Scholarship of Teaching and Learning: Evolution of Research on Library and Information Science Education

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Scholarship of teaching and learning plays an important role in informing educational practices in every discipline. The aim of this study was to identify the trends of research on library and information science (LIS) education. A total of 1,986 articles on LIS education published from 1999 to 2018 were retrieved from bibliographic databases using topical and thesaurus-based queries. They were analyzed for their topics, methods, educational level and aspect, country, and outlet. The results showed that curriculum (what we teach) received more research attention than pedagogy (how we teach). Teaching organization of information (including cataloguing, classification, and metadata) was the most researched topic. Educational aspects of some sectors such as archives and record keeping and academic libraries have received more attention, while some other sectors such as school libraries have not been covered as widely. Survey was the most popular research method used in research articles. There were 134 articles covering LIS education in the United States, representing the greatest coverage by geographic region. While some topics such as serials librarianship and law were discussed in early 2000, in recent years topics such as political literacy, crisis management, privacy, digital humanities, and GLAM convergence have emerged in the literature.

Keywords: LIS education, research trends, scholarship of learning, scholarship of teaching, topic analysis

Modern library and information science (LIS) education is more than a century old. Scholarship of learning and teaching is important in any discipline, as education needs to be informed by research and be evidence-based. Research on LIS education started a few decades ago (e.g., White, 1981), but little is known about research on LIS education. As Chang, Huang, & Lin (2015) argue, knowing about research trends in a field facilitates a deeper understanding of the development of the discipline.

LIS has a good number of scholarly journals that publish original research about all aspects of librarianship and information sciences. While there have been several studies on general research trends in LIS in the past (e.g., Järvelin & Vakkari, 1993; Pandita & Singh, 2015; Tuomaala, Järvelin, & Vakkari, 2014), no study has focused on LIS education, and we do not have an overall picture of issues that are addressed and

KEY POINTS:

- There has been far more research on curriculum (what is taught) than on pedagogy (how it is taught) in LIS education.
- There is a lack of experimental research that indicates that little research is done on the development of teaching practices.
- Teaching information organization was the dominant topic, but new topics such as diversity, political literacy, and ethics have made their way into the research literature.

studied by LIS researchers. Most of the past studies on LIS research trends do not cover LIS education as one of the topics. Content analysis of LIS research by Chang et al. (2015), Lyu, Yao, Mao, & Zhang (2015), Blecic et al. (2017), Onyancha (2018), and Liu and Yang (2019) did not mention LIS education in their analysis. However, a few studies, especially older ones, did include LIS education in their analysis. Mckechnie & Pettigrew (2002), in their study of the use of theory in library and information science papers, revealed that 348 out of 1,160 papers (30%) were about social sciences, one of the sub-categories of which was LIS education. Koufogiannakis, Slater, & Crumley (2004) examined 807 research articles published in 2001 and sorted them into six categories. One of the categories was education (including user education), which included 95 articles. Of these, 26 were about LIS education. Tsay & Lai (2007) also found that professional education and information retrieval were two prominent subjects. Tuomaala et al. (2014) analysed articles in core LIS journals in three different years. They found that, in 1965, 2.1% of articles (out of a total of 142 articles), in 1985, 4.7% of articles (out of a total 449 articles), and in 2005 only 0.3% of articles (out of a total of 626 articles) were about education in LIS. Content analysis of articles published in the *Canadian Journal of Information and Library Science* since 1986 by Julien and Fena (2018) showed that 11 out of 402 papers (2.7%) were about educational issues in LIS.

All of these studies that included some data about LIS education also treated LIS education as a single category and did not include any more granular information about different aspects of education.

This study aims to analyze the research conducted from 1999 to 2018 in the area of LIS education to find out about the research topics and trends in that period. This two-decade period was chosen because most of the changes (e.g., online education and the impact of information technology on LIS) have happened in this period, and it was a long enough period for a trend analysis. LIS education in this study is broadly defined and includes both formal education and in-service training. It includes all disciplines that are related to LIS, including archives and records management, librarianship (and its specializations), information science, and data management.

Methods

Citation databases are usually the preferred choice for collecting publication data for trend analysis. Among citation databases, Scopus is believed to have a better coverage of social sciences and humanities compared to Web of Science (Mongeon & Paul-Hus, 2016). However, Scopus started to index the *Journal of Education for Library and Information Science*, the key journal dedicated to LIS education, in just 2017 and does not include volumes before that. There are also many LIS-related journals that are not indexed in Scopus. To take a more exhaustive approach to data collection, a mix of databases and search approaches were used, as outlined below, to obtain data for a 20-year period, from 1999 to 2018. The data collection was conducted in mid-2019.

