Much has been written about scholarly communication with studies investigating the drivers for research and publishing. For academics in particular, publication is a major determinant of a successful case for continuing employment, promotion and the winning of competitive research funding. The purpose of this paper is to inform understanding of publishing by Australian library and information studies (LIS) academics and practitioners. Records from a citation database were downloaded, cleaned, parsed and partially analysed in Excel; further analyses were performed in SPSS. The paper finds that, in line with publications in other fields, there has been an increase in the number of papers published, that the proportion of papers with more than one author has increased, and that the number of Australian and international authorship collaborations has increased.

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Patricia Willard, Mary Anne Kennan, Concepción S Wilson, Information Systems, Technology and Management, Australian School of Business, The University of New South Wales, Sydney 2052. E-mails: p.willard@unsw.edu.au; maryanne.kennan@unsw.edu.au; c.wilson@unsw.edu.au. Howard D White, College of Information Science and Technology, Drexel University, Philadelphia, PA 19104, USA. E-mail: whitehd@drexel.edu
Much has been written about scholarly communication, with studies investigating the drivers for research and publishing, the channels researchers use to communicate their ideas, research results and experiences, and the technological, social and political forces that enable change in this area. For academics, publication (particularly publication in international refereed journals) is a major determinant of a successful case for continuing employment, promotion and the winning of competitive research funding. The research reported here investigates publication patterns of Australian library and information studies (LIS) academics and practitioners over the period 1975-2006. Although the first Australian university LIS school dates from 1960, the growth in the number of schools and academic staff did not start until the 1970s, and it is probably fair to assume that a body of publication by staff affiliated to academic institutions began to appear from about the mid-seventies. A number of US studies have investigated the productivity of academic staff of American LIS programs. This project will follow a similar method to that used in four US studies which collectively covered the years 1966-2004. However, we are not looking at productivity; rather we aim for a bird’s eye view of the Australian LIS publishing scene. The Thomson Scientific (formerly the Institute for Scientific Information or ISI) Social Science Citation Index (SSCI) was used in these four US studies; however, in this study all three Thomson Scientific citation databases (Social SciSearch, SciSearch, and Arts & Humanities Search) are used to generate the publication data for this Australian project, which utilised data from journals included under the journal subject category ‘Information Science & Library Science (IS&LS)’. These data sources have a US bias and will miss some Australian material. To give more comprehensive coverage, the next stage of this project will include databases specific to LIS, as well as some Australian databases.

For this paper we aim to form the beginnings of a picture of publishing by Australian academics and practitioners in the IS&LS journal list. (In this paper we have accepted the broad journal subject category IS&LS to be equivalent to and/or include LIS.) The paper focuses on a quantitative analysis examining the number of documents (almost all of which were journal articles, hence articles, papers and documents are used interchangeably in this discussion), the numbers of authors per paper, the Australianness of the authors of the papers, and the broad disciplinary backgrounds of authors. From these beginnings we aim in future work to further analyse the nature and impact of IS&LS research and publications of Australian LIS academics.

LITERATURE

As indicated above, the dissemination of the work of scholars and academics has been considered from a number of perspectives in the literature. The overarching concern is with the scholarly communication process and is not limited to publication, but embraces all of the patterns of communication associated with discourse and dissemination. Specific disciplines have been investigated and, not
surprisingly, there are quite substantial differences in communication patterns between disciplines.\(^2\) Despite these differences, the number of publications in all fields (attributable to factors such as the accelerating growth in knowledge and pressure to achieve research status) has increased over time, particularly since the 1990s.\(^3\) In Australia’s case, Butler\(^4\) suggests that there is also a direct relationship between the growth in publication numbers and the Australian university funding regimes.

Although much communication between scholars is informal and involves processes for sharing ideas before formal publication (including participation in e-lists, seminars and presentation at conferences) publication in refereed journals is a very important part of the scholar’s life, and interest in it has led to studies of authorship, content and citation patterns.

As with the broader area of scholarly communication, authorship patterns differ between disciplines with, for example, higher incidences of multiple authorships in the physical sciences than the social sciences.\(^5\) However, the move toward more collaborative work is widespread.\(^6\) Butler\(^7\) reports that in 1981 only 11.4% of Australia’s publications involved international co-authorship, but by 1999 this had reached 34.9%, with indications that this percentage continues to rise. The rise in co-authorship has produced a literature addressing issues arising from it, including the need for clarity about final accountability for content and the ethical allocation of credit.\(^8\) Laudel\(^9\) cautions that analyses of co-authorship may not be straightforward and may reflect many different types of collaboration, or indeed other relationships altogether.

