the citations were obtained. The fifth phase (2008-2017) was the most prolific phase, during which 38.58% of publications emerged. This phase witnessed 49.11% citations, the highly cited phase. It confirmed increased curiosity and enthusiasm among the authors toward the topic. The final phase (2018-2024) of the era, spanning only the last seven years, totaling 37.27% publications, attracted 14.34% citations.

5.2. Most Productive Journals

The 1296 documents were distributed in 325 journals/conference proceedings/books/book chapters. The top 11 ranked by publications count (20 or more) are listed in Table 1. Notably, 34% of documents were published in the listed journals. “Education for Information” was the most productive journal, with 88 publications, followed by the “Journal of Education for Library and Information Science” (77), “Library Philosophy and Practice” (68), “Library Review” (31), and so on. From the perspective of

Table 1 — Most Productive Journals

Journals	TNP	TNC	ACP
Education for Information	88	506	0.174
Journal of Education for Library and Information Science	77	236	0.326
Library Philosophy and Practice	68	130	0.523
Library Review	31	287	0.108
Library Trends	29	1095	0.026
New Library World	29	429	0.068
Cataloging and Classification Quarterly	28	229	0.122
Journal of the Medical Library Association	25	333	0.075
International Information and Library Review	24	132	0.182
Journal of Librarianship and Information Science	22	121	0.182
Journal of Library Administration	20	113	0.177

(Source: Study Data)

citation count, “Library Trends” is leading with 1095 citations, followed by “Education for Information” (506), “New Library World” (429), and so on. In terms of ACP, among the listed document types, the top three journals were “Library Philosophy and Practice” (0.523), “Journal of Education for Library and Information Science” (0.326), “International Information and Library Review”, and “Journal of Librarianship and Information Science”, each with 0.182 ACP.

5.3. Most Productive Publishers

Table 2 identified the top 10 most preferred publishers. The publishers published 20 or more publications, which are listed here. The “Emerald Group Publishing Ltd.” published the most articles (91 articles). “Routledge” (82) is the second most preferred publisher, succeeded by the “University of Idaho Library” (61), the “University of Toronto Press” (58), and so on. In terms of citation count, “Emerald Group Publishing Ltd.” (708) was cited the most, followed by “Routledge” (340), “IOS Press” (309), and so on. From the perspective of ACP counts, “Elsevier Ltd.” is leading with 10.67 ACP, followed by “Emerald Group Publishing Ltd.” (7.78), “IOS Press” (6.72), and so on.

5.4. Country Contributions

The top 18 countries were recognized on the grounds of publication count (10 publications or more) and are listed in Table 3. The United States is the leading country, contributing 595 documents, followed by India (73), Canada (70), Nigeria (57), United Kingdom (54) and so on. From the perspective of citations, the United States (5334) also received the highest number of citations. Canada (676) was the second most cited country, followed by the United Kingdom (542), Australia (397), India (269), South Africa (232) and so on. From an ACP viewpoint,

Table 2 — Most Productive Publishers

Publishers	TNP	TNC	ACP
Emerald Group Publishing Ltd.	91	708	7.78
Routledge	82	340	4.15
University of Idaho Library	61	120	1.97
University of Toronto Press	58	111	1.91
IOS Press	46	309	6.72
Taylor and Francis	39	115	2.95
IGI Global	37	75	2.03
SAGE Publications Ltd	32	178	5.56
John Wiley and Sons Inc.	24	94	3.92
Elsevier Ltd	21	224	10.67

(Source: Study Data)

phases, i.e., 1968-1977 and 1978-1987, no author keyword could be extracted by the software. Keywords like Library, Library Education, Library and Information Science, LIS Education, Information Science, etc. were found in every phase. That is why these have not been added to the graph.