- Scopus: a complex keyword query (see Appendix A) with all phrases related to education in LIS searched in title, abstract, and keywords (Scopus TITLE-ABS-KEY

field) of articles. The search was restricted to 99 LIS journals indexed in Scopus, as well as book chapters. The list of journals was obtained from Scimago, and journals related predominantly to information systems or information technology (e.g., *MIS Quarterly*) were removed.
- Scopus: all articles published in the journal *Education for Information* for the period of the study were obtained.
- LISTA (Library and Information Science and Technology Abstracts): all articles published in *JELIS* for the period of the study were obtained.
- ProQuest Library Science Database: a thesaurus search (see Appendix B) including all descriptors related to education in LIS and its subfields were used to retrieve all relevant items.

The items were restricted to those published in English. Research articles, review articles, book chapters, and conference papers were included in the study. Non–peer-reviewed journals were not included in the analysis. The data obtained through the above four methods were combined, and duplicates were removed, which resulted in 2,890 documents. Then each item's title and abstract were read by researchers, first to determine whether it was related to LIS education and then to categorize them based on topic and other features. This resulted in the removal of some items, as they were not about education in LIS, so the final dataset included 1,986 items. Given the number of articles, it was not practical to access and look at the full text of the articles for the analysis, although ideally that would have led to a more accurate analysis.

For categorization and topical coding of the articles, the following procedure was used:

- Geography: If articles specifically discussed LIS education in a country or geographic region, the geographic region was recorded.
- Methodology: If the methodology of the paper was clearly reported in the abstract, it was recorded.
- Education level: If articles specifically were about education at a certain level (e.g., undergraduate, Master's, or doctoral), the level was recorded.
- Pedagogy versus curriculum: Where appropriate, articles that were mainly about what is taught were categorized under curriculum, and those that were mainly about how it is taught were categorized under pedagogy.
- Topic: For topics, we initially tried to use a combination of ASIS&T thesaurus (to cover LIS aspect of topics) and Australian Thesaurus of Education Descriptors (to cover education-related aspects of topics). However, they proved to be ineffective for this purpose as they could not cover the level of granularity that we intended to cover in our categorization. Therefore, we developed a list of topics inductively by categorizing a number of articles. Once the categories were developed, the two researchers independently coded a sample of articles (50) and compared their coding to check for inter-coder reliability, which appeared to be acceptable (83% agreement between the two coders). When coding topics, each article was assigned only one topic that appeared to be the focus of the article or the dominant topic.

Findings

Publication year and outlet

The number of publications has fluctuated over the years. Figure 1 shows the number of publications in each year, with the largest number in 2010 (139 papers). The articles were published in 227 different sources, with 99 sources having only one relevant publication. Table 1 shows the top 20 publication outlets that together published 1,172 (59%) out of 1,986 articles. *JELIS* is, as would be expected, the top journal (376) and then *Education for Information* (175). The third outlet is *Cataloging and Classification Quarterly* with 88 articles. This is interesting because, as discussed below, teaching information organization is also a popular topic in LIS education literature.

Geographical coverage

Some of the articles (583 articles) specifically mentioned the geographic region or country that they covered. The heat map (Figure 2) shows the countries that were discussed in the articles. The darker the colour, the more articles about that country. The largest number of papers was about the United States (134), followed by Australia (51), India (47), and Nigeria (42). The articles about Africa mostly covered anglophone rather than francophone Africa, which might simply be because only English-language items were included in the data. The heat map does not incorporate 14 articles that were generally about Africa as a continent, seven about Europe, one about Central Asia, one about the Caribbean and Latin America, one about Arab countries of the Persian Gulf region, and one on Asia without naming specific countries.

