Fifty years of LIS education in Australia: Research productivity and visibility of LIS educators in higher education institutions

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Abstract

This paper surveys aspects of the research productivity and visibility of Australian Library and Information Studies (LIS) educators as reflected in publications retrieved from eight relevant databases. Searching was restricted to educators serving for at least two years in Australian LIS programs from 1959 to 2008; the records obtained were downloaded and checked for accuracy. The results show that fewer than five percent of educators, generally with long service, produced over one-quarter of all journal articles, while nearly one-third of educators authored no articles. About three-quarters of all journal articles were single-authored; however, multiple authorship has increased over time, especially since 2000. Nearly one-half of all articles were published in Australian national journals; as these journals were indexed only in national and LIS-specific databases, such databases must be included to obtain a reliable picture of Australian LIS research productivity.

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Introduction

Prior to the 1960s, aspiring LIS professionals in Australia were taught by practicing librarians according to a syllabus and a series of examinations set by the Library Association of Australia (now the Australian Library and Information Association, ALIA) for the qualification of Registration. From 1959, professional LIS education moved into higher education institutions, and the Registration system was gradually phased out, ending in 1980. Especially in the early decades, most educators came from library practice. The new academic workplace presented these former librarians with different demands, not only with teaching, but also with research: an important role of the academics is to provide a foundation of research and inquiry for their disciplines (see e.g., Budd & Seavey, 1996). It is of interest to look at how well the transition has been made from practice to academia over the ensuing fifty years. In an earlier paper we examined aspects of the academization of Australian LIS educators through this period, including *inter alia* the increasing percentage of PhDs obtained by staff (Wilson et al., 2010). Here we will examine another aspect of this process – the output of research publications by staff.

Perhaps as important as research output (or productivity) is what may be termed the visibility of this output to the global discipline of LIS. There are numerous electronic sources covering a variety of scholarly publications (for example, open access journals; publications of various document types via Google Scholar; publications made accessible by individuals, institutions, organizations and societies). However, still the most important for research purposes are the specialized subject literature databases that cover national and/or international journals and conferences. Research visibility is frequently gauged through publications covered in a selection of such databases. The storage and retrieval of research publications (or their bibliographic surrogates) in databases ensures their potential impact on future scholarly activities globally. Conversely, lack of inclusion means limited or negligible impact – an unnoticed publication is an unread and uncited publication. Furthermore, there has been a growth in research evaluation for institutions and for governments, using selected databases from which to measure productivity and impact (see e.g., Butler, 2008). Such measures may directly bear on subsequent funding, on career paths of educators, and even on the survival of programs.

A first task is to define who we mean by educators in LIS programs in the Australian higher education sector over the fifty-year period. The phrase 'LIS program' refers to a coherent set of all LIS courses, undergraduate or postgraduate, taught together in an institution, equivalently a department or school if an autonomous academic unit. The term 'higher education' refers to that sector of post-secondary education that excludes vocational training. We have taken LIS programs in higher education in Australia to be those professional level programs accredited by the Australian Library and Information Association (ALIA). This is a pragmatic choice – using accreditation as a way of 'protecting space' in a world where the study of information is increasingly of interest in disciplines beyond LIS (Cronin, 2002). This allows us to bypass exactly what comprises LIS – or for that matter, any discipline, domain or specialty (see e.g., Palmer & Cragin, 2008). The many definitions and conceptions of LIS are debated regularly (for example, at the triennial International Conference on Conceptions of Library and Information Science, CoLIS). One definition, perhaps most compatible with this study, is that LIS is a field which engages in teaching and research about libraries, information and documentation as a domain in its own right (Hjørland, 2000). LIS is used as the generic acronym to indicate Library or Librarianship; Information or Knowledge; and Studies, Science, Services or Management. It must be acknowledged, though, that Australian

LIS programs are not always named as such, nor do they have library or any variation of the word in their titles.

With respect to staff, the term 'educator' is taken as more generic than the terms 'academic' or 'faculty member'. From a comprehensive list of 693 LIS educators, variously listed as serving in some capacity in Australian LIS programs from 1959 to 2008 (Wilson et al., 2010), we have selected for the present study those 382 educators with more than two years total service in Australian LIS programs *per se*. Educators could move, for example, to cognate disciplines in the higher education sector, to LIS programs in other countries, or to practice in libraries, and continue to publish similar works. Such publications have been excluded from this study.

Thus, this paper surveys aspects of the research publications of longer-serving Australian LIS educators over 50 years, as retrieved from selected national and international databases. We believe it has value beyond Australian LIS. Firstly, within the global LIS community, the Australian LIS study provides a comparison of research productivity with other countries or geographical regions. Secondly, beyond LIS, this study may be related to teaching and research in the many professions that have moved from institutions of practice into academia, requiring a similar transformation of staff into academics.

Background: the Australian Context

It may be helpful here to briefly chronicle developments in Australian higher education relevant to the research publication history of Australian LIS educators. Fuller accounts of changes in Australian higher education are available at *www.deewr.gov.au/HigherEducation/Pages/default.aspx* and accounts of the history of Australian LIS programs are variously given by Rochester et al. (1997), Hallam (2007) and Wilson et al. (2010).

In 1959, when Australian professional LIS education started to move into higher education institutions, the Australian higher education sector consisted of universities (which were autonomous institutions), and a variety of technical institutes/colleges and teachers colleges (which were mainly under Australian State government education departments). It should be noted that Australia then had, and still has, relatively few private (self-accrediting) higher education institutions. Thus the first such LIS program began in a university, and the second in a technical institute; school or teacher librarianship programs also appeared in teachers colleges.

With a growing demand for student places in the higher education sector from the latter 1950s, the direction and financing of the sector were increasingly assumed by the Australian Federal government. Most importantly, it largely adopted a commissioned report (Martin, 1964) recommending that the sector be remodelled as a 'binary system' of universities and of colleges of advanced education (CAEs). The CAEs were to be either newly created or based on reorganised selected technical and teachers colleges; to qualify, many such institutions had to diversify and expand their curricula. Universities were intended to focus on the advancement of knowledge, while CAEs were to focus on practical education – the Martin report specifically saw new LIS programs as more suitably placed in the CAEs rather than in universities. Thus the 1970s witnessed a proliferation of LIS programs, principally in the CAEs. In 1978, Australia, a country with a population of just over 14 million (Australian

Bureau of Statistics, 2008), found itself with 19 LIS programs – two in universities and 17 in CAEs – of which many were quite small.

Two decades later, in a more stringent economic environment, the Australian Federal government adopted another commissioned report on higher education (Dawkins, 1988) recommending that the sector be 'rationalized' to a Unified National System comprised only of universities. In addition to existing universities, new public universities were to be created (only) from a reorganisation of the CAEs – often from amalgamations of smaller institutions or their absorption into existing universities. The former division of function was abandoned. As a consequence, by the early1990s, all LIS higher education programs existed in universities. However, in some cases institutional amalgamation led to amalgamation of formerly separate LIS schools (and to their downsizing). Furthermore, the economic and managerial climate was generally not favorable for small independent programs, and most LIS programs were either absorbed into larger schools of other disciplines, or closed.

