

# Ranking the Research Productivity of Library and Information Science Faculty and Schools: An Evaluation of Data Sources and Research Methods

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This study evaluates the data sources and research methods used in earlier studies to rank the research productivity of Library and Information Science (LIS) faculty and schools. In doing so, the study identifies both tools and methods that generate more accurate publication count rankings as well as databases that should be taken into consideration when conducting comprehensive searches in the literature for research and curricular needs. With a list of 2,625 items published between 1982 and 2002 by 68 faculty members of 18 American Library Association– (ALA-) accredited LIS schools, hundreds of databases were searched. Results show that there are only 10 databases that provide significant coverage of the LIS indexed literature. Results also show that restricting the data sources to one, two, or even three databases leads to inaccurate rankings and erroneous conclusions. Because no database provides comprehensive coverage of the LIS literature, researchers must rely on a wide range of disciplinary and multidisciplinary databases for ranking and other research purposes. The study answers such questions as the following: Is the Association of Library and Information Science Education's (ALISE's) directory of members a reliable tool to identify a complete list of faculty members at LIS schools? How many and which databases are needed in a multifile search to arrive at accurate publication count rankings? What coverage will be achieved using a certain number of databases? Which research areas are well covered by which databases? What alternative methods and tools are available to supplement gaps among databases? Did coverage performance of databases change over time? What counting method should be used when determining what and how many items each LIS faculty and school has published? The authors recommend advanced analysis of

research productivity to provide a more detailed assessment of research productivity of authors and programs.

## Introduction

Although rankings of academic units had been a part of the U.S. academic landscape for nearly 100 years before the 1980s, they received little attention from constituencies other than administrators, federal agencies, graduate school applicants, and higher education researchers (Stuart, 1995). Over the last two decades, however, national rankings have become more widely read and more influential among students, parents, and the academic community than ever before, primarily because of the publication of rankings by mass circulation magazines, such as the *U.S. News & World Report's America's Best College* (1983– ), *Money* magazine's *Money Guide: Your Best College Buys Now* (1990– ), *Time/The Princeton Review* (1992– ), and *Kaplan/Newsweek's How to Get Into College* (1997– ). It is estimated that these four titles alone sell approximately 7 million copies of newsmagazine college rankings and guides annually (McDonough, Antonio, Walpole, & Perez, 1998).<sup>1</sup>

Today, there is little doubt that mass circulation rankings and those published in academic journals have become increasingly important to schools, colleges, and universities, particularly because the status conveyed by them influences academic institutions' abilities to (1) attract higher-quality faculty, students, and administrators; (2) generate increasing support from alumni and donors; and (3) provide excellent placement opportunities to graduates (Machung, 1998; Roush, 1995; Stock & Alston, 2000). Rankings have become

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Received December 3, 2003; revised May 24, 2004, July 20, 2004; accepted September 2, 2004

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<sup>1</sup>For a detailed historical account of rankings in national magazines, reports, and scholarly papers, see Howard (2002).

increasingly important also because they can support and/or threaten institutions' core organizational identities and functions, in addition to affecting admissions policies and the number of student applications received (Elsbach & Kramer, 1997; Machung, 1998; Monks & Ehrenberg, 1999). University presidents and deans are well aware of the published rankings and often cite positive ones in their speeches and program evaluations.

Ranking implies both evaluation and quality and often is based on, or is influenced by, the research performance of faculty members and their academic departments. *Quality* in this sense is generally defined as a measure of the extent to which an idea, paper, author, or institution has contributed to the progress of knowledge (van Raan, 1996). Today, the general practice for evaluating and ranking the research performance of faculty members and their academic units in many colleges and universities is to rely on three interrelated criteria or data: the opinions of faculty members and administrators, lists of publications, and citation counts.

Rankings based on opinions of faculty members and administrators are almost universal in terms of the method used for data collection, namely, surveys. The rationale behind perception-based data is that, since ranking pertains to the status position afforded to a department or university by relevant others (e.g., faculty and administrators), the most direct approach would appear to be eliciting their evaluations (Mulvaney, 1992, 1993; White, 1993).

Rankings based on lists of publications range from simple evaluation systems such as publication counts, to systems that devise certain evaluative or weighting scales for different kinds of publications—books, chapters in books, articles in refereed and nonrefereed journals, conference papers, and so on. In some cases, publication length and the reputation or rank of the publisher or journal are taken into consideration as well. The rationale for using lists of publications for ranking library and information science (LIS) schools and faculty is based on claims that scholarly publications produce new knowledge, confer prestige on the university and to the individual researcher, attract better faculty and students, produce better teaching as new knowledge is integrated into the preparation of students, develop the faculty member intellectually and professionally, and attract research funds (Blake & Tjoumas, 1990; Boyce & Hendren, 1996; Garland, 1991; Wilson, 1979).

The use of citation analysis for evaluating or ranking the research performance or productivity of scholars is based on the assumption that citations are a form of giving credit to, or recognizing the value, quality, significance, or impact of, the authors' work (Cole & Cole, 1967, 1968). For a detailed discussion on this point, see Gilbert (1978), Smith (1981), van Raan (1996), and White (1990). Proponents of citation analysis claim that their method is less obtrusive than the direct perception studies, and less dependent on the actions of constituent members of the entity whose prestige is being judged than the publications count method. They further claim that citation analysis makes clearer use of quality dimensions and, since it is based on the actions of disinterested others,

provides better evidence of recognition and visibility (Cronin & Overfelt, 1994; Fogarty & Saftner, 1993).

## Ranking Studies in Library and Information Science

Ranking studies in LIS have a long history. Danton (1983), for example, lists and compares eight perception-based ranking studies published between 1956 and 1981. These and similar subsequently published rankings (e.g., Gourman, 1985; *U.S. News & World Report*, 1999; White, 1987, 1993), however, have generated considerable controversy among the LIS community and attracted significant and detailed methodological criticism (Biggs & Bookstein, 1988; Bookstein & Biggs, 1987; Boyce & Hendren, 1996; Chubin & Hackett, 1990; Cronin & Overfelt, 1994; Garfield, 1983a, 1983b; King, 1987; Martin, 1996; McGrath, 1993; Mulvaney, 1992, 1993). These critics have emphasized several points:

- Participants in these studies often make judgments on the basis of little knowledge of the individual programs they assess.
- There is little agreement on the nature and meaning of quality in LIS literature and education.
- Judgments are often determined by unstated criteria that are probably not consistent from person to person.
- Judgments are often based on opinions of faculty and administrators of the programs being evaluated and not on those of their students or graduates, that is, people who could provide more accurate indications of program performance.
- Different individuals in different cognitive and social locations may evaluate a given scientific contribution (and therefore its authors) rather differently.
- Quality indicators cannot be quantified in such a way that the differences between the best and second best schools are apparent and meaningful.
- Many factors influence rankings without consideration of actual quality, including number of graduates, teaching load, clerical and research assistance, age of the school, geographical location of respondents, as well as the choice of population to be surveyed, low return rate, and other factors associated with the use of survey methods.

Largely because of these criticisms, researchers started to use different (or additional) methods in ranking LIS schools. In 1983, Robert Hayes, then dean of the Graduate School of Library and Information Science of the University of California at Los Angeles, published the first ranking of American Library Association– (ALA-) accredited LIS schools on the basis of publication and citation counts (Hayes, 1983). Since then, eight similar ranking studies have been published—three based on publication and citation counts (Bates, 1998; Budd, 2000; Budd & Seavey, 1996), one based on citation counts only (Brace, 1992), and four based on publications counts only (Boyce & Hendren, 1996; Pettigrew & Nicholls, 1994; Varlejs & Dalrymple, 1986; Wallace, 1990).<sup>2</sup> Details on these studies are shown in Table 1.

<sup>2</sup>Buttlar (1991, p. 46) and Watson (1985, p. 339) provide authorship rankings of schools, but as small parts of studies focusing on different topics.

TABLE 1. Publication and citation count ranking studies.

	Sample time span	Data sources	Programs included	Faculty included	Publication type	Total programs	Total faculty
Hayes (1983)	1965–1980	<i>SSCI</i>	All U.S.	Full and associate	Total	60	411
Varlejs & Dalrymple (1986)	1983	<i>ISTA, LLIS, LISA</i>	All U.S. and Canada	Full-time, visiting, and emeriti	Total (bks., chpts., art., tech. repts.)	68	725
Wallace (1990)	1984–1988	<i>LLIS</i>	Carnegie I (U.S.)	Assistant, associate, full	Total (except bk. revs.)	20	236
Brace (1992)	1979–1990	<i>SSCI</i>	All U.S.	All full-time	Citations only	Varies	NR
Pettigrew & Nicholls (1994)	1982–1992	<i>ERIC, LLIS, LISA, PASCAL, SSCI</i>	All U.S. and Canada	Assistant, associate, full	Total pub., mong., total art., ref. art., nonref. art., misc., bk. revs.	59	607
Budd & Seavey (1996)	1981–1992	<i>SSCI</i>	All U.S.	All full-time (assist., assoc., full)	Art. only	50	1,047 <sup>a</sup>
Boyce & Hendren (1996)	1984–1993	<i>LLIS</i>	All U.S. and Canada	All full-time	Total, papers, bk. revs.	57	647
Bates (1998)	1981–1991	<i>LLIS, SSCI, WorldCat</i>	Illinois, Indiana, Michigan, UCLA	Full and associate	Art., auth. bks., ed. bks., misc. (rev. art., bk. revs., cols., etc.)	4	37
Budd (2000)	1993–1998	<i>SSCI</i>	All U.S.	All full-time (assist., assoc., full)	Art. only	49	706 <sup>a</sup>

Note. *SSCI* = *Social Sciences Citation Index*; *ISTA* = *Information Science & Technology Abstracts* (formerly *Information Science Abstracts*); *LLIS* = *Library Literature & Information Science* (formerly *Library Literature*); *LISA* = *Library and Information Science Abstracts*; NR = not reported; *ERIC* = Education Resources Information Center; Bks. = books; chpts. = chapters; art. = articles; tech. repts. = technical reports; revs. = reviews; pub. = publications; ref. = reference; nonref. = nonreference; misc. = miscellaneous; auth. bks. = authored books; ed. bks. = edited books; cols. = columns; mong. = monographs.