Figure 5 shows the keywords that were the most relevant to the author during the last four phases. This keyword analysis reflects the most studied topic and trend of research in LIS education and LIS curriculum in each phase. In the 1988-1997 phase, the most relevant author keywords were Librarians, Literacy, Literature, Reading, Information Services, etc. It shows that most of the research in that phase was primarily on LIS education and library services. The

most frequent and relevant keywords in the 1998-2007 phase were Distance Education, Curriculum, Digital Libraries, Information Literacy, Information Technology, Online Education, etc. This shows that this phase was dedicated to distance education and Information Technology studies. The next phase's (i.e., 2008-2017) relevant keywords were E-Learning, Archival Education, Web 2.0, Blended Learning, Digital Curation, Bibliometrics, etc. Web 2.0 components and metric-related studies took place during this phase. The phase 2018-2024 was the most recent. The arrival of COVID-19 changed the scenario for this phase. The effect of COVID-19 can also be seen in LIS education and research. This phase's topmost relevant author keywords were Research Data Management, Altmetrics, Social Media, Artificial Intelligence, Informal Learning, etc. Issues such as the digital divide and unemployment arose in this phase. The whole phase was dedicated to different learning patterns, such as informal learning and online learning, and using Artificial Intelligence (AI) studies.

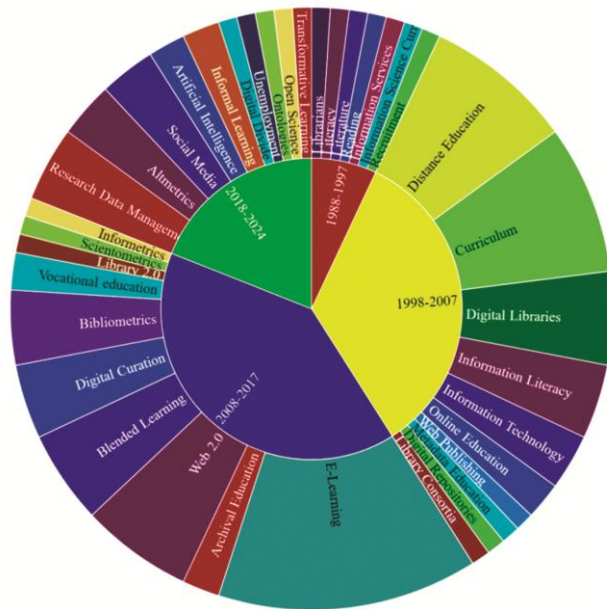


Fig. 5 — Top Relevant Keywords Phase-wise (Source: Generated by Authors)

5.7. Emerging Keywords in the Last Phase (2018-2024)

Table 4 represents the crucial keywords that emerged recently, for example, Open Data, Digital Badges, Disinformation, Metadata Education, Transformative Learning, Business Courses, etc. These keywords reflect the newly arising areas in LIS and ensure that all these aspects are covered in the LIS Curriculum.

5.8. Primary Topics and Their Top Most Relevant Keywords

Open Alex practices an automated system that looks at a work's title, abstract, journal name, and citations to tag it with topics. These topics are organized into subfields, fields, and top-level

Table 4 — Emerging Keywords in Last Phase (2018-2024)