LIS has also experienced increased co-authorship in recent times, though it has not had a high level of this in the past. Harsanyi\(^10\) cites research findings based on College and Research Libraries showing a rate of less than 5% in 1939 to 1944, which increased to over 27% in 1975 to 1979. Lipetz\(^11\) reports that the relative proportions of single-authored and multiple-authored papers in the Journal of the American Society for Information Science (JASIS) shifted greatly over the period 1955-1995, with the percentage of papers with a single author declining from 70% in 1955 to 50% by 1995. Turning to Australia, Rochester\(^12\) surveyed research articles published in the Australian Library Journal and Australian Academic and Research Libraries over the period 1985-1994, focusing on characteristics of authorship. Her investigation found that the majority of authors wrote alone, that there was some collaboration within institutions, and that there were a very small number of collaborations over greater distances. She commented on the role internet communication would probably play in increasing collaborative writing.\(^13\) A recent investigation of authorship characteristics from the Asia and Pacific region for the period 1967-2005 ranked Australia as the most productive country.\(^14\) This study used as its data source the 20 top journals in the IS&LS category of Thomson Scientific Journal Citation Reports impact factors. Data was also gathered on the productivity of authors and collaboration patterns, including international collaboration.
Other aspects of authorship have also been explored, including institutional affiliations, gender difference, collaboration patterns, and the productivity of individuals and academic programs, a particular concern when investigating the work of academics. Content analysis and citation analysis have also informed investigations. Lipetz claims that the scholarship of JASIS articles increased over the period 1955-1995, basing this claim on the disappearance of papers lacking citations and an exponential growth in the average number of references per paper. Hayes used data from the Social Science Citation Index (SSCI) to investigate the productivity (defined for this and several subsequent projects as publication and citation) of US LIS faculty and programs. This work has been replicated. The results identified the LIS programs with the highest per capita rates of publication and most citations to journal articles, as well as individuals with the most journal articles in the investigated periods of SSCI. The limitation of using only one data source, and of SSCI in particular (for example, it does not include authorship of chapters in books or their associated citation records) are acknowledged. Pettigrew and Nicholls, using ten years of data (1982-1992), investigated the publication patterns of US LIS faculty and concluded that the presence of a doctoral program led to a higher rate of publication of refereed articles. Striking a note of caution, Meho and Spurgin reviewed studies of LIS school and faculty productivity and concluded that the restriction of data sources to one, two or even three databases led to inaccurate rankings and erroneous conclusions, as the literature is dispersed reflecting the increasingly multidisciplinary nature of LIS.

The move toward co-authorship is commented on in several further studies. Terry looked at authorship patterns in College and Research Libraries over the period 1939-1994, noting that co-authorship increased from 5% for the period 1939-1944 to 59.5% for the period 1989-1994.

We initially intended to look at Australian LIS academics and practitioners and their publishing practices. However, as we began to collect our data, it became evident that academics outside of LIS were publishing in the IS&LS subject category journals. We therefore question whether the issues facing the LIS profession (discussed elsewhere) may also be facing LIS publishing. Studies of the professions indicate that a central element of each is an accepted body of knowledge over which the profession claims unrivalled expertise. Abbott calls this the profession’s ‘jurisdiction’. Coupled with this is a system of certifying individuals who have mastered that body of knowledge.

From the 1980s librarianship and information science has been viewed as one of a number of information professions which exists in a turbulent environment in which other professions and academic disciplines vie for what librarians, and LIS academics, have seen as their traditional jurisdiction. Claiming, maintaining and reclaiming jurisdiction is an ongoing task for professions and the scholars associated with those professions. Macdonald, following Larson, characterises this task as being a significant element in the ‘project’ that professions engage in to maintain their identity. However, the intensity of activity in defining
jurisdiction varies from time to time: most intense as the profession is established, and when it is under some challenge from rival professions, as between computer science and possibly other fields, and LIS. We are interested to see if this contest of jurisdictions is evident in academic LIS research publications.