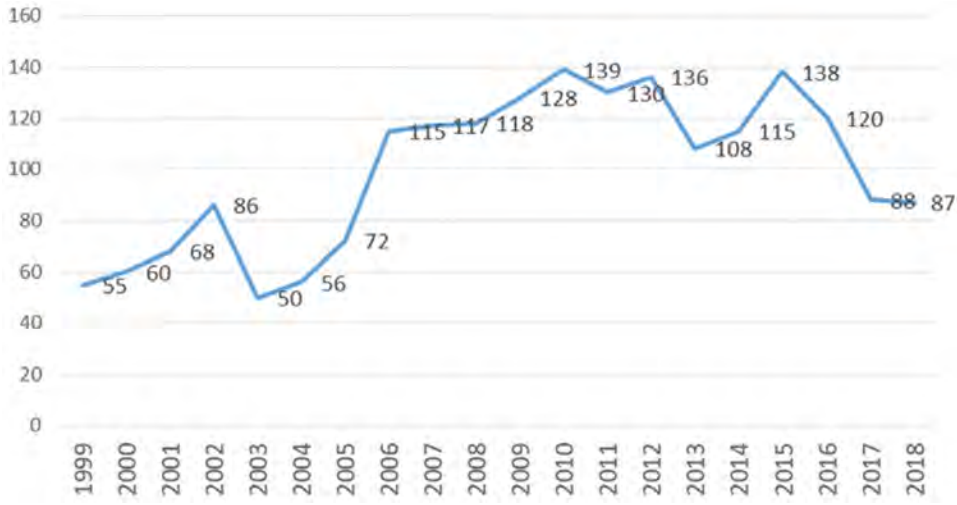

Figure 1: Distribution of publications by year

Table 1: Publication sources of LIS education articles

Title	No
Journal of Education for Library and Information Science	376
Education for Information	175
Cataloging and Classification Quarterly	88
Library Review	55
Library Philosophy and Practice	48
Reference Librarian	45
Journal of Academic Librarianship	41
Australian Library Journal	36
Library Trends	33
International Information and Library Review	32
Journal of Library Administration	30
New Library World	28
Library Quarterly	25
Reference and User Services Quarterly	25
IFLA Journal	24
Library Management	24
American Archivist	23
College and Research Libraries	22
Library and Information Science Research	22
Archival Science	20
Total	1,172

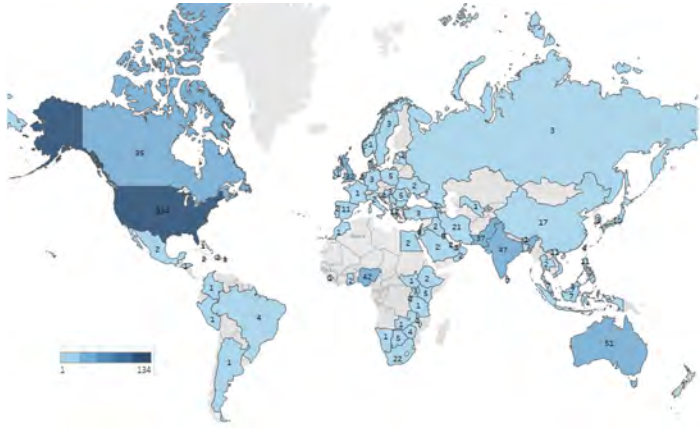

Figure 2: Heat map of frequency of articles discussing LIS education in different countries

Table 2: Methods used in the articles

Method	*n*
Survey	382
Literature review	44
Content analysis	43
Case study	34
Mixed methods	17
Focus group	10
Grounded theory	7
Qualitative method	7
Delphi study	4
Experimental	3
Action research	2
Discourse analysis	1
Ethnography	1
Phenomenology	1
Total	556

Methods

In terms of the research methods used in the articles (Table 2), 548 articles mentioned their research methods in the abstract or there was enough information for us to identify the methodology clearly. The most common method used was survey (382 articles). There were 44 review articles or articles that were mainly literature reviews. A few articles used more than one method (for instance, they used both survey and content analysis), so they have been counted once for each method. As a result, the total in the table (556) is larger than the number of articles that specified their method (548). The category "qualitative method" refers to those articles that used a qualitative method/approach but did not name a specific method (e.g., ethnography).

Education level

Some articles discussed different educational levels. Postgraduate studies were the most frequently discussed education level (200 articles). The "General" category (150 articles) shown in Figure 3 included articles that were about education (for instance, a survey of students was conducted), but the level of education was not mentioned in the abstract or title. Nine articles discussed more than one level of education.