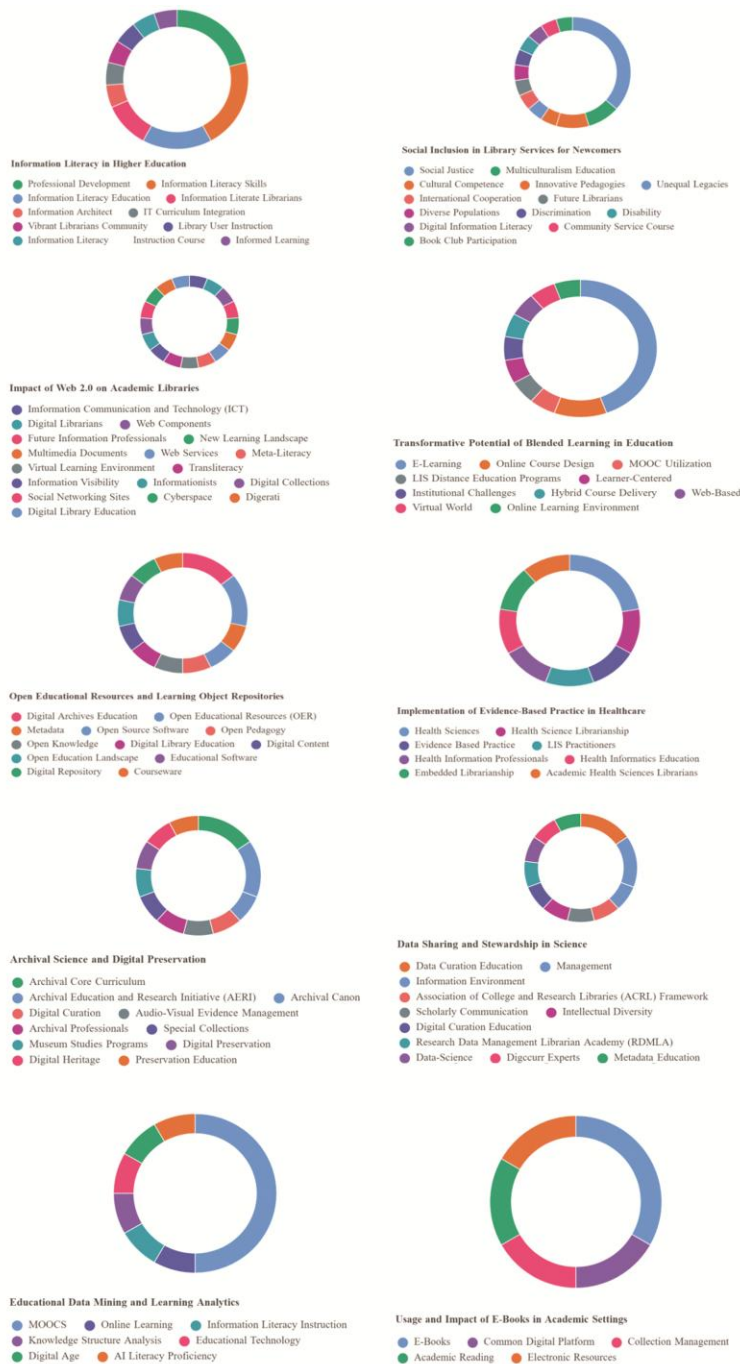
Year	Keywords
2018	Altmetrics, Bibliometrics, Blended Professionals, Continuing Education, Data Analytics, Informetrics, Massive Open Online Courses (MOOCs), Ontology, Open Data, Semantic Tools.
2019	Entrepreneurship, E-Learning, Research Data Management, Digital Badges, Informal Learning, Marketing, Moodle, Proficiency Building.
2020	Neoliberalism, Swayam, Digital Competences, Digital Divide, Disinformation, Emerging Technologies.
2021	Unemployment, Metadata Education, Emerging Job Market, Future of Profession, Z-Generation, Curriculum Mapping, Employability, Internet of Things.
2022	Archival Collections, Multicultural Populations, Rare Books, Soft Skills, Archival Literacy, Omeka, Museum, Data Curation and Management, Data Visualization and GIS.
2023	AI Literacy, Sustainable Libraries, Transformative Learning, Gamification, Latent Dirichlet Allocation, Social Aspects of Information, ACRL/ALA Standards, Natural Language Processing.
2024	Business Courses, Experiential Learning Program, Practicum Placement, Education Task Force.

(Source: Study Data)

domains. A model assigns scores to each topic for a work; the topic with the highest score is labelled as the “primary topic.” Among the 1296 publications, 1025 publications have been classified into 185 primary topics by OpenAlex, while the primary topics for 271 publications (20.91%) were not identified. Of the 185 Primary Topics, 12 topics (each associated with 10 or more publications) and their relevant keywords are illustrated in Figure 6. A complete list of

all 185 Primary Topics with their corresponding keywords is listed in Appendix.

Various emerging topics were identified, reflecting the most studied areas and the current job market requirements. Topics such as “Information Literacy in Higher Education” (23.30%), “Social Inclusion in Library Services for Newcomers” (7.79%), “Impact of Web 2.0 on Academic Libraries” (4.78%), “Transformative Potential of Blended Learning in



(Contd.)