Particularly in the early decades of LIS programs in higher education in Australia, most educators came from library practice, so the academic workplace presented these former librarians with new tasks, including research. For many the introduction to research came from enrolment in higher research degrees while also 'on the job'. Even in CAEs, institutions not initially intended to undertake research, 'academic drift' developed from the outset as educators also acquired formal higher qualifications and participated in research and publication. (A resulting political pressure was a factor in the development of the Unified National System.) With the establishment of the Unified National System of universities from the late 1980s, the research requirement on all staff was acknowledged, and increasingly needed for promotion. New government funding policies for research were introduced (Parliament of Australia, 2000-2001): funding which previously had been tied *inter alia* to the status and size of the university was henceforth to be related only to the quality and the impact of the research itself. This encouraged competition between universities for research funds and put pressure on them to increase their research output. Whether there has yet been a more equitable distribution of funds for research between the older-established universities and the newer universities (with most of the extant LIS programs) is moot. In the last decade the federal government has been under some pressure to find more satisfactory ways of promoting research across the sector as shown in a succession of schemes: the Quality Assurance Framework in 2000 (*www.dest.gov.au/archive/highered/occpaper/00g/00g.pdf),* the Research Quality Framework (RQF) in 2005 and Excellence in Research for Australia (ERA) in 2008 (*www.arc.gov.au*).

Selected Bibliometric Studies

As further background for this study, the following provides a short account of selected bibliometric studies on research productivity in LIS. Such studies generally focus on publication trends of LIS scholarly literature such as: growth over time of the number of publications and ranking by, for example, countries, institutions, schools, authors, journals. Davarpanah and Aslekia (2008) provided a picture of the global distribution of papers in 56 LIS journals in *Social Science Citation Index* (*SSCI*) from 2000 to 2004; the US led with 58% of the journal articles, followed by the UK (10%), Canada (4%) and then Australia (3%). Meho and Spurgin (2005) searched all publications of 68 North American LIS academics in over 100 databases from 1982 to 2002 to provide a detailed assessment of research productivity of North American LIS authors and programs. They found that only 10 databases 'provided significant coverage of LIS indexed literature' and limiting data sources to fewer than about four databases leads to 'inaccurate rankings and erroneous conclusions'.

LIS research productivity studies are generally geographically-oriented. One such series of papers for North America, used publications gathered from *SSCI* to look at the research productivity from 1964 to 2004 of faculty in all LIS programs accredited by the American Library Association (ALA). These studies showed increases in LIS research productivity over time suggesting increases in 'faculty effectiveness' (Hayes, 1983; Budd & Seavey, 1996; Budd, 2000; Adkins & Budd, 2006; 2007). Boyce and Hendren (1996) used the *Library Literature* database to look at the productivity of faculty from ALA accredited LIS schools in North America for journal articles and book reviews from 1984 to1993. The authors concluded that publication counts in *Library Literature* may not be 'a valid single measure of school effectiveness' nor 'account for publication outside traditional library literature'. Extending the range and number of databases beyond *SSCI* or *Library Literature*, and the types of publication to include more than just journal articles, Pettigrew and Nicholls (1994) looked at nearly 8,000 publications by just over 600 LIS academics in ALA accredited schools in North America over 11 years. They showed that productivity was higher in LIS schools with PhD programs than in those without. Shaw and Vaughan (2008) investigated the relationship of academic ranks versus publication and citation patterns of 30 LIS academics from ALA accredited schools and found that as academics advanced in rank, so did their numbers of publications with junior academics publishing more conference papers and fewer journal papers and their more senior counterparts just the reverse. The influence of (or citations to) the publications showed that the *Web of Science* reported almost no citations while *Google Scholar* located citations that showed the publications of senior academics 'significantly' cited more than those of junior academics.

Regional and international LIS research productivity studies are also increasing. For example, Åström (2008) used *curriculum vitae* from the web for faculty members from five Nordic LIS schools to assess publishing patterns from 1990 to 2005. Using the *Web of Science* citation databases, Park (2008) looked at authorship characteristics in over 1,300 publications of 12 countries in Asia and the Pacific region in the top 20 LIS journals from 1967 to 2005; Australia led in nearly all categories measured (see also the Results and Discussion below). Patra and Chand (2009) used the *Library and Information Science Abstracts* (*LISA*) database to compare LIS research output in member countries of two associations: seven countries in the South Asian Association for Regional Cooperation (SAARC) and ten countries in the Association of South East Asian Nations (ASEAN). In China, *SSCI* was used to assess LIS research for publications from 1975 to 2004, but only in journals assigned to the 'Information Science & Library Science' subject category of *SSCI*. The results showed an increase in the number of publications as well as an increasing trend to publish in higher impact journals (He & Wang, 2006).

This brief overview of selected bibliometric studies of research productivity in LIS provides a background for the present study which uses a list of all LIS educators of one country over 50 years and searches a variety of databases, some not used in any of the previous studies.

Method

As noted in the Introduction, for the present study all 382 Australian LIS educators with more than two years total service in LIS programs were selected from a comprehensive list of 693 Australian LIS educators in the higher education sector, from 1959 to 2008 (Wilson et al., 2010). As our interest is only in publications produced by these educators when serving in LIS programs, their years of employment in programs were also noted.

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With respect to the excluded 311 educators with only two or fewer years in LIS programs, we note that about one-half were lecturers (equivalently, assistant professors), often in part-time employment, while just over one-quarter were tutors (equivalently, teaching assistants); the remainder were (mainly managerial) academics in higher positions, adjuncts and unspecified visitors or guest lecturers. We believe it unlikely that these personnel would have been engaged in appreciable research through to publication in their short period of service. Nevertheless, a trial search in the *LISA* database was performed for these educators; only 20 documents were retrieved, suggesting returns would be too small for the additional search effort.

Eight databases were used to ensure a reasonably comprehensive coverage of the LIS literature since the sources indexed in each database vary considerably. The databases may be grouped as follows (see Appendix):

- Australian national and LIS subject-specific: *Australian Library and Information Science Abstracts* (*ALISA*).
- International and LIS subject-specific: *Library and Information Science Abstracts* (*LISA*), *Library Literature and Information Science* (*LLIS*), and *Library Information Science & Technology Abstracts* (*LISTA*). The subject coverage of these databases differs in orientation (Boese, 2000; Read & Smith, 2000). The database *Information Science and Technology Abstracts* (*ISTA*), formerly *Information Science Abstracts (ISA)*, was not included as it overlaps extensively with *LISTA* (Jacsó, 2007; Boell, 2010).
- Australian national and with broader subject coverage, specifically education (including aspects of LIS): *Australian Education Index* (*AEI+*).
- International and with various multidisciplinary subject coverage: *Social Sciences Citation Index* (*SSCI*), the *Science Citation Index* (*SCI*), and the *Arts and Humanities Citation Index* (*AHCI*).