Pedagogy versus curriculum

Education research could be about two main aspects of education: pedagogy and curriculum. Simply defined, pedagogy deals with "how we teach" and curriculum is about "what

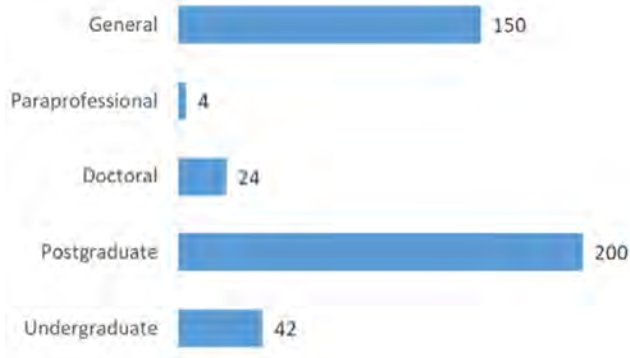

Figure 3: Education level covered in articles (*n* = 420)

Figure 4: Pedagogy and curriculum discussed in articles (*n* = 953)

is taught." It was possible to identify this educational dimension for 953 of the articles (Figure 4). Some articles were related neither to pedagogy nor to curriculum, for example, articles that discussed the history or status of LIS education in a country or those related to organizational aspects (e.g., iSchools). Curriculum was clearly more popular in education literature, with 793 articles focusing on curriculum and 128 focusing on pedagogy. Thirty-two articles discussed both curriculum and pedagogical aspects.

Topics

Table 3 shows the list of topics and their frequency, along with a brief explanatory note. Topics related to the organization of information resources, including metadata, cataloguing, and classification, were the most frequent topic. Information organization is a core competency in LIS, and issues around its teaching have been discussed in many articles. The second most popular topic was e-learning. LIS education, similar to many areas, has moved at least partly to the online environment in many countries, and some universities offer only online courses. A large number of articles discussed past and/or present LIS education practices in a country or geographic region. Education for the field of archives and record management was another topic that was covered in a large number of articles. That was followed

Table 3: Frequency of topics

Topic	Count	Notes
Information organization	145	Information organization including cataloguing, classification, metadata, information retrieval
E-learning	139	Issues related to e-learning (including online courses, MOOCs etc.) in LIS and the role of information professionals in supporting e-learning and its educational implications
Country profile	98	Discussing LIS education in a country
Archives	94	Related to archive and record-keeping education
Trends, etc.	82	Discussing challenges, changes, status, or trends in LIS education
Academic libraries	63	Educational issues related to academic libraries and librarians
Diversity	59	Related to diversity, gender, inclusion, multiculturalism, etc.
Digital libraries & resources	58	Educational issues related to digital libraries or digital resources
Reference services	57	Issues related to its teaching and inclusion in curricula etc.
History	57	Discussing historical aspects of LIS education
Training	55	Professional development, on-the-job training, training, continuous education, etc.
Curriculum	55	Analysis, discussion, comparison, and evaluation of curricula
IT (information technology)	51	IT course subjects in LIS curricula and LIS schools
Teaching	50	Related to teaching methods and techniques and pedagogy
Job market	48	Related to the job market and the alignment of education with the market
IL (information literacy)	48	Related to information literacy and user education
TL (teacher librarians)	40	Issues related to education of teacher librarians
Special libraries	33	Educational issues related to special libraries and librarians (excluding health libraries)
Practicum	33	Issues related to practica, internships, and similar subjects
Competencies	33	Related to competencies that LIS professionals and graduates should have
Research	28	Related to teaching research methods and related subjects
Mentoring	25	Related to mentoring in professional development
Educational needs	25	Needs assessment and discussion of educational needs
Management	23	Related to teaching management

(*Continued*)

Topic	Count	Notes
Evaluation	23	Evaluation of education
Service education	22	Related to teaching service culture and customer service
Health libraries	22	Educational issues related to health libraries and librarians
Educational technologies	21	Use of or issues related to their use in LIS education
Leadership	20	Issues related to its teaching and inclusion in curricula, etc.
Social media	18	Issues related to its teaching and inclusion in curricula, etc.
Doctoral	18	Related to education of PhD and other doctoral courses
Collaboration	18	Collaboration in development, planning, or delivery of education
Students	17	Related to students' satisfaction, attitudes, preferences toward education and courses
Public libraries	17	Educational issues related to public libraries and librarians
Learning styles	17	Related to different learning styles (of students, etc.) and implications for teaching
Assessments	17	Related to assessments (design, implementation, effectiveness, etc.)
KM (knowledge management)	15	KM education
iSchools	15	Issues related to iSchools as educational institutions
IM (information management)	15	Issues related to its teaching and inclusion in curricula, etc.
Quality	14	Related to quality issues in education
Accreditation	14	Related to accreditation issues
Ethics	13	Professional ethics and its inclusion in teaching and curriculum
Future	11	Related to the future of LIS education
Children's libraries	11	Educational issues related to children's and school libraries and librarians
Associations	11	Role of associations (e.g., ALA) in education
Academics	11	Issues related to LIS academics' views, their competencies, etc.
Data management	11	Issues related to its teaching and inclusion in curricula, etc.
Courses	10	Discussion of specific courses, usually offered in a specific institution
Programming	9	Inclusion of software programming in curriculum
I18N (internationalization)	9	Issues of internationalization of LIS education
Galleries, libraries, archives, and museums (GLAM)	8	Convergence of GLAM education or integrated education for GLAM