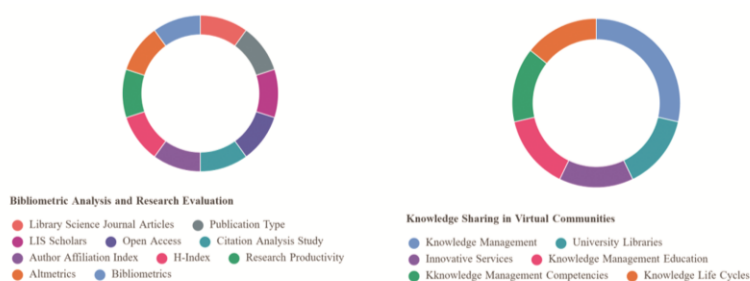


Fig. 6 — Primary Topics and their Top Most Relevant Keywords (Source: Generated by Authors)

S.N.	Primary Topic & Occurrence in Papers (%)	Keywords
1	Information Literacy in Higher Education -302 (23.30%)	Information Literacy Education, Professional Development, Informed Learning, Information Literacy Skills, Information Literate Librarians, Information Literacy Instruction Course, Library User Instruction, Vibrant Librarians Community, IT Curriculum Integration, Information Architect
2	Social Inclusion in Library Services for Newcomers -101 (7.79%)	Social Justice, Cultural Competence, Book Club Participation, Community Service Course, Digital Information Literacy, Disability, Discrimination, Diverse Populations, Future Librarians, International Cooperation, Unequal Legacies, Multiculturalism Education
3	Impact of Web 2.0 on academic Libraries- 62 (4.78%)	Cyberspace, Digerati, Digital Collections, Digital Library Education, ICT, Information Visibility, Informationists, Multimedia Documents, New Learning Landscape, Social Networking Sites, Transliteracy, Virtual Learning Environment, Web Components, Digital Librarians, Future Information Professionals, Meta-Literacy, Web Services
4	Transformative Potential of Blended Learning in Education- 53 (4.09%)	E-Learning, Hybrid Course Delivery, Institutional Challenges, LIS Distance Education Programs, MOOC Utilization, Online Course Design, Online Learning Environment, Virtual World, Web-Based
5	Open Educational Resources and Learning Object repositories- 32 (2.47%)	Courseware, Digital Archives Education, Digital Content, Digital Library Education, Digital Repository, Educational Software, Metadata, OER, Open Education Landscape, Open Knowledge, Open Pedagogy, Open-Source Software
6	Implementation of Evidence-Based Practice in Healthcare- 28 (2.16%)	Academic Health Sciences Librarians, Embedded Librarianship, Evidence Based Practice, Health Informatics Education, Health Information Professionals, Health Science Librarianship, LIS Practitioners, Health Sciences
7	Archival Science and Digital Preservation- 25 (1.93%)	AERI, Archival Canon, Archival Core Curriculum, Archival Professionals, Audio-Visual Evidence Management, Digital Curation, Digital Heritage, Preservation Education, Special Collections, Digital Preservation, Museum Studies Programs
8	Data Sharing and Stewardship in Science- 22 (1.70%)	Data Curation Education, Digital Curation Education, Information Environment, Intellectual Diversity, Metadata Education, Research Data Management Librarian Academy (RDMLA), Scholarly Communication, Management, Association of College and Research Library (ACRL) Framework, Data-Science, Digccurr Experts
9	Educational Data Mining and Learning Analytics- 19 (1.47%)	MOOCS, AI Literacy Proficiency, Information Literacy Instruction, Knowledge Structure Analysis, Online Learning, Digital Age, Educational Technology
10	Usage and Impact of E-Books in Academic Settings- 15 (1.16%)	Academic Reading, Analytical Tool, Collection Management, Electronic Resources, E-Books, Common Digital Platform, Students
11	Bibliometric Analysis and Research Evaluation-12 (0.93%)	Author Affiliation Index, Bibliometrics, Citation Analysis Study, Library Science Journal Articles, LIS Scholars, Publication Type, Research Productivity, Altmetrics, H-Index, Open Access
12	Knowledge Sharing in Virtual Communities- 10 (0.77%)	Knowledge Management, Knowledge Life Cycles, Knowledge Management Competencies, Knowledge Management Education, Innovative Services, University Libraries
	20 primary topics are associated with 9 to 5 papers each, 119 (9.18%)	
	47 primary topics are associated with to 4 to 2 papers each, 119 (9.18%)	
	106 primary topics are associated with 1 paper each, 106 (8.18%)	
	271 papers' primary topic were not identified, 271 (20.91%)	