Additional databases considered include *SCOPUS*, a multidisciplinary database, which was not selected since its coverage of the LIS literature, in general, is limited to post-1995 publications. Other multidisciplinary databases (e.g., *INSPEC*, *ERIC*, etc.) may have retrieved additional publications, but sample searches for a few of the Australian LIS academics in these did not retrieve additional documents sufficient to warrant searches for all 382 academics (Wilson, 1999; Hood & Wilson, 2001).

Searches for publications were carried out for each of the 382 longer serving LIS educators in all eight databases. *ALISA, LISA, LISTA* and *AEI+* were searched through the University of New South Wales Library's e-resources (*www.library.unsw.edu.au*). *LLIS, SSCI, SCI* and *AHCI* were searched using Dialog (*www.dialog.com*), with the three citation indexes combined using Dialog's *OneSearch* feature. Search statements for all educators in all likely variants of their names were individually designed to suit the 'author' fields in each database. For each educator the results were limited to the first year of service in any LIS program in Australia up to the last year plus two additional years; the two additional years were included to cover time lags which generally occur during the publication process. (It should be noted that these limits may overcount our values of author productivity.) Searches were undertaken in June 2008 and updated in June 2010 to ensure that all publications through December 2008 were included. Records retrieved were then imported into Refworks (*www.refworks.com*), which supports satisfactory import filters for the data format of all eight databases to enable the unification process.

The separate records downloaded from each database were composed into a unique list of records with maximum available bibliographic information, both to ensure that records were correctly selected and for subsequent subject analysis. Where uncertainties still existed as to the suitability of the record (for example, from confusion of common surnames and initials), publication lists in *curriculum vitae* and other e-sources were used to resolve ambiguities.

Records retrieved were for a variety of document types. With the exception of 'books' and 'book chapters' which are not indexed by *SSCI, SCI* and *AHCI*, all document types appear in all databases. As the focus of the study is on journal articles, it was necessary to exclude those records not directly related to research *per se* – such as book reviews, letters, editorials, etc. These were counted but removed for later analysis, see Table 2. With the exception of *ALISA* and some records from *LLIS*, all databases generally had a document type designation. The document type for each record was checked and when missing (or obviously incorrect), it was added to (or corrected). As examples: records with words like 'conference', 'proceedings' or 'presented at' in their titles were assigned the document type 'conference materials'; if an item was not published in a journal or by an academic publisher and it had the words 'study' or 'report' in the title, it was assigned the document type 'books'; theses were sometimes only labelled as such either in the title or the publisher field; finally, if a record had a volume and an issue given (and it was not a 'book review'), it was classified as a 'journal article'. Using this approach it was possible to assign all records a document type.

Results and Discussion

In the process of searching for publications by Australian LIS academics, interesting information about the selected databases searched was revealed. This information impacts on the results, and so will be addressed first. Following the discussion on the databases the productivity of Australian LIS academics is addressed.

Databases

A general summary of the number of records authored or co-authored by 382 Australian LIS educators in LIS programs for more than two years as reflected in eight databases from 1967 to 2008 is presented in Table 1. Somewhat unexpectedly, the *Australian Education Index* (*AEI+*) retrieved the most records (2,888). However, it also had a substantial number (679) of subsequently 'incorrect' records. The latter is due, in part, to its broad subject coverage of *education* and the use of initials rather than full first names in the early years. The initialization of first names was also the case in *LISA* resulting in 163 incorrect records. The three citation databases of Thomson Reuters were the 'cleanest' with no replicate entries. Most likely this consequence is due to the presence of search fields for countries and institutional affiliations of authors. Of the LIS-specific databases, *LLIS* retrieved considerably more records than the others (*LISA, LISTA* and *ALISA* in decreasing order); although, as shown below in Table 2, 61% were book reviews. *LISTA* had the largest total number (34) of replicates, due perhaps to the recent creation of the database through the merging of records from different sources.

Table 1: The number of records retrieved for publications by Australian LIS educators from each of eight databases, 1967-2008; replicates and incorrect records are indicated.

	ALISA	LISA	LISTA	LLIS	AEI+	SSCI	SCI	AHCI

Number of records retrieved in search	**1386**	**1837**	**1411**	**2182**	**2888**	**398**	**123**	**43**
Number of replicates from co-authoring by Australian LIS academics	118	232	155	199	303	52	21	1
Number of replicates from database error	1	5	34	14	5	0	0	0
Number of (other) incorrect records	7	163	42	31	679	1	1	2
Number of unique correct records	**1260**	**1437**	**1180**	**1938**	**1901**	**345**	**101**	**40**

Table 2 presents the number of records retrieved from each database for different document types. For all databases the most common publications were those appearing in journals (journal articles, book reviews and miscellaneous journal materials). Other than the Australian databases, *ALISA* and *AEI+*, they account for most of the records indexed by each database: from 81% for *LISTA* to 98% for *SSCI*. However, the databases differed vastly in their share of book reviews versus other journal materials. In four databases book reviews accounted for a substantial number of the records retrieved (from 19% in *LISTA* to 61% in *LLIS*), highlighting the preponderance of book reviews written by Australian LIS academics.

Table 2: The number and percentage share of document types in publications by Australian LIS educators for each of eight databases, 1967-2008.

	ALISA	LISA	LISTA	LLIS	AEI+	SSCI	SCI	AHCI
Journal Articles	**695**	**1088**	**636**	**604**	**908**	**245**	**87**	**21**
% share in Database	55.2%	75.7%	53.9%	31.2%	47.8%	71.0%	86.1%	52.5%
Book Reviews	7	139	229	1186	13	74	9	15
% share in Database	0.6%	9.7%	19.4%	61.2%	0.7%	21.4%	8.9%	37.5%
Conference Materials [a]	256	79	115	23	506	8	4	1
% share in Database	20.3%	5.5%	9.7%	1.2%	26.6%	2.3%	4.0%	2.5%
Books [b]	134	66	66	37	254	0	0	0
% share in Database	10.6%	4.6%	5.6%	1.9%	13.4%			
Book Chapters [c]	156	37	45	37	213	0	0	0
% share in Database	12.4%	2.6%	3.8%	1.9%	11.2%			
Miscellaneous Journal Materials [d]	12	28	89	51	7	18	1	3
% share in Database	1.0%	1.9%	7.5%	2.6%	0.4%	5.2%	1.0%	7.5%
Total number of records	**1260**	**1437**	**1180**	**1938**	**1901**	**345**	**101**	**40**

[a] Includes mainly conference abstracts.
[b] Encompasses items at the monographic level: Books, Theses, Reports and Bibliographies.
[c] Includes articles in edited monographic collections.
[d] Includes, for example, Letters to the editor, Obituaries, Editorial materials and Conference reviews.