Topic	Count	Notes
Education and practice	8	Gap between education and practice
Collection management	8	Issues related to its teaching and inclusion in curricula, etc.
Marketing	7	Marketing of LIS courses
Disability	7	Issues related to service for people with a disability and its educational aspects for LIS students
Bibliometrics	7	Issues related to its teaching and inclusion in curricula, etc.
Planning	6	Issues related to planning and organization of LIS education
Librarian as teacher	6	Issues related to librarians' role as teacher and its educational aspects
Supply & demand (SND)	6	Issues related to demand and supply in LIS education
Copyright	6	Issues related to its teaching and inclusion in curricula, etc.
Technicians	5	Issues related to education of library technicians
Social justice	5	Issues related to its teaching and inclusion in curricula, etc.
Literature	5	Issues related to LIS literature and its role in education
Learning environment	5	Issues related to learning environment
ICT use	5	Use of ICT by LIS educators or students for learning
Geographic information systems (GIS)	5	Issues related to its teaching and inclusion in curricula, etc.
Community engagement	5	Issues related to its teaching and inclusion in curricula, etc.
Career	5	Issues related to career paths and trajectory in LIS
Serials	4	Issues related to its teaching and inclusion in curricula, etc.
Indigenous	4	Indigenous knowledge in LIS education or education of Indigenous librarians
Identity	4	Issues related to identity in LIS education
Funds	4	Related to funds, grants, and scholarships (for students), etc.
EBP (evidence-based practice)	4	Issues related to its teaching and inclusion in curricula, etc.
Usability	3	Issues related to its teaching and inclusion in curricula, etc.
Sustainability	3	Related to sustainability of LIS education or its inclusion in curricula
student work	3	Work of students in (academic) libraries and issues of training, etc.
Reading (advisory)	3	Reading advisory education.
PM (project management)	3	Issues related to its teaching and inclusion in curricula, etc.
P2P (peer to peer) learning	3	Issues related to its teaching and inclusion in curricula, etc.

(*Continued*)

Topic	Count	Notes
Mobile use	3	Issues related to the use of mobile devices in LIS education
LIS position	3	Issues related to the disciplinary position of LIS among other disciplines.
Liberal arts	3	Issues related to its teaching and inclusion in curricula, etc.
Law	3	Issues related to its teaching and inclusion in curricula, etc.
Intelligence analysis	3	Issues related to its teaching and inclusion in curricula, etc.
Information society	3	Issues related to its teaching and inclusion in curricula, etc.
Conferences	3	Role of conferences as professional development opportunity for practitioners
Volunteers	2	Role of volunteers and volunteering in LIS education and careers
Theory	2	Issues related to its teaching and inclusion in curricula, etc.
Privacy	2	Issues related to its teaching and inclusion in curricula, etc.
PIM (personal information management)	2	Issues related to its teaching and inclusion in curricula, etc.
Entrepreneurship	2	Issues related to its teaching and inclusion in curricula, etc.
Political literacy	1	Issues related to its teaching and inclusion in curricula, etc.
Media literacy	1	Issues related to its teaching and inclusion in curricula, etc.
Library furniture	1	Issues related to its teaching and inclusion in curricula, etc.
Information policy	1	Issues related to its teaching and inclusion in curricula, etc.
Embedded librarianship	1	Issues related to its teaching and inclusion in curricula, etc.
DH (digital humanities)	1	Issues related to its teaching and inclusion in curricula, etc.
Crisis management	1	Issues related to its teaching and inclusion in curricula, etc.
CI (community informatics)	1	Issues related to its teaching and inclusion in curricula, etc.
Censorship	1	Issues related to its teaching and inclusion in curricula, etc.
Accessibility (web)	1	Issues related to its teaching and inclusion in curricula, etc.
Total	1,986	

by articles that discussed challenges, changes, status, or trends in LIS education in general. The literature also discussed a wide range of topics that should be included in LIS education. For instance, political literacy, media literacy, law, and liberal arts were topics that articles considered significant for LIS practitioners and argued for their inclusion in curricula.