While there are a number of interesting issues arising out of the literature, for this paper we examine how aspects of authorship and co-authorship have changed over time. Specifically looking at Australian-authored papers in the IS&LS journal subject category of the three citation databases over the period 1975-2006, the propositions investigated are:

1. that there has been an increase in the number of papers;
2. that the proportion of papers with more than one author has increased;
3. that the number of Australian and international authorship collaborations has increased;
4. that the number of authors from other academic fields publishing in journals categorised as IS&LS is increasing.

METHOD

Our data sources were the three Thomson Scientific citation databases (Social SciSearch, SciSearch, and Arts & Humanities Search) using the Dialog Information Retrieval System (http://www.dialog.com/) for publications reporting original research as specified by the document type field (article, note, review or review bibliography) and subject content as specified by the journal subject category Information Science & Library Science (IS&LS). Dialog’s duplicate detection feature removed documents found in more than one of the citation databases. The Dialog Rank command was used to perform trend analysis over the period 1975 to 2006 on various fields of the data set: publication years, geographical locations for country productivity, and document types.

To track Australia’s share of the world’s publications in IS&LS during 1975-2006, nearly 1,000 bibliographic records were downloaded, cleaned and parsed in Microsoft Excel, then verified against the full-text publications before detailed analyses proceeded: 945 documents proved to be contributed by at least one author with an Australian address. For documents with two or more authors, the correct addresses were matched to the authors by sighting, as a minimum, the first and/or the last page of the records where addresses of authors are given. The 945 documents were grouped into contributions by at least one Australian LIS academic and contributions by non-LIS academics; Australian LIS practitioners and non-LIS practitioners; and contributions from researchers in research institutions such as the CSIRO (that is, neither academics in universities nor practitioners).

SPSS version 14 was used for the data manipulation and DeltaGraph was used for the generation of charts and tables.
Limitations

A major limitation of the project at this early stage is that only the citation databases are searched. Unlike the four studies mentioned above, which use names of LIS academics to provide a measure of research productivity, the journals included in the subject category IS&LS for the years 1975 to 2006 were searched for all publications with the geographical location Australia. At a later stage, we will search the citation databases by Australian LIS academics, as well as searching other LIS-specific and Australian-specific databases. We posit that restricting our data set to publications with the IS&LS journal subject category may disadvantage Australian (and other) LIS academics who publish in journals outside the strict ambit of IS&LS. In addition, it is recognised that none of the refereed Australian LIS journals are covered by Thomson Scientific and so many publications pertinent to the local situation will not be included; and the journal subject category IS&LS includes journals not considered suitable by traditional LIS authors, but more suitable for authors in associated fields such as information systems, medical informatics or computer science.

According to Hood and Wilson, limitations of the Thomson Scientific citation databases (as well as many other databases) include some of the following which have bearing on this study:

- Absence of the geographical location or corporate source fields;
- Incorrect assignation of countries (for example, Austrian institutions in the corporate source field, but Australian in the country field);
- Absence of journal subject category in publications;
- Incorrect representation of author names;
- Assignment of publications to separate countries belonging to one (for example, the UK includes England, Scotland, Wales, and Northern Ireland).

Limitations of the Dialog Information Retrieval System include the duplication detection feature. Depending on when this feature is invoked, results will vary slightly. We have limited the 'rid duplicates' command to work on the smallest data set possible so that publications having the same title but in different journals will not be removed.

In addition, Laudel cautions that in looking at co-authorships we are not necessarily looking at collaborations. We acknowledge this distinction; however, it is not possible from the data sources used to establish which papers are the products of either co-authorship or collaboration.

RESULTS AND DISCUSSION

After the removal of duplicate records, cleaning and parsing of the data into suitably small units for analysis, 945 documents having authors or co-authors with Australian addresses provided the basis for analysis. Almost all (893, or 94.5%) of these documents were journal articles, the remainder being reviews,
review-bibliographies or notes. The data, which spanned 32 years, is presented in four eight-year divisions in the following discussion. Another reminder should be made of the fact that the IS&LS journal category in the Thomson Scientific databases does not include any Australian journals.