The two Australian databases (*AEI+* and *ALISA*) show similar indexing patterns possibly due, in part, to the overlap of document types indexed: conference materials, books and book chapters each made up more than 10% of the document types and when combined, about one-half of all records. In all the other databases, conference materials, books and book chapters are negligible or non-existent. Thus, the two Australian databases are good sources for non-journal publications, while *LLIS* is the database of choice for book reviews. However, journal articles are generally considered the major vehicles for scholarly publications in LIS and further analysis will, therefore, focus only on this document type. Conference materials (or pre-scholarly publications) are generally revised as journal articles after incorporating feedback from discussions at conferences; while contents of most books and book chapters (or post-scholarly publications) often have appeared earlier as conference or journal papers.

Although a combination of international and national LIS databases would most likely retrieve the greater portion of journal publications for most country-oriented productivity studies, the omission of multidisciplinary databases or closely allied disciplines (e.g., *education* for the Australian context) would do a disservice to LIS academics with interdisciplinary interests.

The three Thomson Reuters citation databases, particularly *SSCI* which is used in most of the North American studies, would uncover only a very small fraction of journal articles by Australian LIS academics and even fewer still when limited to journals in the subject category, 'Library Science & Information Science' (Park, 2008; Willard et al., 2008). However, Park's (2008) authorship study of research productivity in the top 20 of *SSCI* 'Library Science & Information Science' journals in the Asia-Pacific region did show Australian LIS academic, Wilson, as the most prolific author; University of New South Wales as the second most productive institution (see also Table 7); and Australia the most productive country. The retrieval results of the current study have demonstrated that coverage provided by individual databases is limited, an issue raised in a recent study by Meho and Sugimoto (2009) when assessing research productivity for smaller 'entities' such as journals and institutions and possibly also for 'smaller' countries outside of North America and Europe.

Journal articles in databases

After the removal of non-journal articles, there were 2,235 unique journal articles authored or co-authored by at least one Australian LIS academic during the period from 1967 to 2008 (Tables 3a and 3b). Although LIS education in Australian higher education institutions was established in 1959, journal articles of LIS academics appeared in the eight selected databases only from 1967 onwards, with modest growth in the 1970s. The 1980s saw remarkable growth followed by further small increases in the 1990s. Partial explanations of the 'quiet' and low-productive period before the 1980s are posited: some of the databases had limited or non-existent coverage in the early decades of Australian publications; there were few LIS academics in the early years (1960s) and most were engaged in establishing LIS programs, thus devoting their time and resources to course development and teaching rather than to research. Although the 1970s saw a growth in the number of LIS academics in Australian higher education institutions, most came as practitioners and therefore lacked research training and exposure to a 'research culture' (Whyte, 1984; Wilson et al., 2010).
Up until the 2000s, research and publication was not in the job specifications of all academics. In some institutions academics may still choose to focus on teaching and professional engagement, rather than teaching and research. Even as increasing numbers of Australian LIS academics had PhDs either prior to entering academia or obtained while in academia, the transition from practitioners to academics was slow (Wilson et al., 2010).

Table 3a: The number of journal articles by Australian LIS educators retrieved from each of eight databases, and the total number of unique journal articles, in five periods from 1967-2008; the percentage of total unique articles retrieved in each period by each database is also shown.

Years	ALISA	LISA	LISTA	LLIS	AEI+	SSCI	SCI	AHCI	Total unique articles per period
1967-1970	0	8 72.7%	3 27.3%	0	0	0	0	0	11
1970-1979	0	128 75.7%	27 16.0%	0	22 13.0%	10 5.9%	1 0.6%	0	169
1980-1989	383 56.3%	305 44.9%	96 14.1%	106 15.6%	437 64.3%	57 8.4%	6 0.9%	7 1.0%	680
1990-1999	293 35.9%	386 47.3%	213 26.1%	275 33.7%	271 33.2%	94 11.5%	30 3.7%	10 1.2%	816
2000-2008	19 3.4%	261 46.7%	297 53.1%	223 39.9%	178 31.8%	84 15.0%	50 8.9%	4 0.7%	559
All years	**695** 31.1%	**1088** 48.7%	**636** 28.5%	**604** 27.0%	**908** 40.6%	**245** 11.0%	**87** 3.9%	**21** 0.9%	2235

Table 3b: The number and percentage share of journal articles by Australian LIS educators retrieved from each of eight databases (db), 1967-2008.

	ALISA	LISA	LISTA	LLIS	AEI+	SSCI	SCI	AHCI	All dbs
No. articles	**695**	**1088**	**636**	**604**	**908**	**245**	**87**	**21**	**2235**
% articles retrieved from db	31.1%	48.7%	28.5%	27.0%	40.6%	11.0%	3.9%	0.9%	**100.0%**
No. articles unique to db	123	358	168	108	293	34	14	12	**1110**
% share of articles unique to db	17.7%	32.9%	26.4%	17.9%	32.3%	13.9%	16.1%	57.1%	**49.7%**

By combining all eight databases, it becomes evident that no one database, not even *LISA* with the highest overall number of journal articles (1,088 – Table 3a), and the highest number of unique journal articles (358 – Table 3b) retrieved, can provide access to even one-half of the research output for Australian LIS academics. The other seven databases contributed from 12 to 293 unique journal articles (Table 3b) and comprised the other one-half of the publication output to provide a reasonably reliable picture of the research productivity of Australian LIS academics. The two Australian databases (*ALISA* and *AEI+*) were disappointing, not so much for their coverage of national journals, but for their non-coverage

of international journals in which Australian academics published. Further, *ALISA* shows only 19 journal articles retrieved from 2000-2008, ceasing in early 2005 (see Appendix).

Table 3a shows that the most productive database in the Australian LIS context was *LISA*; it provided most of the journal articles by Australian authors in the 1970s and in the 1980s when the two Australian databases (*AEI+* and *ALISA*) led in the provision of journal articles (437 and 383), *LISA* was not too far behind with 305 journal articles. During the 1990s *LISA* took over the lead with 386 journal articles and for the period from 2000 to 2008, it was a close second with 261 to *LISTA*'s 297 journal articles. However, past studies of the *LISA* database have indicated problems in the allocation of descriptor terms (Hood & Wilson, 1994) and in the updating of records (Jacsó, 1998).

Another way of showing the advantage of searching a number of different databases is looking at the distribution of articles over databases. Of the 2,235 journal articles, about 50% (1,111) were indexed by only one database with a further 24% (545) by two databases; 14% (304) by three databases; 9% (211) by four; 3% (59) by five. Only five articles appeared in six databases and no article was indexed by seven or eight databases. Generally, though it would appear that searching six rather than eight databases is adequate (Hood & Wilson, 2001), there is still the question of 'which ones' to search. Prior to searching, it is not clear which databases will be the least promising. In the Australian LIS context, the least productive databases were *SCI* and *AHCI* as they contributed only 26 journal articles not found in the other six databases; however, *AHCI* contributed the highest share of unique articles (57%, Table 3b).