<sup>a</sup>Some faculty members were counted more than once as a result of change in academic/professional rank over time.

Many have argued for and others against the use of citations for research quality assessments. Although the proponents argue that this method is an indispensable support tool for traditional evaluative measures (Cronin & Overfelt, 1994; Garfield, 1983a, 1983b; Glanzel, 1996; Koenig, 1982, 1983; Kostoff, 1996; Lawani & Bayer, 1983; Narin, 1976; Narin & Hamilton, 1996; van Raan, 1996, 1997), critics claim that it has some serious problems or limitations that impact its validity, including the following: (1) Citation counts give no clue why a work is being cited; (2) citations are field-dependent and may be influenced by time, number of publications, access to or knowledge of the existence of needed information, as well as the visibility and/or professional rank of the authors; and (3) citation databases provide credit only to the first author, primarily cover English journal articles published in the United States, are not comprehensive in coverage, and have many technical problems such as synonyms, homonyms, clerical errors, and limited coverage of the literature (MacRoberts & MacRoberts, 1986, 1989, 1996; Seglen, 1992, 1998). Studies that report both the validity of citation counts in research assessments and the positive correlation between them and both peer evaluations and publication counts have been discussed and reviewed by many, including Baird and Oppenheim (1994), Biggs and Bookstein (1988), Cronin and Overfelt (1996), Holmes and Oppenheim (2001), Kostoff (1996), Narin (1976), Narin and Hamilton (1996), Oppenheim (1995), Seng and Willett (1995), and Smith (1981).

As have perception- and citation-based rankings, rankings based on publication counts have attracted considerable methodological criticism. For example, Wallace's study (1990) was highly criticized because it used simple count. Critics argued that in order to arrive at more accurate rankings, studies must differentiate between small minor publications (such as book reviews and one-column articles) and major substantial publications (such as refereed journal articles and authored books) (Bates, 1998; Harter & Serebnik, 1990; Herson, 1990; Pettigrew & Nicholls, 1994). Furthermore, Bates (1998) noted that the most commonly used sources of data are aimed at journals, a practice that underrepresents humanities-based communication in which books are as important if not more important than journal articles. Pettigrew and Nicholls (1994) and Wallace (1990) were criticized for allocating full publication credit to each author in the case of multiple authorships (Cronin & Overfelt, 1996; Harter & Serebnik, 1990). Pettigrew and Nicholls were also criticized because they did not differentiate among authored, edited, and compiled books nor distinguish research monographs from textbooks (Cronin & Overfelt, 1996).

In summary, both citation count rankings and publication count rankings have strengths and weaknesses and both imply quality in different ways. Whether to use one or both methods in ranking faculty and academic programs ultimately depends on the goals and objectives of the study and the groups of people or programs being evaluated. In both types of rankings, however, authors have relied on certain

data sources and research methods. Although citation data sources have been extensively examined and evaluated by previous researchers in LIS (see, for example, Nisonger, 2004), studies that examine the appropriateness of data sources used in publication count rankings have been virtually nonexistent. It is therefore the purpose of this study to identify tools and methods that would generate more accurate publication count rankings than those used in previous studies.

Several criticisms of publication count rankings have been discussed in LIS. However, it was surprising that authors of these rankings, as well as their critics, did not address other, perhaps more important, problems. As shown in Table 1, most of the LIS publication count ranking studies relied on only one database for their results. The scope and comprehensiveness of coverage in databases used to rank authors and schools in bibliometric research projects are of special importance. Significant gaps in coverage, the use of nonreliable (or nonrepresentative) sources, subject bias, and limitations on document types indexed in databases used may seriously distort the results of these studies and lead to erroneous conclusions, thus warranting three questions:

- Were the databases used appropriate for identifying the majority, or a representative sample, of items published by faculty members examined?
- Did the databases used favor a particular group of faculty members over others (e.g., those scholars with research agendas in the areas of information-seeking behavior and information retrieval over those focusing on other areas)?
- Which database or group of databases indexes the highest percentage of LIS literature? Does this percentage change over time or according to publication type?

The fact that all authors but one relied exclusively on the ALISE directory of members as the source for identifying faculty members in each ALA-accredited LIS school warrants another question: Is ALISE's directory a reliable source to generate a complete list of faculty members at LIS schools? If not, what other practical methods exist to identify all faculty members at LIS schools accurately?<sup>3</sup>

The current study addresses all these questions and analyzes the findings within the context of research methods adopted by authors of publication count rankings. In doing so, the study examines the validity and reliability of previously published rankings and develops standard procedures to be followed in similar future endeavors. Identifying databases that index the highest percentage of LIS literature not only allows the naming of best databases for ranking purposes, but also provides deans and directors of LIS schools with easy-to-use tools (1) to recognize areas of strengths and weaknesses of the research productivity of their own faculty and (2) to compare the results with those of faculty members

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<sup>3</sup>Only Wallace (1990) examined or cross-examined the accuracy of ALISE's directory. He called each school individually to verify the identity and number of faculty members.

in other similar schools. Identifying databases that index the highest percentage of LIS literature also helps libraries and other information centers make sound acquisitions and periodical subscription decisions and helps students and researchers select and use databases more effectively to support their research and curricular needs. Publication count, especially of scholarly papers, is arguably a very good measure of quality and complements both citation counts and peer-based evaluations (see van Raan, 1996). It is therefore very necessary to use appropriate databases to generate accurate publication count rankings of faculty and academic programs.

## Previous Studies on Coverage of Library and Information Science Databases

Many studies have examined the comprehensiveness of coverage of LIS databases. Coblans (1972); Ernest, Lange, and Herring (1988); Gluck (1990); Hawkins and Miller (1977); LaBorie, Halperin, and White (1985); Read and Smith (2000); and Yerkey (1983) provide good summaries of the major research conducted from the mid-1960s to the year 2000. Typically, most of the testing of coverage was based on subject or topical searches (e.g., LaBorie & Halperin, 1981; Read & Smith, 2000) or on coverage or lack of coverage of particular LIS journals in a database and extent of coverage (e.g., Edwards, 1976; Gilchrist, 1966; Goldstein, 1973; Jacso, 1998; LaBorie, Halperin, & White, 1985). Major findings in all these coverage studies are that overlap between databases has fluctuated over the years and that several databases must be consulted if a comprehensive search is desired. Despite these findings, most authors of publication count ranking studies continued to use only one database as the source for publication counts.

A thorough examination of LIS database coverage studies reveals three major problems with respect to data sources and methods of analysis used. First, in older studies, analysis was usually based on small sets of data because of the tedium of the process (LaBorie & Halperin, 1981). The availability of online abstracting and indexing services, accessible through personal computers, has made the testing and analysis of databases today less tedious. Second, although subject and keyword searches are the most commonly used methods for retrieving information, they have the inherent problem of variations in indexing language, depth, and comprehensiveness across different databases. Third, examining the coverage of only LIS journals is no longer an effective method for measuring coverage performance in databases because of the increasingly interdisciplinary nature of the field. As found in this study and earlier by Yerkey and Glogowski (1989, 1990), today many LIS scholars publish in non-LIS core journals or in journals that are not indexed in LIS databases. Therefore, to arrive at a more accurate measure of coverage in LIS and other relevant databases, one must conduct known-item searches on the basis of comprehensive bibliographies or of a large number of personal lists of publications rather than conducting topical and subject searches for examining the coverage of LIS databases.

## Methodology

### *Selection of Databases*

In order to evaluate the validity and reliability of previously published LIS publication count rankings, we examined all the databases used in these rankings, including: *Education Resources Information Center (ERIC)*, *Information Science & Technology Abstracts (ISTA, formerly Information Science Abstracts)*, *Library and Information Science Abstracts (LISA)*, *Library Literature and Information Science (LLIS, formerly Library Literature)*, *PASCAL*, *Social Sciences Citation Index (SSCI)*, and *WorldCat*. To identify other relevant databases, we conducted a test on hundreds of general and broad subject databases by using DIALOG's OneSearch and DIALINDEX features. This test involved searching for items published by the top 20 individuals who had most journal articles in LIS, according to Budd (2000). It was found that *Inside Conferences* and *INSPEC* index a significant amount of LIS literature and, therefore, should be included in the final pool of databases examined.<sup>4</sup> All of the databases we used were available in electronic formats, and all, with the exception of *LISA* and *WorldCat*, were searched through DIALOG. *LISA* was searched through Ovid's WebSPIRS and *WorldCat* was searched by using the Online Computer Library Center's (OCLC's) FirstSearch. Table 2 provides a detailed description of the nine databases examined.