Number of Publications

Over the 32 year time period the number of Australian-authored documents in the IS&LS category has been steadily increasing: from 130 in 1975-1982 to 390 in 1999-2006 (Figure 1). This is in line with our first proposition, and is not a surprising result as Australian universities have experienced substantial growth over this period. The result of increased publication is in accord with trends in other disciplines, the international literature on LIS publishing, and the expectations of academics, for various reasons, to publish. However, it should be noted that by the period 1999-2006 Australian LIS schools were shrinking in overall numbers as well as in the numbers of LIS academic staff.

Figure 1: Number of IS&LS Publications With at Least One Author with an Australian Address

Co-authorship

Our second proposition, that the proportion of papers with more than one author has increased, was also supported. This also is no surprise, as a number of overseas studies had foreshadowed this result; however, we were interested in the extent to which this trend was manifest among Australian authors. We found that within the journals covered by the Thomson Scientific category IS&LS, the single-authored paper has dropped from 80% of the Australian authored documents in the period 1975-1982 to about 34% in the period 1999-2006. A chi-square test indicates a high level of significance ($\chi^2 163.852$ with 9df with $p \leq 0.000$.)

The change from single authorship over the 32 years is revealing. In the first two periods, 1975-82 and 1983-90, there is no difference in the average number of
authors per paper – both have means of 1.25 authors per paper. But the mean number for 1991-98 is 1.61, and for 1999-2006 it is 2.15. Both of the latter are significantly different from the first two and also from each other (Figure 2). A simple analysis of variance indicates a highly significant change in the mean number of authors over time (F-test, p < 0.000).

Figure 2: Mean Number of Authors per Paper

Where do the Authors Come From?

The increase in co-authored Australian papers leads us to ask who is collaborating with whom. We find that not only is there a rise in the percentage of co-authored papers, but the nature of those co-authorships is changing. Australian authors are co-authoring more – not just with other Australian authors, but also with international authors – with similar increases in the numbers of Australian- and internationally-lead co-authorships (Figure 3). A chi-square test of the changes in authorship patterns over time revealed a high level of significance ($\chi^2$ 158.781 with 9df with p < .000). Single Australian-authored papers (OneAuthAus) have dropped from 80.8% of articles published in 1975-1981 to 33.8% of articles published from 1999-2006. Articles with more than one author now comprise 66.2% of Australian LIS publications, with 34.1% authored by more than one Australian author (MultAusAuth), 32% being international co-authorships, 15.1% where the first author is Australian (AusIntl) and 16.9% with international first authors (IntlAus). While this is slightly less than the reported 34.9% in 1999 reached by Australian publications generally, it does put IS&LS publications in the same sort of ball park. Butler reports that Australian-only authored and co-authored papers have an average citation per publication rate of 4.22, while internationally co-authored papers have an average citation per publication rate of 5.53. As citations are a metric to be considered in the proposed Research
Quality Framework, designed by the Australian Government to identify and reward the highest quality research, and LIS is to compete in the same field as other academic disciplines for funding, it behooves LIS academics to consider both the citation impact of articles they publish and the need to consider collaboration with international colleagues.

Figure 3: Australian and International Authorship Over Time

Backgrounds of Authors of Articles in the IS&LS Category

It cannot be concluded from the above findings that this increased publication over the period represents a proportional increase in publication by LIS academics. The IS&LS journal subject category has never been the sole preserve of LIS academics, and it includes journals such as the *Journal of Computer-mediated Communication*, *MIS Quarterly*, *Journal of the American Medical Informatics Association* and *Telecommunications Policy* in addition to many well-established mainstream LIS publications. So the next step in interpreting the results involves teasing out the relative growth of LIS and other fields such as Information Systems, and trying to track the breaking down of the boundaries between fields as seen through authorship collaborations and choice of journals in which to publish.

The raw numbers of publications of Australian LIS academics show an increase from 32 articles in the period 1975-1982 to 69 articles in the period 1999-2006, and that publication by Australian LIS practitioners has fallen from 52 in 1975-1982 to 43 in the period 1999-2006. When we look at the percentages in this Australian-authored IS&LS literature, a different picture emerges from that which assumes that the growth in publication by LIS academics is in accord with the overall trend. Australian authors publishing in the IS&LS journals are predominantly LIS academics (LIS_Acad), academics from other fields (Oth_Acad), LIS practitioners (LIS_Prac), other practitioners (predominantly from information systems and technology) (Oth_Prac) and others from predominantly research institutions such as the CSIRO (Other) (See Figure 4). The growth of literature by academics from other fields has been quite striking, while there has
been a relative fall-off by LIS academics and practitioners. A chi-square test shows these changes to be significant ($\chi^2 159.483$ with $12\text{df}$ with $p \leq 0.000$).