As the coverage of Australian LIS journal articles varied markedly from database to database a reasonably comprehensive coverage can only be achieved when multiple databases are searched. However, even using all the databases may not enable coverage of all publications. A comparison of the list of journal articles retrieved from the databases for one of the top-producing academics (see Table 7) to the *curriculum vita* (CV) list of publications on the web, found discrepancies due to one or more of the selected databases missing an issue of a journal that they alone regularly indexed, or indeed, found other indexing anomalies (Jacsó, 1998). Productivity analyses using the list of publications in CVs on the web may overcome incomplete coverage; however, studies using such publication lists are also problematic as individual preferences of academics range from listing 'all' publications to just a selected few (Åström, 2008). Additionally, some academics in this study pre-date the 'web era' or have left academia.

Journal articles and LIS academics

The distribution of the 2,235 unique articles over all years is displayed in Figure 1 on the left axis and the number of Australian LIS academics from an earlier study (Wilson et al., 2010) on the right axis; both distributions display similar trends. A time lag between appointment to an academic position and year of journal publications is evident from about 1970 until the mid-1990s, with the time lag much greater in earlier years. The spikes in publishing activity in 1999 and in 2005-2006 may be related to the various implementations of national research evaluation programs by the Australian Federal government (see above).
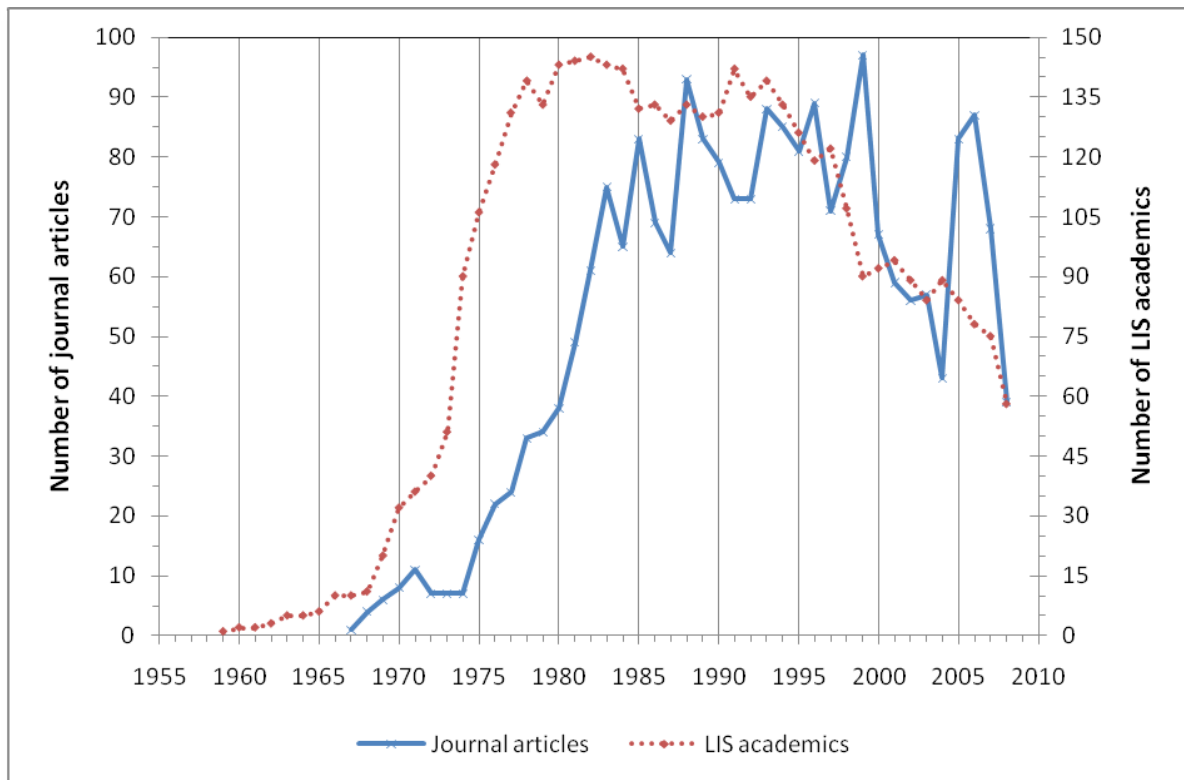
Figure 1: Number of unique journal articles (1967-2008) authored by 382 longer-serving Australian LIS educators, and the number of such educators in Australian LIS programs (1959-2008), per year.

The steady rise of the number of journal articles from 1975 to 1985 may be due, in part to the introduction and development of the different literature databases during this period and to the increasing assimilation of Australian LIS academics into the research and publishing culture of universities (Wilson et al., 2010). The period with the most journal articles by Australian LIS academics was in the 1990s, following the establishment of the Unified National System of universities (Dawkins, 1988), when annual publication outputs fluctuated between 71 and 97 (Figure 1). The decrease between 2000 and 2004 may be explained to a certain extent by the demise of *ALISA* (see Appendix). From 1982 to 1996 *ALISA* averaged 43 journal articles per year (ranging from 32 to 62); however, from 1997 to 2004 the number of journal articles dropped dramatically to about six per year (ranging from 0 to 21), and none from 2005 onwards. While *ALISA*'s contribution was declining from 1997 onward, *LISTA* was expanding its coverage of journal articles by Australian LIS academics for an average of 32 per year (ranging from 19 to 50).

The number of journal articles from *ALISA* also follows the rise and decline from 1982 to 2008 of Australian LIS programs from 16 to 10 and LIS academics from 145 to 58 (Wilson et al., 2010). In the 1980s and 1990s the number of journal articles indexed by *ALISA* was the second highest of all databases with a total of 383 and 293 respectively. A similar decline in the other Australian database *AEI+* was evident, though not as precipitous (Table 3a). Fortunately for Australian LIS, the three international LIS databases (*LISA*, *LISTA* and *LLIS*) appear to have continued indexing the major Australian LIS journals from 2000 to 2008, thus providing adequate coverage of Australian LIS research publications.