Education (4.09%), Open Educational Resources and Learning Object repositories (2.47%), Implementation of Evidence-Based Practice in Healthcare (2.16%), Archival Science and Digital Preservation (1.93%), Data Sharing and Stewardship in Science (1.70%), Educational Data Mining and Learning Analytics (1.47%), Usage and Impact of E-Books in Academic Settings (1.16%), Bibliometric Analysis and Research Evaluation (0.93%), Knowledge Sharing in Virtual Communities (0.77%) etc. were formed. These primary topics depict the areas most studied in LIS and highlight the current and forthcoming research trends.

6 Discussion and Conclusion

6.1. Insights from Bibliometric Analysis

The LIS education plays a vital role in the curriculum development of Library and Information Science. Therefore, the evaluation of available literature on LIS education and curriculum development was necessary to identify the current trend and update the curriculum accordingly.

After conducting a bibliometric analysis, 1,296 publications were identified from the Scopus database, focusing on research in LIS education and curriculum development from 1968 to 2024. Research publications on LIS education and curriculum development have increased significantly in the last 56 years. A decennial growth estimate is calculated (except the last phase) as a decade is ample time for any trend to emerge and bloom. Publications are expanding at a steady pace. Nearly the same number of documents were seen during the 2008–2017 and 2018–2024 phases. Whereas the phase 2018–2024 has not yet been completed even a decade, indicates that LIS education-related research may witness an encouraging rise in the future.

Studies on curriculum development and LIS education have been published most frequently in the journal *Education for Information*. The choice of journals for publication may vary from person to person or nation. There may be various reasons behind such as language barriers, high impact factor of journals, the journal's reputation, high acceptance rate, or to provide national support to local journals.³⁶ Interestingly LIS professionals prefer their national journals for publication.³⁷ At the same time, *Emerald Group Publishing Ltd.* is the most popular publisher in those areas. The United States has made a substantial literary contribution unmatched by any

other nation. The United States is the only nation with a diverse network in nearly every region.

6.2. Insights from Keywords Analysis

After analyzing the retrieved bibliographic data in the area of LIS education and curriculum development for keyword network analysis, the initial questions that have been answered would be Q1: How has the research trend in LIS education changed and evolved in every phase? Q2: How are the emerging keywords impacting the LIS curriculum? Q3: Which are the most frequent keywords in LIS education and curriculum development during the investigation?

In all, 1296 documents yielded 1001 unique author keywords. It was discovered that no author keywords appeared in the first two phases, which were 1968–1977 and 1978–1987. One potential reason why author keywords were not more common in the early years is because previous publishers either did not mandate to give author keywords or authors were unwilling to provide keywords. Publishers, however, started necessitating authors to provide keywords over time. Author keywords assist in finding and retrieving documents and directly represent our research.

In the initial phases, the emphasis was placed on keywords such as Librarians, Literacy, Literature, Reading, Information Services, etc. It demonstrates that most research was conducted in border fields like library services and LIS education. This was the beginning years of library science. Library science courses were starting to expand globally. For this reason, there was not as much subject diversity in the LIS during this phase as in later phases. Other keywords, such as Curriculum, Digital Libraries, Information Literacy, and Online Education, stand out in the next phase. Here, it can be seen that the reach of LIS in the digital realm has begun to grow. Digital literacy is becoming increasingly necessary. Researching digital libraries' various facets, functions, and applications was essential. It was vital to incorporate these topics into the LIS curriculum to meet the demands of the job market. The main novelty regarding another decade's research is the importance of Web 2.0 components, data preservation, and metric-related studies. Studies on Web 2.0 related tools help the researchers explore how these tools could enhance learning and education in LIS. Preservation and curation of data were among the major topics studied during this phase. The rapid growth of digital content has mandated strategies to preserve, organize, and provide access to digital

resources. The studies from 2018 onwards are partially affected by the COVID-19 pandemic. COVID-19's effects are also evident in LIS research and education. During this time, Artificial Intelligence, Research Data Management, Altmetrics, Social Media, etc., were the most widespread author keywords. This phase saw the rise of problems, including the digital divide and unemployment. The entire phase was devoted to exploring various modes of learning, including online and informal learning, and using Artificial Intelligence (AI) research.