### *Units of Analysis*

Since known-item searching provides a more accurate picture of database coverage than other searching methods, as discussed previously, we identified and used complete and current publication lists of faculty members from the top 10 ranked LIS schools according to *U.S. News & World Report* (1999). Given that one-third of the ranking studies have included the Canadian LIS Schools (see Table 1), we used publications lists of faculty members from these schools too ( $n = 7$ ). In total, we searched for publication lists from 18 LIS schools (or 32.1% of all ALA-accredited schools), at the universities of Alberta, British Columbia, Dalhousie, Drexel, Illinois at Urbana-Champaign, Indiana, McGill, Michigan-Ann Arbor, Montréal, North Carolina at Chapel Hill, Pittsburgh, Rutgers, Syracuse, Texas at Austin, Toronto, UCLA, Western Ontario, and Wisconsin-Madison.<sup>5</sup>

To identify publication lists of faculty members in these 18 schools, we visited each school's Web site at three different periods (October 2002, February 2003, and May 2003) and printed out all those online résumés that included complete and up-to-date lists of publications. Complete and up-to-date

lists were defined as those résumés that at least listed all items that were retrieved by the databases used (in most cases, résumés included a note indicating that they were updated in the year 2003). Of the 290 full-time faculty members employed at these 18 schools, 68 (or 23.4%) had the needed information available online (63 from U.S. schools and 5 from Canadian schools).<sup>6</sup> The remaining 222 faculty members either had incomplete and outdated lists of publications or did not have any publication information available online. No attempt was made to contact these faculty members because of the enormous amount and diversity of data already compiled. Incomplete lists of publications were neglected primarily because they included only those articles that were published either in the past 4–5 years or in core LIS periodicals. Including such publication lists in the study would have distorted the actual retrieval or coverage performance of databases.

To be as comprehensive as possible, we included all those journal articles, authored books, papers in conference proceedings, chapters in books, edited books, encyclopedia articles, yearbook articles, book reviews, and edited journals and proceedings that were published by the 68 faculty members. Items that were excluded from the analysis included technical reports, conference presentations, abstracts, workshops, and training manuals. In total, we covered 2,625 items published between 1982 and 2002. This lengthy period was chosen to account for the time span covered by most published ranking studies and to examine whether the coverage performance of databases has changed over time.

All items were entered into a Microsoft Access database and were coded by school, publication year, research area, document type (i.e., journal article, authored book, and so on), refereed status, and whether they were indexed in each of the nine databases. Of the 18 schools covered, 15 were represented by at least one faculty member. There were 3 schools that did not make available complete and up-to-date résumés of their faculty on their respective Web sites.

On average, each year was represented by 125 records (median = 124; range = 209). Regarding research area, each item was assigned one area on the basis of the major research interest of the author and not on the individual topic of the item. Coding the items individually would have been impractical and almost impossible as many of them discussed more than one research area (e.g., "Scholarly Communication and Bibliometrics"). The research areas that were highly represented in the study, in terms of both the number of faculty and the number of records, included information-seeking behavior, human-computer interaction, information retrieval, social informatics, organization of information, information and knowledge management, and school media and children's literature. Information systems, collaboration, digital libraries, scholarly communication, archives, and natural language processing were also well represented (see Table 3). Whether all

<sup>4</sup>A 10th database, *Current Contents (CC)*, was also found to cover a significant amount of LIS literature, ranking sixth among the databases in terms of number of items indexed. This database, however, was not included among the pool because more than 97% of the items it indexes were retrieved by *SSCI*. The Institute for Scientific Research publishes both *CC* and *SSCI*.

<sup>5</sup>The number is 18 rather than 17 because of a tie at rank 10 in the *U.S. News & World Report's* ranking.

<sup>6</sup>At the time of data collection, these 68 faculty members represented approximately 10% of all full-time faculty in all ALA-accredited LIS schools. The 68 faculty members were divided by rank as follows: 27 assistant professors, 18 associate professors, and 23 professors.

TABLE 2. Databases examined in the study.

	<i>ERIC</i>	<i>INSPEC</i>	<i>Inside Conferences</i>	<i>ISTA</i>	<i>LISA</i>	<i>LLIS</i>	<i>PASCAL</i>	<i>SSCI</i>	<i>WorldCat</i>
Publisher/ sponsor	U.S. Department of Education	INSPEC, Inc.	British Library	Information Today, Inc.	Bowker-Saur	Wilson	Institut de l'Information Scientifique et Technique	Institute for Scientific Information	OCLC
Print counterpart	<i>Resources in Education; Current Index to Journals in Education</i>	<i>Physics Abstracts; Electrical &amp; Electronics Abstracts; Computer &amp; Control Abstracts</i>	NA	<i>Information Science &amp; Technology Abstracts</i>	<i>Library &amp; Information Science Abstracts</i>	<i>Library Literature &amp; Information Science</i>	<i>Bibliographie internationale (previously Bulletin signalétique)</i>	<i>Social Sciences Citation Index</i>	NA
Dates covered	1966 to present	1969 to present	1993 to present <sup>b</sup>	1964 to present	1969 to present	Dec. 1984 to present <sup>c</sup>	1972 to present	1972 to present	1200 to present
Number of records	1.1 million	7.7 million	4.6 million	144,000	245,000	250,000	15.0 million	4 million	52 million
Number of LIS records <sup>a</sup>	NA	104,000 (66,000)	NA	144,000 (80,000)	245,000	250,000 (153,000)	NA	184,000 (56,000)	NA
Percentage non-english	4.0	16.0	9.0	6.0	25.0	11.0	22.0	10.0	40.0
Number of journals indexed	750	4,100	16,000	300	550	230	8,500	1,500+	2,500,000
Percentage of conf. papers	1.0	31.0	93.0	3.5	NA	1.0	9.0	4.5	NA
Abstracts	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Records added per year	30,000	300,000	300,000	4,200	11,000	13,000	500,000	150,000	Varies
Frequency of update	Monthly	Weekly	4 times per week	9 times per year	Biweekly	Monthly	Weekly	Weekly	Daily
Main document types indexed	Bks. & mong.; chapters; conf. papers; j. art.; repts; theses & diss.	Chapters; conf. papers; j. art.; repts.; theses & diss.	Chapters; conf. papers; j. art.	Bks. & mong.; chapters; conf. papers; j. art.; repts.; theses & diss.	Chapters; conf. papers; j. art.; repts.	Bks. & mong.; bk. revs.; chapters; conf. papers; j. art.; repts.; theses	Chapters; conf. papers; j. art.; patents; repts.; theses & diss.	Bk. revs.; chapters; conf. papers; editorials; j. art.; letters.	Avs; bks. & mong.; maps; serials; scores; comp. files
Subject coverage	Education; includes library and information science	Physics, elect. eng'g & electronics, comp. & control, info. technology	All	Library and information science	Library and information science	Library and information science	Physics; chemistry; life sci.; applied sci. & tech; Earth sci.; info. sci.	All social science and related sub- disciplines	All

Note. ERIC = Education Resources Information Center; ISTA = Information Science and Technology Abstracts; LISA = Library and Information Science Abstracts; LLIS = Library Literature & Information Science; SSCI = Social Sciences Citation Index; OCLC = Online Computer Library Center; NA = not available; LIS = Library and Information Science; bks. = books; chpts. = chapters; art. = articles; tech. repts. = technical reports; revs. = reviews; pub. = publications; ref. = reference; nonref. = nonreference; misc. = miscellaneous; auth. bks. = authored books; ed. bks. = edited books; cols. = columns; mong. = monographs; jr. = journal; repts. = reports; diss. = dissertations; elect. eng. = electrical engineering; comp. = computer; info. = information; tech. = technical; sci. = science; conf. = conference.

<sup>a</sup>Numbers in parentheses refer to journal articles.

<sup>b</sup>Includes 285,000 records from the period 1982–1992.

<sup>c</sup>The print version was used to cover the years 1982–1984.

TABLE 3. Distribution of items and search results by research area.

Research area	Number of items per field	Number of faculty included	Average number of items per faculty	Number of indexed items	Percentage of indexed items
Human-computer interaction	382	9	42.4	270	70.7
Information retrieval	316	7	45.1	260	82.3
Information-seeking behavior	310	9	34.4	238	76.8
Social informatics	229	5	45.8	158	69.0
Organization of information <sup>a</sup>	180	5	36.0	147	81.7
Scholarly communication	156	2	78.0	126	80.8
Information management <sup>b</sup>	152	4	38.0	97	63.8
Archives	140	2	70.0	98	70.0
Digital libraries	127	3	42.3	96	75.6
Information systems	115	3	38.3	70	60.9
Collaboration	97	3	32.3	67	69.1
School media/children's literature	74	4	18.5	49	66.2
Natural language processing	69	2	34.5	44	63.8
Special populations	53	2	26.5	37	69.8
Bibliometrics	51	1	51.0	42	82.4
Computer-mediated communication	46	1	46.0	21	45.7
Public libraries	45	2	22.5	37	82.2
Management	36	2	18.0	27	75.0
Information policy	25	1	25.0	19	76.0
Telecommunication	22	1	22.0	12	54.5
Totals	2,625	68	38.6	1,915	73.0

<sup>a</sup>Includes cataloging, indexing and abstracting, and thesaurus construction.

<sup>b</sup>Includes data management, data mining, data warehousing, and knowledge management.

these fields are or can be considered LIS fields is beyond the scope of this study. This list of fields, however, seems to indicate that the data generated have captured or covered most if not all of the main research areas in LIS (see Association of Library and Information Science Education, 2004).

The distribution of items by document type is illustrated in Table 4. As expected, journal articles and papers in conference proceedings were the most commonly published types of documents, 45.0% and 31.5% of total publications, respectively.

The determination of the refereed status of the items was primarily based on characterization assigned by the faculty members themselves. Of the 68 faculty included in the study, 44 (or 64.7%) had their publications categorized into "refereed" and "nonrefereed." In cases in which no such categorization was provided, the refereed status of items was determined

TABLE 4. Distribution of items by document type.