Figure 4: Backgrounds of Authors Publishing in Journals in the Thomson Scientific IS&LS Journals Subject Category

In the 1975-1982 survey period, 26.9% of articles in this category were authored by academics from disciplines other than LIS. However, by the period 1999-2006 this figure has grown to be more than 60%. This finding supports our fourth proposition, namely that authors from other academic fields are an increasing presence in journals categorized IS&LS. While we have looked at only Australian authors, it seems likely that this result would hold if a wider or total geographic selection was investigated. It is beyond the scope of this paper to pursue the legitimacy of the inclusion of particular journal titles in the category of IS&LS; however, a case could perhaps be made that Thomson Scientific has played a role in broadening the scope of what can be viewed as an area of relevance to the LIS profession. Thomson Scientific, through the IS&LS journal category, may be shaping the future of the LIS profession, placing it with other information fields.

The percentage of publications by LIS academics and by LIS practitioners in IS&LS journals has dropped. Is this an example of jurisdictional jockeying for territory, or evidence of something altogether different? Perhaps it is an indicator of the coming together of the information disciplines (as foreshadowed by the IS&LS categorisation). Of course, the shrinking of Australian LIS schools and the academic staff teaching courses relevant to LIS within schools has probably also played a part in decreased publication, as has the shrinking of professional staff numbers in many libraries. For at least the first two time periods, and probably also part of the third, the number of Australian LIS academics was increasing and the schools were maturing and offering a mix of programs at undergraduate, postgraduate diploma, masters and doctoral levels, a recipe which the overseas LIS literature suggests produces more publication from academic staff.
CONCLUSIONS
In line with the Australian literature on publishing across disciplines and the international LIS literature, the number of publications by Australian LIS academics has increased; however, their percentage of publications within the category IS&LS has decreased. For Australian LIS practitioners, both the raw numbers and percentages have both dropped. The numbers (and percentages) of co-authored publications in the IS&LS category have increased, and the numbers and percentages of Australian and international author co-authorships have also increased.

However, over the time investigated, the number and percentage of articles by non-LIS academics published in the Thomson Scientific journal subject category IS&LS has also dramatically increased. Questions regarding jurisdictional boundaries arise that at this point in time cannot be answered. Is it a result of Thomson Scientific, either consciously or unconsciously, broadening the scope of what can be viewed as an area of relevance to the LIS profession? Is this latter finding a result of the confluence of the information or ‘I’ fields?

This work begins an analysis of LIS publication in Australia as a case study of scholarly publishing. The focus is on characteristics of authorship – single or joint authorship, whether authorship is collaborative, institutional and geographic affiliations, and so on. The results thus far provide some input for deliberations among Australian LIS educators as they consider research assessment processes such as that being developed for ERA (Excellence in Research Australia). We are currently carrying out further research to provide a deeper assessment of publication performance and trends and guidelines for the future.

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NOTES
3. ibid p113.


13. ibid p227.


16. Hayes op cit; Budd op cit.

17. Lipetz op cit p994.


20. Pettigrew and Nicholls op cit.


23. Terry op cit p381.


30. ibid.

31. Laudel op cit.

32. C S Wilson Research in progress 2008

33. Butler ‘Explaining Australia’s Increased Share’ op cit.

34. ibid.


36. An election on 24 November 24 2007 (after the initial presentation and acceptance of this paper) saw the Australian Federal Government change from a Liberal/National Coalition to a Labor majority. The current state of research assessment in Australia is that on 24 December 2007 the new
Labor Government cancelled the RQF, and on 28 February 2008 proposed its replacement, ERA (Excellence in Research Australia). ERA is to be developed by the Australian Research Council in conjunction with the Department of Innovation, Industry, Science and Research. It is proposed that ERA will assess research using a combination of metrics and expert review conducted by committees of experienced, internationally-recognised experts. The proposed metrics component indicates that our statement still stands: LIS academics need to consider the citation impact of the journals they publish in. Retrieved from the Australian Research Council web site http://www.arc.gov.au/era/default.htm on 19 May 2008.