The average number of journal articles per academic from 1967 to 2008 is shown in Figure 2. Although the distribution is highly skewed with 118 (31%) of the 382 LIS academics having no journal papers indexed in any of the eight databases (see Table 6 below), there is still an

upward trend. Figure 2 has two peaks (1999 and 2005) where the average number of journal articles per academic is at least one, perhaps corresponding to the Australian Federal government's research evaluation proposals mentioned earlier.
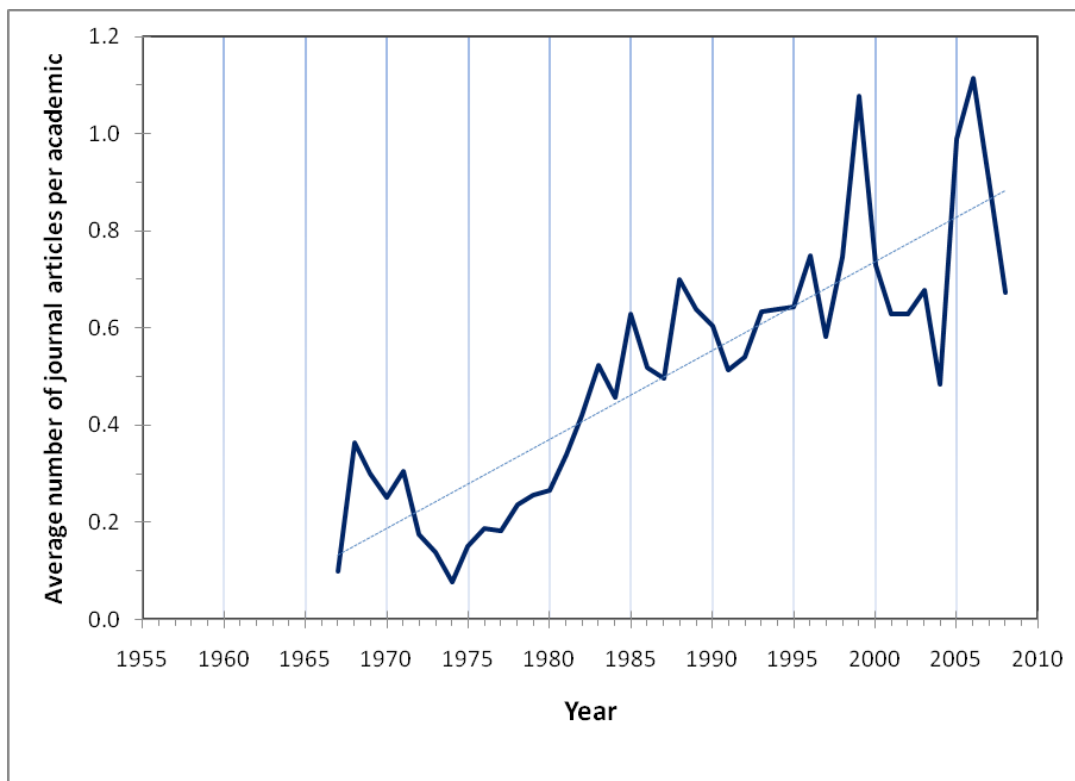

Figure 2: Average number of journal articles per LIS educator per year, and the trend line 1967-2008.

Journal articles and journals

The 2,235 articles were published in 469 different journals with the distribution of articles over journals greatly skewed: 588 (or 26%) of the journal articles were published in five (1%) of the journals, while 233 (10%) of the journal articles were published in 233 (50%) different journals. In other words, Australian LIS academics published in nearly one-half of all journals only once and over one-quarter of their journal articles were published in only five national journals (see Table 4).

Table 4 lists the 38 journals with more than ten articles by Australian LIS academics published from 1967 to 2008 ranked in decreasing order of productivity. As expected the top two journals are Australia's national LIS journals published by the Australian Library and Information Association (*www.alia.org.au*) and are still 'active'. A further 16 are also national journals, nine of which have ceased publication. The list reflects, for the most part, the actual names of the journals although two are name changes (or 'continued by') as in the journals ranked *6*th and *8*th (*Education for Library and Information Services, Australia* and *Education for Librarianship, Australia*). These 38 listed journals, including two 'continued by' journals, accounted for over one-half (1,261 or 56%) of all journal articles published by Australian LIS academics from 1967 to 2008. The 18 national journals are asterisked and represent 44% (985) of the 2,235 journal articles.

Table 4: Journals with >10 articles each by Australian LIS educators, by decreasing number of articles per journal, from 1967-2008. Total number of articles = 2235, in 469 journals; number of articles in journals with >10 articles each = 1261 (56.4% of total), in 38 (8.1% of total) journals.

Rank	Journal name and (years of publication); * denotes national journals	No. of articles
1	* Australian Library Journal (1951–)	202
2	* Australian Academic & Research Libraries (1970–)	160
3	* Orana (1965-2005 **X**)	87
4	* Access (1987–)	75
5	* LASIE (Library Automated Systems Information Exchange) (1970-2002 **X**)	64
6	* Education for Library and Information Services, Australia [ELISA] (continues **8** ELA, 1992-2000 **X**)	46
7	* InCite (1980–)	43
8	* Education for Librarianship, Australia [ELA] (1984-1991 **n.c.** ctd. by **6** ELISA)	41
9	* Scan (1982–)	37
10	* Archives and Manuscripts (1955–)	32
11=	* Australian Library Review (1990-1996 **X**)	30
11=	* Australian School Librarian (1964-1987 **X**)	30
13	* Cataloguing Australia (1975-1999 **X**)	29
14	* Australasian Public Libraries and Information Services (1988–)	28
15	* Australian Special Libraries News (1967-1989 **X**)	27
16	* Society for Mass Media and Resource Technology Journal (1971-1987 **X**)	26
17	Education for Information (1983–)	24
18	Libri: International Journal of Libraries and Information Services (1950–)	20
19	Scientometrics (1978–)	18
20=	* Australasian College Libraries (1983-1989 **X**)	17
20=	Library Acquisitions: Practice and Theory (1977-1999 **n.c.**)	17
22	International Library Review (1969-1992 **n.c.**)	16
23=	Information Processing and Management (1975–)	15
23=	Journal of Education for Library and Information Science [JELIS] (continues **28=** JEL, 1984–)	15
25=	Emergency Librarian (1973-1998 **n.c.**)	14
25=	Internet Research (1991–)	14
27	IFLA Journal (1975–)	13
28=	Asian Libraries (1991-1999, merger / **n.c.**)	11
28=	* Bibliographical Society of Australia and New Zealand Bulletin (1970-2004 **n.c.**)	11
28=	Electronic Library (1983–)	11
28=	Information Research (1995–)	11
28=	Journal of Education for Librarianship [JEL] (1960-1984 **n.c.** ctd. by **23=** JELIS)	11
28=	Journal of Information Science (1979–)	11
28=	Journal of the American Society for Information Science (1970-1999 **n.c.**)	11
28=	Library and Information Science Research (1983–)	11
28=	Library Trends (1952–)	11
28=	School Libraries Worldwide (1995–)	11
28=	School Library Media Quarterly (1981-1997 **n.c.**)	11

'–' denotes the journal is active at the time of writing; '**X'** denotes the journal ceased publication in the latter year; '**n.c.'** indicates the journal underwent a name change in the latter year – only where the continuing journal is also in the Table is it named. Sources used include: National Library of Australia catalogue (*www.nla.gov.au*), Ulrich's Periodical Directory (*www.ulrichsweb.com*) and WorldCat (*www.worldcat.org*).