Document type	Total number of items	Percentage of total items
Journal articles	1,180	45.0
Papers in conference proceedings	827	31.5
Chapters in books	282	10.7
Book reviews	156	5.9
Books	60	2.3
Edited books	34	1.3
Encyclopedia articles	28	1.1
Edited proceedings	23	0.9
Yearbook articles	18	0.7
Edited journals	17	0.7
Totals	2,625	100.0

by our personal knowledge and on two serials verification tools: *Ulrich's International Periodical Directory* and *The Serials Directory*. Knowledge gained from reading résumés that had the publications categorized into "refereed" and "nonrefereed" was very helpful in the process. Items in doubt were coded as "Not Applicable." Unless otherwise specified by individual faculty members, only journal articles and conference papers were coded as refereed or nonrefereed. All other items (e.g., books, encyclopedia articles, and book reviews) were coded as "Not Applicable." Journal articles and conference proceedings listed in résumés sections such as "Other Publications" were coded as nonrefereed. All in all, of the 2,625 items covered, 64% (or 1,675) were refereed, 14% (or 369) were nonrefereed, and 22% (or 581) were not applicable or their refereed status could not be determined. The rate of retrieval of refereed items was much higher than that of nonrefereed and not applicable: 83.5%, 55.8%, and 53.4%, respectively. Finally, Table 5 shows the retrieval or coverage performance by database. Further details on the data is provided in the "Results and Discussion" section below.

### Searches

To determine whether each item is indexed in each of the nine databases, we conducted three types of searches: author, title, and combination (e.g., keywords ANDed with author last name and/or journal name). Author searches were the main data collection method because they returned most of the indexed items for a faculty member with a single query. Additionally, author searches were conducted to ensure that only complete, current publication lists were included in the

TABLE 5. Number and percentage of items retrieved by database and document type.

Document type <i>N</i> = 2,625	<i>Inside</i>									Union of all databases
	<i>ERIC</i>	<i>Conferences</i>	<i>INSPEC</i>	<i>ISTA</i>	<i>LISA</i>	<i>LLIS</i>	<i>PASCAL</i>	<i>SSCI</i>	<i>WorldCat</i>	
Journal articles ( <i>n</i> = 1,180)	401 (34.0%)	18 (1.5%)	508 (43.1%)	498 (42.2%)	589 (49.9%)	598 (50.7%)	521 (44.2%)	555 (47.0%)	3 (0.3%)	992 (84.1%)
Conference papers ( <i>n</i> = 827)	92 (11.1%)	395 (47.8%)	278 (33.6%)	130 (15.7%)	117 (14.1%)	98 (11.9%)	86 (10.4%)	117 (14.1%)	10 (1.2%)	599 (72.4%)
Chapters ( <i>n</i> = 282)	8 (2.8%)	10 (3.5%)	15 (5.3%)	12 (4.3%)	2 (0.7%)	31 (11.0%)	8 (2.8%)	5 (1.8%)	41 (14.5%)	98 (34.8%)
Book reviews ( <i>n</i> = 156)			1 (0.6%)		2 (1.3%)	58 (37.2%)		100 (64.1%)		110 (70.5%)
Authored books ( <i>n</i> = 60)	2 (3.3%)			8 (13.3%)		13 (21.7%)			59 (98.3%)	59 (98.3%)
Edited books ( <i>n</i> = 34)			2 (5.9%)	3 (8.8%)	3 (8.8%)	9 (26.5%)			32 (94.1%)	33 (97.1%)
Encyclopedia articles ( <i>n</i> = 28)						3 (10.7%)			1 (3.6%)	4 (14.3%)
Edited proceedings ( <i>n</i> = 23)		1 (4.3%)		1 (4.3%)	1 (4.3%)	2 (8.7%)			4 (17.4%)	6 (26.1%)
Yearbook articles ( <i>n</i> = 18)	1 (5.6%)			5 (27.8%)		3 (16.7%)	1 (5.6%)		2 (11.1%)	11 (61.1%)
Edited journals ( <i>n</i> = 17)	1 (5.9%)			1 (5.9%)		3 (17.6%)			1 (5.9%)	3 (17.6%)
Total number of items retrieved and percentage	505 (19.2%)	424 (16.2%)	804 (30.6%)	658 (25.1%)	714 (27.2%)	818 (31.2%)	616 (23.5%)	777 (29.6%)	153 (5.8%)	1,915 (73.0%)

*Note.* This table can be read as follows: *PASCAL* retrieves 44.2% of all journal articles published by LIS faculty, 10.4% of all conference papers, 2.8% of all chapters, 5.6% of all yearbook articles, and 23.5% of all LIS faculty literature. *LIS* = Library and Information Science; *ERIC* = Education Resources Information Center; *ISTA* = Information Science & Technology Abstracts; *LISA* = Library and Information Science Abstracts; *LLIS* = Library Literature & Information Science; *SSCI* = Social Sciences Citation Index.

study. In five cases, author searches retrieved numerous publications that were not included in a faculty member's publications list. These lists were dropped from the original group of 73 lists. In order to avoid low recall of an author's items because of inconsistent name indexing, author searches were conducted by using the "expand" feature in DIALOG, "browse" feature in WebSPIRS, and direct "author" searches in FirstSearch. We also used author names as keywords in FirstSearch to retrieve records for items in edited volumes. Title searches were conducted to ensure that items not found in author searches were not missed because of errors in author indexing or searching. When an item was still not found in a title search, combination searches were used to ascertain that the item was not indexed. All of the searches were first executed in October 2002 and then repeated in May 2003 by each of the investigators, and the results were compared, verified in case of a mismatch, and then recorded.

#### *ALISE Members Directory*

As mentioned earlier, ALISE's members directory was the only source that all LIS publication count ranking studies relied on for identifying the faculty examined. With the exception of Wallace (1990), no study supplemented this source with another tool or method to verify the list of faculty

members. This study found that as of September 2002, the directory listed the names of faculty members of only 45 of 56 existing ALA-accredited LIS schools. The faculty of the 11 remaining schools were not listed because their schools were no longer institutional members of ALISE. After comparing ALISE's list of regular full-time faculty of the 45 institutional members with a list of faculty generated in September 2002 from the Web sites of the same schools, it was found that the faculty were not accounted for in 81 of 583 (or 13.9%) of cases.<sup>7</sup> Although these findings may not concretely suggest that earlier ranking studies were relying on incomplete lists of schools and faculty members, they suggest that future studies should rely on other or additional methods and tools for identifying faculty members to be examined, such as the Web sites of the academic units examined.

Although the Web site method was not compared to other available techniques for identifying faculty members of LIS schools (e.g., telephone inquiries), a school's Web site is considered to be a very reliable source, particularly because it is widely used as a major tool to recruit students and faculty and provide them and others with necessary and up-to-date information. It should be noted that all of the

<sup>7</sup>Some of these missing names may be attributed to new hires that were not yet reported to ALISE.

56 ALA-accredited LIS schools have Web sites that, for example, include a list of regular full-time faculty members.<sup>8</sup>

### Limitations of the Study

The primary limitation of this study is that the lists of publications used to evaluate the databases were not compiled from a random sample of faculty members. However, there is little or no evidence that faculty of schools represented here and faculty of other LIS schools have significantly different research focus and publishing behavior. Also, there is not a standard breakdown of the field into research areas. So, we really do not know, for example, how many information retrieval faculty or items are considered a representative sample as opposed to faculty or items in the area of digital libraries. Earlier studies that ranked schools or compared them have almost entirely focused on the number of items published by faculty in each school (or group of schools) and not on the research area, type, or place of publication.

Any potential sources of unreliability in this study were assumed to have been compensated for by inclusion of a large number of schools and faculty members, covering publication lists spanning lengthy periods, and by both taking into consideration all important document types and including a wide variety of research areas. The potential sources of unreliability have also been lessened by making use of data published in earlier studies and by conducting several tests on them to verify the results obtained here.

### Results and Discussion

The results of this study are presented and discussed in four sections: databases needed and found appropriate for ranking and retrieval purposes, bias in subject coverage among databases, change in coverage performance over time,

<sup>8</sup>Our examination of the Web sites of all 56 ALA-accredited LIS schools showed that as of September 2002, there were 685 regular full-time faculty members employed in these schools, divided by rank as follows: 236 assistant professors, 248 associate professors, and 201 professors.

and method of counting. When appropriate, comparisons with and between earlier studies are made. It should be emphasized here that it is not the intention of this study to rank faculty and programs or to assess the quality and importance of their papers. Rather, the emphasis is on evaluating and determining which data sources should be used in both publication count ranking studies and conducting of comprehensives searches in the literature.

### Which and How Many Databases Are Needed?

Data collected in this study have shown that books, journal articles, and papers in conference proceedings are much better covered by the nine databases examined than chapters in books, encyclopedia articles, yearbook articles, and editorial items (see Table 5). Data also showed that *Library Literature and Information Science (LLIS)* indexes the highest percentage of LIS faculty publications (31.2%), followed by *INSPEC* (30.6%), *SSCI* (29.6%), and *LISA* (27.2%) (Table 6). Significant in these findings is the high percentage of publications that are not indexed by the databases. For example, *LLIS*, the most comprehensive database in the field, misses more than two-thirds of the publications. Even when results of all nine databases are combined, 27.0% (or 710 of 2,635) of the publications remain not found. This fact was not surprising given the fact that chapters in books, encyclopedia articles, yearbook articles, and editorial items (i.e., types of documents that are not well covered in indexes) represented 54.1% of the missed items. Most of the remaining missed items were non-refereed journal articles and conference papers—also types of documents that are less well covered in databases than refereed documents (44.2% of the “nonrefereed” items in this study were not found by any of the nine databases in comparison to 16.5% of the refereed items). It is important to add here that one-fourth of the faculty members accounted for 58.9% of the “not found” items. The reason was that these faculty members published more book reviews, chapters in books, and nonrefereed journal articles and conference papers than other faculty members. This fact, in turn, suggests that faculty

TABLE 6. Database coverage performance by document type.