Figure 5 shows the distribution of topics by frequency and average of publication year of articles that covered those topics. Note that the vertical axis is logarithmic for a clearer view of topics. The colour and shape show the number of distinct years in which a topic appeared in the literature. This is different from the frequency (shown in the vertical axis),

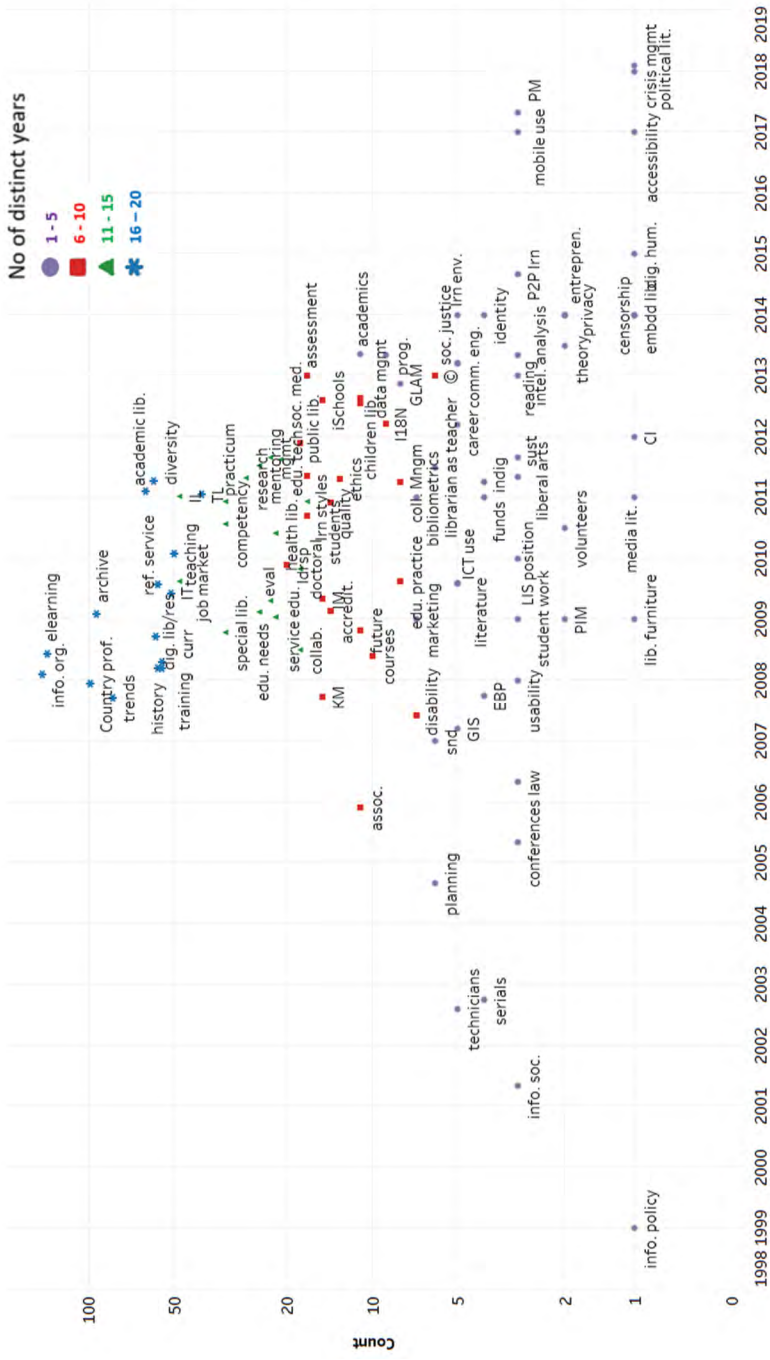

Figure 5: Frequency and average publication year of articles by topics

and it tells us in how many different years a topic was covered in the literature. For instance, those that appeared in one to five different years are shown in purple circles (e.g., information policy), those in red squares appeared in six to 10 years, those in green triangles appeared in 11 to 15 years, and finally those in blue asterisks appeared in 16 to 20 years. The names of topics are deliberately presented in short format so they can fit in the diagram.