Some of the publishing patterns of Australian LIS academics for the last four decades are highlighted in the research results. *Firstly,* nine of the 18 national journals have ceased

publications due to reasons about which only speculation is possible; for example, economic constraint coupled with the decline of submissions from, *inter alia,* national information professionals and LIS academics whose numbers declined sharply from the mid-1990s (Figure 1) and whose publication inclination might have shifted internationally. Pressure to publish in highly ranked international journals increased in Australia with the introduction of the research evaluation exercises in the 2000s. *Secondly*, four of the most frequently occurring national journals in Table 4 target school or teacher librarianship (*Orana, Access, Scan* and *Australian School Librarian*) suggesting a substantial contribution to the education of this sector in Australian LIS programs and, therefore, to research issues in school/teacher librarianship. In addition, two other international school library journals appear at the end of Table 4, each with 11 articles by Australian LIS academics. *Thirdly*, the majority of the journal titles are 'library science' oriented rather than 'information science' oriented, suggesting more library oriented subject areas in which Australian LIS research have focused from 1967-2008. *Fourthly*, the preponderance of journal articles in national journals may suggest that Australian LIS academics were somewhat hesitant to engage in the international LIS publishing arena, at least in the earlier decades of this study's time frame. The low numbers of journal articles retrieved from the three Thomson Reuters citation databases (*SSCI, SCI* and *AHCI*) would support this suggestion (see Table 3a).

Authorship of journal articles

There appears to be a rising trend in collaborative research and publication among Australian LIS academics as shown in Table 5. However; over all years, most (72%) of the journal articles are by one author, another 25% by two or three authors, and only about 3% had more than three authors. Over the entire period, there was an average of 1.4 authors ranging from one to 16 authors. An authorship study of the top two national journals (*Australian Library Journal* and *Australian Academic & Research Libraries*, Table 4) from 1985 to 1994 showed that 'not one of the research articles was the result of international collaboration' (Rochester, 1997). During the last ten years (1999 to 2008) when the number of LIS academics was declining (Figure 1), collaboration appeared to be increasing with only 58% of the journal articles by one author. A similar rising trend for collaboration among LIS academics in general has been noted (Park, 2008; Yan & Ding, 2009).

Table 5: The number and percentage share of journal articles by Australian LIS educators by the number of authors per article, in four time periods, 1967-2008; the mean number of authors in each time period is also shown.

No. of authors / jnl. article	Number and percentage of journal articles				
	1967-1978	1979-1988	1989-1998	1999-2008	All years
1	129 88.4%	527 83.5%	577 71.9%	377 57.5%	1610 72.0%
2	11 7.5%	79 12.5%	182 22.7%	163 24.8%	435 19.5%
3	4 2.7%	16 2.5%	31 3.9%	74 11.3%	125 5.6%
4	0 0%	4 0.6%	7 0.9%	27 4.1%	38 1.7%
≥ 5	2 1.4%	5 0.8%	5 0.6%	15 2.3%	27 1.2%
Total	146	631	802	656	2235
Mean number of authors	**1.21**	**1.24**	**1.37**	**1.72**	**1.42**

Author productivity

Table 6 shows the number of journal articles by LIS academics and the average number of years in academia based on an earlier study (Wilson et al., 2010). As stated above, 118 (31%) of the academics had not published any journal articles in journals indexed by the eight selected databases while in Australian LIS programs, and they served on average seven years as Australian LIS academics. Another 135 (35%) published from one to five journal articles only. The remaining 129 (34%) LIS academics contributed the bulk of journal articles for the years from 1967 to 2008. There was only a weak relationship between the years spent in LIS programs in Australia and for the number of journal articles published during that time span for the 382 academics with more than two years in academia.

Table 6: Productivity groupings of 382 educators (1967-2008), with average number of years of service in Australian LIS programs (1959-2008).

No. of journal articles/ author	No. of authors	Percentage of authors	Average no. of years in LIS programs
0	118	30.9%	7
1 to 5	135	35.3%	11
6 to 10	54	14.1%	13
11 to 20	45	11.8%	17
> 20	30	7.9%	17

The 14 most productive LIS academics with 30 or more journal articles are listed in Table 7. They account for over one-quarter (634) of the total number of journal articles. The years spent in Australian LIS programs ranged from 6 to 37 with a mean of about 21 years. For the average number of articles published per year while in an LIS program, Oliver, with the least number of years in academia outranked the other 13 academics. The first (Clyde) and second (Todd) ranked academics published primarily in school/teacher librarianship journals showing a strong relationship with the total number of articles in journals targeting school libraries (see Table 4); additionally, 79% and 51% respectively of their articles appeared in the two national databases (*ALISA* and *AEI+*). The next three academics tied for third place and while the first two academics (Gorman and Rochester) had 28% of their publications indexed in the national databases, the third academic (Wilson) had all publications indexed in international databases. The other nine academics had from 13% to 60% in either *ALISA or AEI+*, suggesting a preponderance of publications in national journals that were indexed in the two Australian national databases. An analysis of the percentage of articles in national journals support the database analysis: all but two academics – Wilson (13%) and Gorman (30%) – had from 57% to 86% in national journals (Table 7).

Related to the number of publications of each of the 14 most productive LIS academics is the acquisition of PhDs: four were obtained in the 1980s, seven in the 1990s and one in 2007. Thus nearly all top producers had PhDs; moreover, two of the top five academics obtained their PhDs in 1981 and the other three in the 1990s. It would appear that research productivity is related to not only obtaining a PhD, but having it early in one's academic career to foster research skills and further scholarly publications. This brief analysis of a few of the prolific LIS academics in Table 7 hints at the scatter and diversity of subject interest

(within and beyond LIS) and internationality of publications among the Australian LIS academics from 1967 to 2008.

Table 7 also provides the Australian institutions in which the top-14 academics spent years as LIS educators. Six of the academics spent from 3 to 21 years at CSU (Charles Sturt University); however, only Williamson remains at CSU but has a dual appointment with Monash University. Additionally, seven have spent from 6 to 37 years in only one Australian institution. Several of the LIS programs have closed during the fifty-year period: Townsville CAE, U Ballarat, U Canberra, UNSW, Adelaide CAE, UniSA, and U Melbourne. Since the end of the study period (2008), several new LIS programs have emerged, some in the same institutions as below: U Canberra and UniSA. (For a current list of the Australian Library and Information Association accredited courses in LIS, see *www.alia.org.au/education/courses/librarianship.html*.)

Table 7: Australian LIS educators from 1959-2008 with ≥ 30 journal articles each, in decreasing order of the number of articles authored from 1967-2008 while in Australian LIS programs. The Table also shows their approximate percentage of articles in national journals, total number of years served in Australian LIS programs, average number of articles per year of service, and the current name of Institutions served in (see below).