Databases	All documents (n = 2,625)			Journal articles (n = 1,180)			Refereed documents (n = 1,675)		
	Rank	Number of items retrieved	Percentage	Rank	Number of items retrieved	Percentage	Rank	Number of items retrieved	Percentage
<i>LLIS</i>	1	818	31.2	1	598	50.7	4	600	35.8
<i>INSPEC</i>	2	804	30.6	5	508	43.1	1	733	43.8
<i>SSCI</i>	3	777	29.6	3	555	47.0	2	650	38.8
<i>LISA</i>	4	714	27.2	2	589	49.9	3	646	38.6
<i>ISTA</i>	5	658	25.1	6	498	42.2	5	578	34.5
<i>PASCAL</i>	6	616	23.5	4	521	44.2	6	562	33.6
<i>ERIC</i>	7	505	19.2	7	401	34	7	454	27.1
<i>Inside conferences</i>	8	424	16.2	8	18	1.5	8	365	21.8
<i>WorldCat</i>	9	153	5.8	9	3	0.3	9	11	0.7
<b>All 9 databases</b>		<b>1,915</b>	<b>73.0</b>		<b>992</b>	<b>84.1</b>		<b>1,399</b>	<b>83.5</b>

Note. *ERIC* = Education Resources Information Center; *ISTA* = Information Science & Technology Abstracts; *LISA* = Library and Information Science Abstracts; *LLIS* = Library Literature & Information Science; *SSCI* = Social Sciences Citation Index.

members who do not publish books and/or refereed journal articles and conference papers are not likely to have their items well indexed by databases, thus reducing the possibility that they rank as high as they should when using total publication count as a criterion for ranking faculty productivity.

Searches on the 710 missed items using hundreds of databases other than those examined here showed that only 8.6% (or 61) of the missed items can be found elsewhere (in 19 different databases), mainly in *Current Contents* (22 items—primarily in the research areas of digital libraries, information management, school media and children’s literature, human-computer interaction, and social informatics), *America: History and Life* (11 items—all in the research area of archives), and *The Engineering Index* (5 items—all but 1 “information management”-related).<sup>9</sup> Approximately 47.5% of the 61 found items were refereed journal articles. Most of the remaining found items were book reviews (24.6%), chapters in books (18.0%), and nonrefereed conference proceedings (9.8%).

When the examination of coverage was limited to journal articles only, the results improved a little. As shown in Table 6, *LLIS*, the database that ranks first in retrieving

<sup>9</sup>Phrase searches on google.com revealed that 37.1% (or 241) of the remaining 649 items can be found on the Web. Of these, 70.5% were conference papers and 27.3% were journal articles. Approximately half of the 241 items are published by the faculty members themselves and could be retrieved either on the Web or through links provided on the faculty member’s resume. Publishers and sponsors of conference proceedings and online journals publish the other half.

journal articles, indexes 50.7% of the total number of articles. This means that almost one-half of the journal articles published by LIS faculty are unaccounted for by the most comprehensive database in the field. When only refereed items are examined, the percentage of items not indexed drops to 43.8% for *INSPEC*, followed by *SSCI* (38.8%), *LISA* (38.6%), and *LLIS* (35.8%). These results suggest that the rankings of faculty and schools developed by those authors who used a single database as the data source were in fact drawing conclusions on the basis of, at best, 47% of the published journal articles, as is the case with Budd (2000) and Budd and Seavey (1996), and of less than one-third of the total published literature, as is the case with Boyce and Hendren (1996) and Wallace (1990).

Criticizing those ranking studies that relied on only one database as the data source, Pettigrew and Nicholls (1994) used five different databases to generate rankings of LIS schools: *ERIC*, *LLIS*, *LISA*, *PASCAL*, and *SSCI*. These databases, according to data collected in this study, index approximately 52.0% of the total items published by academic scholars, 75.8% of their journal articles, and 61.7% of their refereed publications. A comparison of Budd and Seavey’s (1996) ranking of schools by “per capita total journal articles” with that of Pettigrew and Nicholls using Spearman’s rho found a significant difference between the two rankings at the .01 level: 2-tailed ( $r_s = -.433$ ). Difference was also significant at the .01 level: 2-tailed ( $r_s = .187$ ) when ranking was limited to refereed journal articles (see Table 7). Although it can be assumed that the results attained

TABLE 7. Comparison of ranking of U.S. doctorate-granting library and information science programs by average journal articles.

School	Pettigrew & Nicholls (1994)				Budd & Seavey (1996)	
	Refereed only		Refereed and nonrefereed		Refereed and nonrefereed	
	Rank	Number of publications per faculty	Rank	Number of publications per faculty	Rank	Number of publications per faculty
Hawaii	22	1.7	1	26.6	8	4.3
Simmons	9	4.9	2	23.8	13	3.0
Indiana	1	9.1	3	22.9	3	5.5
SUNY–Albany	18	2.8	4	16.3	10	3.8
Michigan	6	6.2	5	15.0	11	3.3
Wisconsin–Madison	3	6.4	6	11.3	14	2.5
Rutgers	10	4.8	7	11.1	12	3.3
UCLA	2	7.6	8	10.7	1	6.7
North Carolina–Chapel Hill	4	6.4	9	9.3	6	5.0
Wisconsin–Milwaukee	5	6.3	10	9.1	9	4.0
UC–Berkeley	7	5.7	11	8.4	4	5.4
SUNY–Buffalo	13	3.8	12	8.3	NR	—
Illinois	12	3.9	13	7.9	2	5.7
Syracuse	8	5.0	14	7.0	5	5.1
Texas–Austin	14	3.2	15	6.8	NR	—
Drexel	11	4.4	16	6.7	7	4.4
Alabama	15	3.0	17	6.5	NR	—
North Texas	16 (tie)	2.9	18 (tie)	5.7	NR	—
Texas Women	20	2.4	18 (tie)	5.7	NR	—
Pittsburgh	21	2.3	20	5.6	NR	—
Florida State	16 (tie)	2.9	21	5.2	NR	—
Maryland	19	2.5	22	5.1	NR	—

Note. Table excludes six nondoctoral programs reported by Budd and Seavey (1996). NR = not ranked.

by Pettigrew and Nicholls are more accurate than those of Budd and Seavey (for the simple reason of using more representative data sources), the question remains: Were the databases used by Pettigrew and Nicholls the most comprehensive or the most appropriate for publication count ranking purposes?

To answer this question, we developed top 10 unions of two, three, and four databases to identify the groups of databases that retrieve the highest percentage of LIS faculty literature. It was found that if two databases were to be used to develop total publication count rankings, then the data sources to consult should be *INSPEC* and *LLIS*. Combined, these two databases index 49.6% of all items published by LIS faculty. If three databases were to be used, then one should add *Inside Conferences* as the third database, thereby increasing coverage performance to 58.2%. If four databases were to be used, coverage increases to 64.0% with the addition of *SSCI*. Table 8 provides more details on these rankings, and Table 9 summarizes the increase in coverage when using the most comprehensive union of two, three, four, five, and all nine databases. Table 9 also shows that the increase in coverage declines sharply with the use of more databases. For example, when adding a second database to the most comprehensive database, coverage increases by 18.3%. When adding a third database to the most comprehensive union of two databases, coverage increases by 8.6% only, then by 5.7% when adding a fourth database, and so on.

No differences were found when results were limited to refereed items; same databases that are most comprehensive for retrieving total publications are also most comprehensive for retrieving refereed items (see Table 10). However, when results were limited to journal articles, *Inside Conferences* was replaced by a periodical database (e.g., *SSCI* and *LISA*). This finding was not unexpected because *Inside Conferences* does not index journals.

In conclusion, data generated and analyzed in this study indicate that the nine databases examined cover approximately 97% of all the indexed items published by LIS faculty, and, thus, one may not need to use other databases to search for LIS scholarly literature. However, data also show that the retrieval performance of databases varies widely and that no database provides comprehensive coverage of LIS literature. Therefore, restricting ranking data sources to one database alone, as Boyce and Hendren (1996), Budd (2000), Budd and Seavey (1996), and Wallace (1990) did, would miss many items and lead to inaccurate rankings and erroneous conclusions. Additionally, since it may not be very practical to use nine databases for ranking and other research purposes, it is suggested that authors of publication count rankings who focus on journal articles use at least four databases to arrive at accurate rankings to include *INSPEC*, *LLIS*, *SSCI*, and *LISA*. If the focus of a study is on refereed items, then one should use *INSPEC*, *LLIS*, *SSCI*, and *Inside Conferences*. The same is true for total publications but with the addition of *WorldCat* to enhance the coverage of monographic items, as suggested by Bates (1998).

TABLE 8. Union of databases.