Depending on their relevancy, the keywords were chosen to display the phase-wise emerging keywords. The study has discovered that a few of the most frequent common keywords found in each research phase, such as Library, Library Education, Library and Information Science, LIS Education, Information Science, etc., were not taken. LIS Education, Library and Information Science, Information Literacy, Curriculum, and Information Science were the top author keywords with the highest frequency in overall research. The author-generated keywords from the most recent phase (2018-2024) were further evaluated. Studies conducted during this period reflect current research trends. Analyzing these trends will help identify emerging topics and enable academicians to adjust the LIS curriculum to meet current requirements. Recent studies have observed the emergence of several new keywords not identified in previous research, including Ontology, Research Data Management, Neoliberalism, Z-Generation, Internet of Things, Soft Skills, AI Literacy, and Gamification.

6.3. Insights from Topic Modeling

Further keyword analysis was conducted to identify primary topics, providing deeper insights into the data. Tracking the prevalence of these topics over time can help analyze recent research trends. The relevance and importance of these topics in the present scenario have also been widely acknowledged in existing literature. According to Hepworth, modern librarians, who often come from computing or library backgrounds, need to embrace lifelong learning and the developing skills process. On the other hand, faculty members might not have had enough instruction in information literacy or might not completely understand its importance because it is abstract and internalized. As a result, they frequently fail to recognize its complexity and effectively integrate it into their teachings.³⁸ Cooke et al. examined that courses on social and community

informatics, along with those on the digital divide, often included elements of social justice. However, they were not solely focused on exploring the broader spectrum of social justice issues within Library and Information Science (LIS).³⁹ While exploring the role of ICT in libraries, Shastri and Chudasma recommended the need for skilled professionals with ICT expertise in cloud computing, virtual service delivery, and CMS in libraries today to fulfill the evolving demands of users. They further determined that the scarcity of qualified personnel emphasizes the importance of recruiting experts with the necessary training to provide efficient library services.⁴⁰ Mukhopadhyay and Mukhopadhyay examined Library Carpentry, an emerging field in library science that helps LIS professionals manage data and enhance library services. They emphasized its application to advanced methods like "Named Entity Recognition" and "data reconciliation in library operations." They underlined that library employees must become proficient with these tools to enhance services, develop data-driven offers, and satisfy the changing requirements of contemporary library operations.³³ Literature has revealed that archivists lack the knowledge and are ill-equipped to train others in electronic preservation and digitization.⁴¹ Raju emphasized how the swift rise of digital technologies has restructured the skills needed by information professionals in modern electronic environments. However, many librarians and archivists feel perturbed in this space, often hesitant or unprepared to manage the demands of print and digital collections.⁴² The mentioned studies showed a notable discrepancy between the skills taught to LIS graduates and the demands of modern jobs, which frequently hinder their professional ability. Emerging primary topics and relevant content should be integrated into the LIS curriculum to address this. This will ensure that future professionals are better prepared to meet evolving demands and are equipped to work efficiently in diverse, global environments.

7 Limitations and Future Works

This in-depth study tracks and maps the status and trends of LIS education research using bibliometric analysis and a topic modeling approach. The study is focused exclusively on LIS education and curriculum-related research, with data gathered solely from the Scopus database. Similar studies could be conducted using other databases for a more comprehensive understanding. The findings indicate that integrating

the World Wide Web and technological advancements has significantly influenced research activity. The diversity in LIS studies and emerging trends reflects the field's interdisciplinary nature. This type of analysis can be revisited periodically, and future studies could further explore LIS educational and curriculum development. The pace of change in LIS research is rapid, necessitating updates to the curriculum to align with current trends. Adjustments in the curriculum are essential to ensure that LIS professionals remain competitive and meet market requirements.

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