Rank	Name	No. articles	% articles in national journals	No. yrs. in progs.	No. articles/yr in progs.	Australian institutions with LIS programs, and in parentheses number of years spent in programs, in sequential order.
1	Clyde, L.A.	72	75%	13	5.5	Townsville CAE[a] (2); CSU (3); ECU (8)
2	Todd, R.	69	74%	11	6.3	UTS (11)
3=	Gorman, G.E.	47	30%	15	3.1	U Ballarat (2); CSU (13)
3=	Rochester, M.K.	47	68%	28	1.7	U Canberra (20); CSU (8)
3=	Wilson, C.S.	47	13%	27	1.7	UNSW (27)
6=	Henri, S.J.	44	61%	21	2.1	CSU (21)
6=	Nimon, M.P.	44	86%	34	1.3	Adelaide CAE[b] (10); UniSA (24)
8=	Maguire, C.J.	42	81%	37	1.1	UNSW (37)
8=	Oliver, R.G.	42	71%	6	7.0	ECU (6)
10=	Clayton, P.R.	41	83%	18	2.3	U Canberra (18)
10=	Middleton, M.R.	41	61%	28	1.5	UNSW (10); QUT (18)
12	Williamson, K.	35	60%	20	1.8	U Melbourne (7); RMIT U (1); Monash U / CSU (12)
13	Harvey, D.R.	33	70%	18	1.8	Monash U (7); ECU (2); CSU (9)
14	Genoni, P.W.	30	57%	16	1.9	CUT (16)

CAE = College of Advanced Education; U = University.
[a] Amalgamated with James Cook University (*www.jcu.edu.au)*.
[b] Merged with other institutions to form the University of South Australia (**UniSA** *www.unisa.edu.au*).
CSU = Charles Sturt University (www.csu.edu.au), **ECU** = Edith Cowan University (*www.ecu.edu.au*), **UTS** = University of Technology Sydney (*www.uts.edu.au*), **U Ballarat** (*www.ballarat.edu.au*), **U Canberra** (*www.canberra.edu.au*), **UNSW** = University of New South Wales (*www.unsw.edu.au*), **QUT** = Queensland University of Technology (*www.qut.edu.au*), **U Melbourne** (*www.unimelb.edu.au*), **RMIT U** = Royal Melbourne Institute of Technology University (*www.rmit.edu.au*), **Monash U** (*www.monash.edu.au*), **CUT** = Curtin University of Technology (*www.curtin.edu.au*).

Conclusion

This study investigated the research productivity of Australian LIS academics over a fifty-year period (1959 to 2008) as reflected in eight selected databases indexing literature pertaining to LIS to varying degrees. Searches were implemented using all the variant names

of each of 382 LIS academics with more than two years in Australian LIS programs, and publication surrogates were downloaded for analysis.

An interesting and useful product of the research was the information revealed about the databases in which Australian LIS research is indexed. Analysis of the results showed that few publications by Australian LIS academics were retrieved prior to 1980. Therefore, initiatives covering LIS publications pre-1980, such as, H. W. Wilson's *Library Literature & Information Science Retrospective* (*www.hwwilson.com/databases/liblit_retro.htm*) extending coverage back to 1905, are welcomed additions to the LIS literature databases. The coverage of Australian LIS publications varied markedly from database to database and a reasonably comprehensive coverage can be achieved when multiple databases are searched. Results of this study support the claim that research evaluation based on just one database (for example, *LISA*) or even a group of databases covering 'all' of knowledge, such as the three Thomson Reuters citation databases, will invariably miss a significant number of publications and, therefore, may draw incomplete conclusions. This was certainly the case with the Australian LIS academic cohort.

Moreover, the choice of a specific database for research evaluation, as for example *Scopus* for the 2010 ERA (*www.arc.gov.au/era*), will inevitably favor publications from specific subject disciplines, while being less favorable to other disciplines. At least in this study, it could be argued that while, for instance, the Thomson Reuters citation databases might provide sufficient coverage for some disciplines; this was not the case for LIS in an Australian context. Most likely disciplines where research is based on considerable international collaboration are better represented in large multidisciplinary databases than disciplines where research is more locally focussed as with Australian LIS. Furthermore, as the Australian LIS-specific database *ALISA* ceased in 2005, there is only the more general education database, *AEI+* covering Australian aspects of LIS research publications. Byrne (1983) pointed out nearly three decades ago that Australian research is in danger of being 'lost' or remain 'invisible'; this is still a possibility for LIS research publications. Alternately, Australian LIS educators need to publish in international journals (indexed in international databases) to gain visibility in the global research arena; since 2000, this practice has been increasing.

Other characteristics of the research output of Australian LIS academics found in this study include: (*1*) the relative dominance of journal material (articles and book reviews) with a mean of over 80% across databases, indicating the importance of journals in Australian LIS research productivity; (*2*) an increase in the average number of authors of journal articles over the years pointing to an increase in research collaboration; (*3*) a heavily skewed productivity distribution with nearly one-third of longer-serving academics producing no journal articles in the databases searched and a small number of longer-serving academics authoring or co-authoring over one-fourth of all the journal articles; (*4*) an overwhelming share of journal articles from national rather than international journals; and (*5*) a number of the prolific journals (as well as prolific educators) related to school or teacher librarianship.

In common with earlier LIS productivity studies of North American academics, this study reveals increases in research productivity over time, suggesting increases in academic effectiveness, in research output at least. Looking at the increase in publications, it becomes apparent that Australian LIS, like its contemporaries in LIS elsewhere, is maturing as a field of study and developing a larger body of research. Although research productivity is only one measure of faculty effectiveness, it is a necessary one. The production and publication of research helps the profession establish its foundations. Furthermore, the academization of Australian LIS educators has made solid gains through a firmly based tradition of scholarship.

Future research will look more closely at the profiles of the different LIS programs throughout the fifty-year period. Additionally, the subject-related variables of the 2,235 journal articles will be analyzed to provide insight into the development of LIS research topics in Australia over time.

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Appendix: Characteristics of eight databases used to search for publications by Australian LIS educators.

Database Code	Full Database Name	Time frame from which records were retrieved [*]	Database size: total number of records in time frame	Database subject scope; National (Australian) or International coverage
ALISA	*Australian Library and Information Science Abstracts*	1975-2005	11,537	LIS; National
LISA	*Library and Information Science Abstracts*	1966-2008	315,910	LIS; International
LISTA	*Library, Information Science and Technology Abstracts*	1959-2008	1,210,296	LIS; International
LLIS	*Library Literature and Information Science (formerly, Library Literature)*	1979-2008	335,373	LIS; International
AEI+	*Australian Education Index*	1959-2008	174,621	Education (including LIS); National
SSCI	*Social Sciences Citation Index*	1972-2008	4,862,843	Social sciences; International
SCI	*Science Citation Index*	1974-2008	28,201,171	Science, technology, engineering and medicine; International
AHCI	*Arts & Humanities Citation Index*	1980-2008	3,263,533	Arts and humanities; International

[*] Databases were searched either from 1959 or from the initial year of the database, to 2008 or in the case of *ALISA* to its cessation in April 2005. Journal articles by Australian LIS educators were retrieved from 1967 to 2008.