Top 10 unions of two databases				
Rank	Databases	Items retrieved	Percentage of indexed items (n = 1,915)	Percentage of total items (n = 2,617)
1	<i>INSPEC</i> + <i>LLIS</i>	1,299	67.8%	49.6%
2	<i>INSPEC</i> + <i>SSCI</i>	1,220	63.7%	46.6%
3	<i>Inside Conferences</i> + <i>LLIS</i>	1,211	63.2%	46.3%
4	<i>Inside Conferences</i> + <i>SSCI</i>	1,143	59.7%	43.7%
5	<i>INSPEC</i> + <i>LISA</i>	1,143	59.7%	43.7%
6	<i>INSPEC</i> + <i>ISTA</i>	1,118	58.4%	42.7%
7	<i>LLIS</i> + <i>SSCI</i>	1,097	57.3%	41.9%
8	<i>Inside Conferences</i> + <i>LISA</i>	1,088	56.8%	41.6%
9	<i>ERIC</i> + <i>INSPEC</i>	1,067	55.7%	40.8%
10	<i>Inside Conferences</i> + <i>INSPEC</i>	1,047	54.7%	40.0%
Top 10 unions of three databases				
Rank	Databases	Items retrieved	Percentage of indexed items (n = 1,915)	Percentage of total items (n = 2,617)
1	<i>Inside Conferences</i> + <i>INSPEC</i> + <i>LLIS</i>	1,524	79.6%	58.2%
2	<i>INSPEC</i> + <i>SSCI</i> + <i>LLIS</i>	1,485	77.5%	56.7%
3	<i>Inside Conferences</i> + <i>LLIS</i> + <i>SSCI</i>	1,443	75.4%	55.1%
4	<i>Inside Conferences</i> + <i>INSPEC</i> + <i>SSCI</i>	1,425	74.4%	54.5%
5	<i>INSPEC</i> + <i>LLIS</i> + <i>WorldCat</i>	1,420	74.2%	54.3%
6	<i>INSPEC</i> + <i>ISTA</i> + <i>LLIS</i>	1,413	73.8%	54.0%
7	<i>ERIC</i> + <i>INSPEC</i> + <i>LLIS</i>	1,399	73.1%	53.5%
8	<i>INSPEC</i> + <i>LISA</i> + <i>LLIS</i>	1,385	72.3%	52.9%
9	<i>INSPEC</i> + <i>LISA</i> + <i>SSCI</i>	1,375	71.8%	52.5%
10	<i>INSPEC</i> + <i>LLIS</i> + <i>PASCAL</i>	1,372	71.6%	52.4%
Top 10 unions of four databases				
Rank	Databases	Items retrieved	Percentage of indexed items (n = 1,915)	Percentage of total items (n = 2,617)
1	<i>Inside Conferences</i> + <i>INSPEC</i> + <i>LLIS</i> + <i>SSCI</i>	1,675	87.5%	64.0%
2	<i>Inside Conferences</i> + <i>INSPEC</i> + <i>LLIS</i> + <i>WorldCat</i>	1,638	85.5%	62.6%
3	<i>INSPEC</i> + <i>LLIS</i> + <i>SSCI</i> + <i>WorldCat</i>	1,606	83.9%	61.4%
4	<i>Inside Conferences</i> + <i>INSPEC</i> + <i>ISTA</i> + <i>LLIS</i>	1,597	83.4%	61.0%
5	<i>Inside Conferences</i> + <i>INSPEC</i> + <i>LISA</i> + <i>LLIS</i>	1,588	82.9%	60.7%
6	<i>ERIC</i> + <i>Inside Conferences</i> + <i>INSPEC</i> + <i>LLIS</i>	1,585	82.8%	60.6%
7	<i>Inside Conferences</i> + <i>INSPEC</i> + <i>LLIS</i> + <i>PASCAL</i>	1,584	82.7%	60.5%
8	<i>Inside Conferences</i> + <i>LLIS</i> + <i>SSCI</i> + <i>WorldCat</i>	1,559	81.4%	59.6%
9	<i>INSPEC</i> + <i>ISTA</i> + <i>LLIS</i> + <i>SSCI</i>	1,545	80.7%	59.0%
10	<i>ERIC</i> + <i>INSPEC</i> + <i>LLIS</i> + <i>SSCI</i>	1,541	80.5%	58.9%

Note. *ERIC* = Education Resources Information Center; *ISTA* = Information Science & Technology Abstracts; *LISA* = Library and Information Science Abstracts; *LLIS* = Library Literature & Information Science; *SSCI* = Social Sciences Citation Index.

TABLE 9. Increase in coverage by number of databases used.

Number of databases	Databases	Number of items retrieved	Percentage of retrieved items ( <i>n</i> = 1,915)	Percentage of total items ( <i>n</i> = 2,625)
One	<i>LLIS</i>	818	42.7%	31.2%
Two	<i>INSPEC</i> + <i>LLIS</i>	1,299	67.8%	49.5%
Three	<i>Inside Conferences</i> + <i>INSPEC</i> + <i>LLIS</i>	1,524	79.6%	58.1%
Four	<i>Inside Conferences</i> + <i>INSPEC</i> + <i>LLIS</i> + <i>SSCI</i>	1,675	87.5%	63.8%
Five	<i>Inside Conferences</i> + <i>INSPEC</i> + <i>LLIS</i> + <i>SSCI</i> + <i>WorldCat</i>	1,789	93.4%	68.2%
Nine	All nine databases used in the study	1,915	100.0%	73.0%

Note. *ERIC* = Education Resources Information Center; *ISTA* = Information Science & Technology Abstracts; *LISA* = Library and Information Science Abstracts; *LLIS* = Library Literature & Information Science; *SSCI* = Social Sciences Citation Index.

### Bias in Subject Coverage Among Databases

Bias, or strengths and weaknesses in subject coverage among databases, is another factor that should be taken into consideration when ranking the research productivity of faculty and schools, particularly because LIS literature is scattered among several databases and because no database provides comprehensive coverage of this literature. If it exists, bias may put some faculty members or schools with particular research strengths or weaknesses at an advantage or disadvantage in terms of publication count rankings.

No study that discusses bias in subject coverage among LIS databases was found. Data collected here, however, showed that scholars in the research areas of archives, social informatics, school media and children's literature, information management, special populations, information systems, telecommunication, and computer-mediated communication are at a disadvantage in the coverage of their literature by the nine databases examined here, in comparison to other major LIS research areas (see Table 11). All these research areas fall below the average coverage of LIS literature for total publications, journal articles, and refereed items. Moreover, the literature of natural language processing falls well below average for total publications but performs above average when only journal articles and refereed items are examined. In contrast, digital libraries literature is well covered in terms of total publications but falls below average when searching is limited to journal articles and refereed items. Such limitations of the databases should be taken into consideration in future ranking studies.

With the exception of the archives literature, the inclusion of additional databases would not have changed the results significantly. The results for the literature of archives would have significantly improved if *America: History and Life* was included among the databases examined. Results showed that with the addition of this database, coverage of archives literature improves from 70.0% to 78.6% for total publications, from 72.2% to 83.5% for journal articles, and from 73.1% to 83.7% for refereed items. Although employing the World Wide Web would have significantly improved the results of certain research areas and placed them near or above average in all document type categories, particularly in the areas of digital libraries, information systems, natural language processing, and telecommunication, other research areas, such as social informatics, school media and children's literature, information management, special populations, and computer-mediated communication, remained relatively poorly covered. Further analysis of the data showed that these latter five research areas remained poorly covered because of the larger number of chapters in books that are published by their respective faculty members (17.9% of their total publication output in comparison to 8.8% for faculty in other research areas). As discussed earlier, chapters in books are types of documents that were found to be poorly covered in databases.

Table 12 illustrates the strengths and weaknesses of the databases examined in each research area. The table shows that some databases, such as *INSPEC* and *LLIS*, provide the most comprehensive coverage in several research areas, whereas databases such as *ERIC* and *PASCAL* do not perform distinctively in almost any research area. Also, *INSPEC* and

TABLE 10. Increase in coverage by number of databases used and document type.

	Total publications	Journal articles	Refereed items
Two databases	<i>INSPEC</i> + <i>LLIS</i> (49.5%)	<i>INSPEC</i> + <i>LLIS</i> (69.3%)	<i>INSPEC</i> + <i>LLIS</i> (61.6%)
Three databases	<i>Inside Conferences</i> + <i>INSPEC</i> + <i>LLIS</i> (58.1%)	<i>INSPEC</i> + <i>LLIS</i> + <i>SSCI</i> (76.8%)	<i>Inside Conferences</i> + <i>INSPEC</i> + <i>LLIS</i> (72.7%)
Four databases	<i>Inside Conferences</i> + <i>INSPEC</i> + <i>LLIS</i> + <i>SSCI</i> (63.8%)	<i>INSPEC</i> + <i>LISA</i> + <i>LLIS</i> + <i>SSCI</i> (80.3%)	<i>Inside Conferences</i> + <i>INSPEC</i> + <i>LLIS</i> + <i>SSCI</i> (78.0%)
Five databases	<i>Inside Conferences</i> + <i>INSPEC</i> + <i>LLIS</i> + <i>SSCI</i> + <i>WorldCat</i> (68.2%)	<i>ERIC</i> + <i>INSPEC</i> + <i>LISA</i> + <i>LLIS</i> + <i>SSCI</i> (81.9%)	<i>Inside Conferences</i> + <i>INSPEC</i> + <i>LISA</i> + <i>LLIS</i> + <i>SSCI</i> (80.1%)

Note. *ERIC* = Education Resources Information Center; *ISTA* = Information Science & Technology Abstracts; *LISA* = Library and Information Science Abstracts; *LLIS* = Library Literature & Information Science; *SSCI* = Social Sciences Citation Index.

TABLE 11. Distribution of items and search results by research area and document type.

Research area	Total publications		Journal articles		Refereed items	
	Number and percentage of indexed items	Rank	Number and percentage of indexed items	Rank	Number and percentage of indexed items	Rank
Bibliometrics	42 (82.4%)	1	27 (100.0%)	1	34 (100.0%)	1
Information retrieval	260 (82.3%)	2	112 (94.9%)	7	210 (89.7%)	8
Public libraries	37 (82.2%)	3	27 (93.1%)	9	14 (93.3%)	5
Organization of information <sup>a</sup>	147 (81.7%)	4	86 (100.0%)	1	100 (91.7%)	6
Scholarly communication	126 (80.8%)	5	59 (92.2%)	10	81 (94.2%)	4
Information-seeking behavior	238 (76.8%)	6	146 (89.0%)	11	192 (86.5%)	9
Information policy	19 (76.0%)	7	16 (100.0%)	1	16 (100.0%)	1
Digital libraries	96 (75.6%)	8	42 (75.0%)	15	61 (77.2%)	14
Management	27 (75.0%)	9	22 (95.7%)	5	18 (100.0%)	1
Human-computer interaction	270 (70.7%)	10	137 (84.0%)	12	200 (83.3%)	11
Archives	98 (70.0%)	11	70 (72.2%)	17	76 (73.1%)	16
Special populations	37 (69.8%)	12	19 (79.2%)	14	14 (70.0%)	17
Collaboration	67 (69.1%)	13	28 (93.3%)	8	63 (90.0%)	7
Social informatics	158 (69.0%)	14	91 (80.5%)	13	103 (83.1%)	12
School media/children's literature	49 (66.2%)	15	30 (75.0%)	16	17 (81.0%)	13
Information management <sup>b</sup>	97 (63.8%)	16	24 (55.8%)	19	83 (76.1%)	15
Natural language processing	44 (63.8%)	17	20 (95.2%)	6	34 (85.0%)	10
Information systems	70 (60.9%)	18	31 (60.8%)	18	61 (63.5%)	19
Telecommunication	12 (54.5%)	19	1 (100.0%)	1	11 (52.4%)	20
Computer-mediated communication	21 (45.7%)	20	4 (28.6%)	20	11 (64.7%)	18
<b>Totals</b>	<b>1915 (73.0%)</b>		<b>992 (84.1%)</b>		<b>1,399 (83.5%)</b>	

<sup>a</sup>Includes cataloging, indexing and abstracting, and thesaurus construction.