In terms of temporal trends, while some topics such as information society or information policy or issues related to serials (management, collection, etc.) were discussed in the early 2000s, there were some topics that appeared in the literature more recently, such as political literacy, crisis management, web accessibility, project management, digital humanities, identity, and student to student interaction (P2P learning). However, they were covered in only one or just a few articles. Topics that were more frequent (those appearing higher in the diagram) were covered over a longer period of time. Three topics—namely, e-learning, trends etc., and training—appeared in all 20 years. History, archives, information organization, and country profile each appeared in 19 years. Information literacy first appeared in 2002, and social media, internationalization, and GLAM first appeared in 2007.

Discussion and conclusion

Research into education in every field or scholarship of teaching and learning is an important part of the development of any discipline. Such research helps the development of teaching methodologies and practices, which in return can result in the improvement of student learning. Teaching, like any other practice, needs to be informed by scholarly evidence. LIS as a discipline and practice has been influenced by many factors, including developments in information technology, and LIS educators have tried to update and improve their teaching practices by doing research and sharing their experiences. The articles analyzed in this study were the results of such endeavours. The fact that there was a considerable number of articles on teaching and learning aspects of the organization of information, which is a core competency and a significant part of information work, indicates the effort of LIS educators to update and improve the teaching practice and enhance the learning experience of students.

Most of the topics covered in the literature could be grouped into a few clusters, including types of libraries (e.g., academic and public libraries), technology-related topics (e.g., e-learning and educational technology), organization-related topics (e.g., iSchools and associations), professional development (e.g., training and conferences), student-related topics (e.g., student work and learning styles), curricula and content (e.g., KM and leadership), and educational issues (e.g., diversity and job market). The analysis of the range of topics showed a few characteristics of the research in this area. While some core topics such as information organization and issues around e-learning and academic libraries were well covered, some other topics such as community engagement, which is becoming increasingly important in LIS practice, were not well covered. The analysis also showed that certain sectors within LIS are well presented in education research, including archives and record management, while some other sectors such as teacher-librarians or school and children's libraries are not well covered.

In terms of the educational aspect, there is clearly more focus on curriculum than pedagogy, and this might be because those who write about LIS education are topic experts who teach LIS courses but are not necessarily experts in education, so more attention is paid

to what is taught rather than how it is taught. This highlights an important gap, because although we update our curricula and keep up with the development of technologies and services, our research might not well inform our teaching practices. There could be an opportunity here for collaboration with education scholars. Another feature that shows room for change or perhaps improvement is the nature of the articles and their methodology. Many of the papers were not research articles in the conventional sense; instead, they seemed like essay-type publications that included viewpoints and discussions. Of course, as Atkinson (2001) argued, scholarship of teaching should not be limited to peer-reviewed articles. But the lack of research might indicate that collectively we do not study the education in our field systematically and formally. Survey was the dominant methodology identified in conventional research articles. Survey has its strengths and weaknesses like any other method and is not a shortcoming per se. However, its dominance indicates that many of the studies have been done with the aim of seeking opinions, views, or attitudes of the research population. The lack of experimental research shows that little research is done on the development of teaching practices, which is also confirmed by the small number of papers on pedagogy.

It is promising that some of the issues that present-day societies try to address, such as diversity, internationalization, political literacy, and ethics, are discussed in the literature. This might mean that there are known problems in those areas (e.g., diversity, gender, etc.) in LIS as a discipline, but it might also imply that we acknowledge that there are issues, and scholars are trying to improve the situations in relation to those issues. We know that, for instance, the inclusion of diversity in LIS education is still a challenge in some parts of the world (Maestro, Ramos-Eclevia, Eclevia, & Fredeluces, 2018). However, it is also a sign of maturity that the discipline has a specialized journal on its disciplinary education (*JELIS*), although the journal's visibility and accessibility can be improved. There might be an opportunity for the professional bodies of the disciplines to play a more active role in promoting and advocating for scholarship of learning and teaching.