<sup>b</sup>Includes data management, data mining, data warehousing, and knowledge management.

TABLE 12. Coverage performance of databases by research area (percentage).

	<i>Inside</i>								
	<i>ERIC</i> ( <i>n</i> = 505)	<i>Conferences</i> ( <i>n</i> = 424)	<i>INSPEC</i> ( <i>n</i> = 804)	<i>ISTA</i> ( <i>n</i> = 658)	<i>LISA</i> ( <i>n</i> = 714)	<i>LLIS</i> ( <i>n</i> = 818)	<i>PASCAL</i> ( <i>n</i> = 616)	<i>SSCI</i> ( <i>n</i> = 777)	<i>WorldCat</i> ( <i>n</i> = 153)
Archives ( <i>n</i> = 140)	12.9	5.0	13.6	27.1	30.0	<b><u>43.6</u></b>	20.7	22.9	5.7
Bibliometrics ( <i>n</i> = 51)	23.5	9.8	31.4	43.1	43.1	<b><u>60.8</u></b>	33.3	<b><u>58.8</u></b>	3.9
Collaboration ( <i>n</i> = 97)	16.5	28.9	<b><u>41.2</u></b>	10.3	21.6	13.4	13.4	17.5	0.0
Computer-mediated communication ( <i>n</i> = 46)	4.3	<b><u>30.4</u></b>	10.9	4.3	0.0	0.0	8.7	6.5	13.0
Digital libraries ( <i>n</i> = 127)	19.7	17.3	<b><u>38.6</u></b>	26.0	20.5	19.7	19.7	21.3	11.8
Human-computer interaction ( <i>n</i> = 382)	12.8	17.3	<b><u>36.9</u></b>	17.0	20.7	15.4	20.2	<b><u>30.6</u></b>	4.2
Information management ( <i>n</i> = 152)	7.2	<b><u>36.8</u></b>	<b><u>30.3</u></b>	11.2	8.6	7.2	10.5	9.2	3.9
Information policy ( <i>n</i> = 25)	24.0	0.0	20.0	20.0	40.0	<b><u>56.0</u></b>	16.0	<b><u>64.0</u></b>	4.0
Information retrieval ( <i>n</i> = 316)	26.3	23.4	<b><u>46.8</u></b>	<b><u>40.8</u></b>	38.6	36.7	38.3	40.2	4.4
Information systems ( <i>n</i> = 115)	1.7	22.6	<b><u>45.2</u></b>	2.6	5.2	1.7	16.5	7.0	2.6
Information-seeking behavior ( <i>n</i> = 310)	36.8	14.5	22.6	38.1	<b><u>40.6</u></b>	<b><u>48.1</u></b>	30.6	32.6	4.8
Management ( <i>n</i> = 36)	30.6	8.3	11.1	13.9	52.8	<b><u>69.4</u></b>	44.4	16.7	2.8
Natural language processing ( <i>n</i> = 69)	18.8	24.6	<b><u>39.1</u></b>	27.5	23.2	26.1	29.0	<b><u>37.7</u></b>	1.4
Organization of information ( <i>n</i> = 180)	23.3	7.8	31.1	44.4	<b><u>48.9</u></b>	<b><u>58.9</u></b>	36.1	38.9	7.8
Public libraries ( <i>n</i> = 45)	35.6	0.0	4.4	40.0	40.0	<b><u>57.8</u></b>	28.9	44.4	15.6
Scholarly communication ( <i>n</i> = 156)	17.9	8.3	29.5	32.1	36.5	<b><u>50.0</u></b>	26.9	<b><u>50.6</u></b>	2.6
School media/children's literature ( <i>n</i> = 74)	31.1	1.4	1.4	2.7	17.6	<b><u>43.2</u></b>	4.1	12.2	13.5
Social informatics ( <i>n</i> = 229)	11.8	9.6	<b><u>30.6</u></b>	14.4	9.2	9.6	13.1	<b><u>27.5</u></b>	10.5
Special populations ( <i>n</i> = 53)	13.2	1.9	9.4	17.0	22.6	<b><u>56.6</u></b>	13.2	22.6	9.4
Telecommunication ( <i>n</i> = 22)	0.0	<b><u>45.5</u></b>	9.1	0.0	4.5	0.0	0.0	0.0	4.5
<b>Total</b> ( <i>N</i> = 2,625)	19.2	16.2	30.6	25.1	27.2	31.2	23.5	29.6	5.8

Note. The databases that provide the best coverage in each research area are underlined and boldfaced. In some cases, two databases are underlined, especially when the difference between the top and second top database is marginal. ERIC = Education Resources Information Center; ISTA = Information Science & Technology Abstracts; LISA = Library and Information Science Abstracts; LLIS = Library Literature & Information Science; SSCI = Social Sciences Citation Index.

TABLE 13. Coverage performance of databases over time.

	<i>ERIC</i>	<i>Inside Conferences</i>	<i>INSPEC</i>	<i>ISTA</i>	<i>LISA</i>	<i>LLIS</i>	<i>PASCAL</i>	<i>SSCI</i>	<i>WorldCat</i>
	Number (percentage)	Number (percentage)	Number (percentage)	Number (percentage)	Number (percentage)	Number (percentage)	Number (percentage)	Number (percentage)	Number (percentage)
1982–1988 ( <i>n</i> = 400)	61 (15.3)	0 (0.0)	126 (31.5)	106 (26.5)	135 (33.8)	166 (41.5)	97 (24.3)	156 (39.0)	23 (5.8)
1989–1995 ( <i>n</i> = 844)	152 (18.0)	97 (11.5)	230 (27.3)	197 (23.3)	231 (27.4)	295 (35.0)	175 (20.7)	251 (29.7)	61 (7.2)
1996–2002 ( <i>n</i> = 1,381)	292 (21.1)	327 (23.7)	448 (32.4)	355 (25.7)	346 (25.7)	357 (25.9)	344 (25.0)	370 (26.8)	69 (5.0)

Note. *ERIC* = Education Resources Information Center; *ISTA* = Information Science & Technology Abstracts; *LISA* = Library and Information Science Abstracts; *LLIS* = Library Literature & Information Science; *SSCI* = Social Sciences Citation Index.

*LLIS* together combine for the two most comprehensive databases for 18 of 20 research areas represented in this study. Only the literature of computer-mediated communication and telecommunication is not well covered by these two databases. This is primarily because most of the literature in these two fields is published in conference proceedings, a fact that explains why *Inside Conferences* performs well in indexing it. Finally, Table 12 shows that although databases such as *INSPEC* and *LLIS* are very strong in coverage in several research areas, they are separately very weak in several others. Also, although some topics, such as bibliometrics, information policy, and management, may not require the use of more than two databases to identify most of their respective indexed literature, other topics require the use of several databases. This finding conforms to earlier results that the number of databases needed for certain searches is much more topic dependent than previous studies would indicate (see Hood & Wilson, 2001).

The aforementioned discussion of results suggests that authors of publication count rankings not only cannot rely on one database as the data source for publication count ranking purposes, but also have to be careful in the selection of databases and their coverage limitations in certain research areas. Scholars who rely solely on *LLIS* and/or *SSCI*, for example, are likely to miss quite a number of items in several research areas such as collaboration, computer-mediated communication, digital libraries, and information systems and management. Results also suggest that future publication count ranking studies should highly consider including *America: History and Life* as a data source to provide better coverage of archival research. Although Web searching could be used to fill in gaps in the periodical databases, it works only when using known-item searches (e.g., title searches or title along with author searches) rather than author or keyword searches. For Web searching too, one must use phrase searching technique (using the title of an item) rather than free text in order to limit the retrieved set to the most relevant items. Moreover, given the interdisciplinary and scattered nature of LIS and its literature, there seems to be a need for ranking by specialty. In other words, rather than comparing the research productivity of any two faculty members or schools, it is more appropriate to compare two faculty members or groups of faculty members with similar research areas or interests. This will not

only generate a more accurate ranking of faculty and schools but it will also be fair to those who might be doing exceptionally well in certain specialties but not so well overall.

#### Change Over Time

This study examined items that were published between 1982 and 2002 to account for the time span covered by most ranking studies and to examine whether the coverage performance of databases has changed over time. Table 13 divides the examined items into three different periods: 1982–1988, 1989–1995, and 1996–2002. The table shows that *LLIS*, *SSCI*, and *LISA*, in that order, were consistently among the most comprehensive databases in the field until the mid-1990s. The table, however, also shows that over the years there has been a decline in coverage performance in most traditional LIS periodical databases (the only exception is *ERIC*). This decline is most probably the result of a mismatch between the growth of the scientific literature and the increase in indexing coverage by database producers.

When considering the literature of the 1996–2002 period alone, it is important to note that the traditional LIS databases that are most often used by students, faculty, and researchers (i.e., *ISTA*, *LISA*, *LLIS*, and *SSCI*) provide similar coverage performance of the literature. It is also important to note, however, that the broad, multidisciplinary periodical database of *INSPEC* provides better indexing coverage than the traditional LIS databases. This finding, however, does not mean that the traditional LIS databases should be disregarded in a search. As discussed earlier, each of the nine databases examined in this study has strengths and weaknesses, and to arrive at a more accurate ranking or to conduct a more comprehensive search in the literature, several databases should be consulted, most importantly, *LLIS*, *INSPEC*, *SSCI*, *Inside Conferences*, *LISA*, and *WorldCat*. Although librarians, faculty, and researchers may be aware of the value of the traditional LIS databases, many of them may not be aware of the breadth of coverage of *INSPEC* and, therefore, should strongly consider using it for ranking and other research purposes in LIS. The same is true of *Inside Conferences*, a fairly recently produced database that is exclusively devoted to indexing conference proceedings.

### Method of Counting

One last area of concern that was raised by critics of publication count ranking studies but that was never empirically tested or examined is the use of simple count. Critics argued that in order to arrive at more accurate rankings, studies must differentiate between small minor publications (such as book reviews and one-column articles) and major substantial publications (such as refereed journal articles and authored books) (Bates, 1998; Harter & Serebnik, 1990; Hernon, 1990; Pettigrew & Nicholls, 1994). With the exception of *LISA*, all periodical databases examined in this study include a “document type” field for their records. A manual examination of hundreds of records in these databases with document types referring to *journal articles* revealed that there is no way to separate a 1-page article from a 20-page article. Accordingly, any ranking study that is done without manually examining the retrieved records will give the same credit to each article regardless of its length.

The manual examination of records also revealed numerous errors in terms of document type classification. For example, *SSCI* does not have a document type specifically devoted to conference papers and, therefore, indexes these papers as journal articles. Prefaces and introductory essays written by editors or guest editors are indexed in several

databases as journal articles. In many cases, too, lengthy reviews of books, software, and databases are indexed as journal articles.

To verify these findings and assess their influence on rankings, we compared the ranking of individuals with the most journal articles according to Budd (2000), who used *SSCI*, with a ranking based on a manual examination of items published by the same individuals using the same database. Table 14 shows that after eliminating conference papers, editorial materials, and one- to three-page articles, as well as book, software, and database reviews, the new (or adjusted) ranking was found to be significantly different from the one generated by Budd ( $r_s = .345$  at the .01 level – 2-tailed). This adjusted ranking not only identified those individuals whose research productivity is inflated by Budd’s method (e.g., Carol Tenopir, Peter Jacso, Martha E. Williams, Peter Hernon, and A. J. Anderson), but also identified individuals who should have been included among the individuals with the most journal articles, namely, J. Andrew Large, Christine L. Borgman, and Gary Marchionini, among others.

To verify the findings discussed earlier—that several databases must be consulted when ranking the research productivity of LIS faculty and schools—Table 14 also shows that when using the four periodical databases that

TABLE 14. Comparison of ranking of individuals with the most journal articles.

Name	Budd (2000) <i>SSCI</i> , 1993–1998		<i>SSCI</i> 1993–1998 <sup>a</sup>		<i>INSPEC</i> , <i>LISA</i> , <i>LLIS</i> , <i>SSCI</i> , 1993–1998	
	Number	Rank	Adjusted number	Adjusted rank	Adjusted number <sup>a</sup>	Rank <sup>a</sup>
Tenopir, Carol	43	1	13	5T	16	6T
Jacso, Peter	32	2	7	15	10	15
Cronin, Blaise	26	3	25	1	29	1
Williams, Martha E.	23	4	1	22	3	21T
Spink, Amanda	22	5	15	2	20	2T
Hernon, Peter	20	6T	10	13	17	5
McClure, Charles R.	20	6T	13	5T	20	2T
Anderson, A. J.	19	8	0	23	0	23
Budd, John M.	15	9T	14	3T	16	6T
Dimitroff, Alexandra	15	9T	14	3T	14	9T
Allen, Bryce L.	13	11T	12	8T	14	9T
Bates, Marcia J.	13	11T	11	10T	13	11
Losee, Robert M.	13	11T	13	5T	15	8
Wolfram, Dietmar	13	11T	12	8T	12	12T
Kantor, Paul B.	12	15T	6	16T	9	16T
Saracevic, Tefko	12	15T	6	16T	9	16T
Smith, Linda C.	11	17T	3	21	3	21T
Varian, Hal R.	11	17T	11	10T	18	4
Sievert, MaryEllen C.	10	19T	11	10T	12	12T
Weingand, Darlene E.	10	19T	5	18T	7	20
Large, J. Andrew	—	NR	9	14	11	14
Marchionini, Gary	—	NR	5	18T	9	16T
Borgman, Christine L.	—	NR	4	20	9	16T

Note. T = tie; NR = not ranked; *ERIC* = Education Resources Information Center; *ISTA* = Information Science & Technology Abstracts; *LISA* = Library and Information Science Abstracts; *LLIS* = Library Literature & Information Science; *SCI* = Social Sciences Citation Index.

<sup>a</sup>After eliminating conference papers, editorial materials, and 1 to 3-page-long articles, as well as book, software, and database reviews.

provide the most comprehensive coverage of the periodical literature (i.e., *INSPEC*, *LISA*, *LLIS*, and *SSCI*), ranking of individuals with the most journal articles can be significantly different (for several individuals) than when using a single database. For example, Peter Hernon ranks 13th with 10 journal articles when using only *SSCI*, whereas he ranks 5th with 17 journal articles when using *INSPEC*, *LISA*, *LLIS*, and *SSCI*. Similar cases include those of Hal R. Varian, Gary Marchionini, and Christine L. Borgman. This is just another indication of the necessity to use multiple databases and manually examine results when ranking authors and schools or when conducting comprehensive searches in the literature.

## Conclusion

This study evaluated the data sources and research methods used by authors to rank the research productivity of Library and Information Science (LIS) faculty and schools. In doing so, the study aimed at identifying both tools and methods that would generate more accurate publication count rankings as well as databases that should be taken into consideration when conducting comprehensive searches in the literature. The main conclusion reached here is that the selection of databases to be used to generate publication count rankings has a great impact on the results and conclusions of such rankings. The same is true of sources used to identify study participants. Researchers undertaking ranking studies and students, faculty, administrators, and others, who use the results of these studies need to be aware of the potential implications of using inappropriate, incomplete, and nonrepresentative data sources.

The study confirms earlier research that LIS literature is highly scattered and is not limited to standard LIS databases. What was not known or verified before, however, is that a significant amount of this literature is indexed in the interdisciplinary or multidisciplinary databases of *Inside Conferences* and *INSPEC*. Other interdisciplinary databases, such as *America: History and Life*, were also found to be very useful and complementary to traditional LIS databases, particularly in the areas of archives and library history. The finding that *LLIS*, the most comprehensive disciplinary database in the field, misses more than two-thirds of the published literature suggests that there is a need to seek out and use these multidisciplinary databases for ranking as well as for other research purposes. According to this study, any future publication count ranking of LIS faculty and schools must use all of the following databases: *America: History and Life*, *INSPEC*, *LISA*, *LLIS*, and *SSCI* (for studies focusing primarily on journal articles), plus *Inside Conferences* (to enhance the coverage of conference proceedings), and *WorldCat* (to enhance the coverage of monographic items). The use of all or most of these databases was found to lead to a better, more accurate ranking (see Table 14). In addition, future studies should develop rankings on the basis of the findings of this article. Future studies should also explore how rankings based on the principles developed here compare to citation-count-based and perception-based rankings.

The study demonstrates that authors of ranking studies should take into consideration that coverage among databases is very topic dependent, that browsing the Internet and published bibliographies and works cited in articles and books is still necessary to fill some of the gaps in database coverage, and that ALISE's directory of members should not be used alone as a source for identifying all faculty members at LIS schools.<sup>10</sup> Moreover, until publishers add to their databases such fields as "document length," "word count," and "refereed status," manual examination of the records will remain necessary to distinguish between one-to two-page documents and longer ones as well as between refereed and nonrefereed items. The same is true of document type: publishers have to create more accurate description of the documents they index in their databases. Furthermore, the coverage performance of databases changes over time. Therefore, studies like this one should be conducted every few years to verify any changes in coverage and/or identification of new relevant databases. Replication of this study, with multiple different samples, is also necessary to verify the results obtained here further.

Whether to use publication counts in isolation when ranking authors and academic programs depends on the purpose of the study or the ranking. Among others, however, peer-based evaluations and/or citations authors receive to measure the value, quality, significance, or impact of their work can, and in many cases should, be included in ranking and other similar evaluative studies or processes in order to generate a more accurate illustration of the research performance assessment of authors and programs. This assertion does not lessen the importance and significance of the findings of this study. An accurate publication count ranking based on the principles developed in this article can at least help support or identify discrepancies between research productivity and peer evaluation and citation data. Identifying databases that index the highest percentage of LIS literature can also help libraries and other information centers make sound acquisitions and periodical subscription decisions and help students and researchers select and use databases more effectively to support their research and curricular needs.

Finally, when using publication count data in ranking and similar research evaluative assessments, one should take into consideration advanced systems or analyses that devise certain weighting scales for different kinds of publications—for example, books, chapters in books, articles in refereed and nonrefereed journals, conference papers—as well as publication length, the reputation or rank of the publisher or journal, and the research specialty(ies) of those who are ranked, among others. For citation count data, one should go beyond ISI's citation databases, as recommended by Cronin (2001), Nisonger (2004) and Reed (1995), among others.

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<sup>10</sup>In January 2004, the ALISE board approved the creation of a companion publication to the ALISE Membership Directory. The board mentioned that it will be a comprehensive directory of all LIS faculty in the United States and Canada, whether they are ALISE members or not.

## Acknowledgments

We would like to thank the anonymous reviewers and the editor of *JASIST*, who provided valuable comments and suggestions to enhance this work.

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