The research has some limitations that need to be taken into account when interpreting the results. First, due to the limited coverage of databases, it is possible that some outlets that are not indexed in the included databases were left out of the data set. Also, topical searches using keywords are never perfect, especially when we rely on the presence of keywords in certain parts of articles (e.g., title) and authors might use different terms. There might also have been some conference papers on LIS education that were not included in the data set because conferences are not well indexed in databases. Although ideally a thorough content analysis should look at the full text of articles, given the number of articles it was not practical for researchers to do this in this study. We would have liked to analyze the affiliation (at country level) of the authors of the articles, but affiliation data were available only in Scopus results and not in the other two databases. Finally, assigning topics to articles was challenging. It is obvious that some topics overlap. For instance, an article could be about teaching personal information management to academic librarians and it could be categorized under both topics. But we had to compromise for pragmatic reasons and limit the number of topics to one main or dominant topic. Although the results may not fully illustrate the spectrum of topics covered in LIS education literature at a fine level of granularity, they are indicative and suggestive of the main topics discussed in the literature.

The next step is to see if there are gaps in the existing literature in the sense of not reflecting the challenges and needs of education and educators in LIS. Those involved in LIS education should also reflect on whether they need to be more involved in the scholarship of learning and be more active in writing and sharing their challenges and practices in education. It would be useful to see who does the research on LIS education and whether there is any collaboration with the scholars in the field of education in this area.

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Appendix A: Scopus topic query

TITLE-ABS-KEY ("library educat*" OR "librarianship educat*" OR "library and information science* educat*" OR "library and information studies educat*" OR "(lis) educat*" OR "LIS educat*" OR "information science* educat*" OR "library and information educat*" OR "library curricul*" OR "librarianship curricul*" OR "library and information science* curricul*" OR "library and information studies curricul*" OR "(lis) curricul*" OR "LIS curricul*" OR "information science* curricul*" OR ("curriculum development" pre/1 "librar*") OR "education in lis" OR "lis program*" OR "catalog* educat*" OR "information organi* educat*" OR "classification educat*" OR "data educat*" OR "education of librarian*" OR "education for information professional*" OR "education for librarian*" OR "education for library and information" OR "archival educat*" OR "bibliometrics education" OR "lis course*" OR "librarianship courses" OR (education pre/3 "information professional*") OR (training pre/3 "information professional*" OR "library technician* education" OR "library technician* training*" OR "paraprofessional education" OR "library paraprofessional* training*" OR "library assistant* education" OR "library assistant* training*" OR "teacher librarian* education")

Appendix B: ProQuest query based on its thesaurus descriptors

DE "CATALOGING education" OR DE "EDUCATION of academic librarians" OR DE "EDUCATION of African American librarians" OR DE "EDUCATION of archivists" OR DE "EDUCATION of catalogers" OR DE "EDUCATION of children's librarians" OR DE "EDUCATION of library technicians" OR DE "EDUCATION of minority librarians" OR DE "EDUCATION of public librarians" OR DE "EDUCATION of reference librarians" OR DE "EDUCATION of school librarians" OR DE "EDUCATION of special librarians" OR DE "EDUCATION of technical services librarians" OR DE "EDUCATION of young adult services librarians" OR DE "HISTORY of library education" OR DE "INFORMATION resources management education" OR DE "INFORMATION science education (Continuing education)" OR DE "information science education" OR DE "IN-service training of archivists" OR DE "LAW librarians – Training of" OR DE "LIBRARIAN certification" OR DE "LIBRARY directors – Training of" OR DE "LIBRARY education – Awards" OR DE "LIBRARY education (Continuing education) – Awards" OR DE "LIBRARY education (Continuing education)" OR DE "LIBRARY education financing" OR DE "LIBRARY education standards" OR DE "LIBRARY education" OR DE "LIBRARY school curriculum" OR DE "LIBRARY science teachers – Training of" OR DE "LIBRARY science teachers" OR DE "SERIALS librarians – Training of" OR DE "STUDY & teaching of bibliometrics" OR DE "TRAINING of academic librarians" OR DE "TRAINING of archivists" OR DE "TRAINING of catalogers" OR DE "TRAINING of information science teachers" OR DE "TRAINING of information scientists" OR DE "TRAINING of librarians" OR DE "TRAINING of library administrators" OR DE "TRAINING of library employees" OR DE "TRAINING of library media specialists" OR DE "TRAINING of library technicians" OR DE "TRAINING of medical librarians" OR DE "TRAINING of public librarians" OR DE "TRAINING of reference librarians" OR DE "TRAINING of school librarians" OR DE "TRAINING of special librarians" OR DE "TRAINING of young adult services librarians" OR DE "WOMEN librarians – Training of" OR DE "WOMEN library administrators – Training of"