The study reported in this paper is part of a larger program of studies designed to review and renew the curricula of Library and Information Science (LIS) and the broader Information Management (IM) courses. This paper contributes to the larger program by examining the Australian job market for library and information professionals (IPs). The purpose of the paper is to analyse job advertisements as readily accessible indicators of the knowledge, skills and competencies required of IPs by employers and potential available roles. The paper presents current (2010) findings and compares them with trends identified in earlier Australian job advertisement content analyses based on data collected in 2004. The information revealed by the study may be utilised by educators to inform curriculum review and renewal. The method used is a content analysis of Australian job advertisements. The current advertisements were collected from web-based sources; ALIA's employment web pages and two national web job-boards, Seek and MyCareer.com. The text from job advertisements was analysed using a content analysis software package to identify a) current and potential employers of IPs and b) the potential roles available for IPs. The data revealed an increasing demand for IPs with records management skills, and skills in business content management, web management and other information management systems, indicating an increasing overlap with the field of information systems. The '-move to the generic-' identified as an emerging trend in 2004 has solidified in continuing demands for good interpersonal and communication skills, adaptability and flexibility, and IT and management skills.


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CHANGING TRENDS IN LIS JOB ADVERTISEMENTS

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ABSTRACT

The study reported in this paper is part of a larger program of studies designed to review and renew the curricula of Library and Information Science (LIS) and the broader Information Management (IM) courses. This paper contributes to the larger program by examining the Australian job market for library and information professionals (IPs). The purpose of the paper is to analyse job advertisements as readily accessible indicators of the knowledge, skills and competencies required of IPs by employers and potential available roles. The paper presents current (2010) findings and compares them with trends identified in earlier Australian job advertisement content analyses based on data collected in 2004. The information revealed by the study may be utilised by educators to inform curriculum review and renewal. The method used is a content analysis of Australian job advertisements. The current advertisements were collected from web-based sources; ALIA’s employment web pages and two national web job-boards, Seek and MyCareer.com. The text from job advertisements was analysed using a content analysis software package to identify a) current and potential employers of IPs and b) the potential roles available for IPs. The data revealed an increasing demand for IPs with records management skills, and skills in business content management, web management and other information management systems, indicating an increasing overlap with the field of information systems. The “move to the generic” identified as an emerging trend in 2004 has solidified in continuing demands for good interpersonal and communication skills, adaptability and flexibility, and IT and management skills.
INTRODUCTION

This study examines the structure and nature of the Australian job market for Library and Information Professionals (IPs), using content analysis of Australian job advertisements. The study reported in this paper is part of a larger program of studies designed to review and renew the curricula for LIS (Library and Information Science) / IM (Information Management) studies (QUT 2009). Job advertisements were searched for current and future potential employers of IPs and analysed to identify which skills employers are seeking. This paper’s findings are contextualised in longer-term trends in information professional work, through comparative analysis with earlier Australian job advertisement content analyses based on data collected in 2004 (Kennan et al. 2006, 2006b, 2006c).

The planning of education curricula for a 21st century IP workforce must consider an information world characterized by rapid change and sometimes short-lived trends, driven by new information delivery technologies and converging workplace practices. By comparing results with earlier studies, this study aims to identify which trends are continuing, whether skills perceived as emergent six years ago have become assumed competencies, and what skills currently appear to be emergent.

Thus, the study reported in this paper investigates job advertisements for information professionals. It analyses the knowledge and skills employers advertise for in roles that are suitable for information professionals. While not claiming to throw light on all aspects of the employment market, job advertisements are an easily available indicator of the short to mid-term direction of workplace demands for particular knowledge, skills and competencies (Cullen 2004; Kennan et al. 2006). The analysis of advertisements provides a window to what is currently wanted (required as well as preferred) and hence to what employers believe they need for the organisations to continue and thrive. It also enables educators to examine their courses in the light of these findings, to ensure that required needs are being met.

From this point this paper briefly examines the literature on LIS job advertisements and the skills and competencies identified. The paper then explains the study’s method and summarises the study’s findings through comparison with the earlier studies. It concludes
with a discussion on what trends appear to be continuing or changing, what skills are in demand that might be considered within the purview of LIS education, and what areas require further research.

RELATED LITERATURE

Since the late 1980s, studies including content analyses of job advertisements, workforce planning reports and graduate and employer surveys have revealed an increasing diversity of employment opportunities within the information professions. These suggest that a significant proportion of LIS/IM graduates are employed in new information roles in traditional library contexts, for example, as digital librarians (Choi and Rasmussen 2009; Tammaro 2009) or metadata professionals (Park 2009). Furthermore, surveys of graduate destinations and employers suggest a “recent trend of employment opportunities for librarians or ‘information managers’ growing and diversifying” (van Wanrooy 2006, p.16). Other collecting and non-profit institutions, consulting companies, government departments and corporations in a range of sectors increasingly employ “information specialist” skills (Abell et al. 2006; Hall and Abell, 2006). Accordingly, LIS/IM graduates may also find work in “non-traditional” contexts. One 2002 Australian graduate destination survey found that 32.7% of graduates went into non-Librarianship roles, including Records Management (16.8%), Archives (4.7%), Computing and Information Systems (0.9%), and “Other information work” (10.3%, more than half of which involved Research) (Genoni and Smith 2005b).

Consequently, LIS/IM curriculum responsibilities have evolved towards “educating graduates to work in broader information environments and to consider new career paths in non-traditional agencies and organizations” (Yu and Davis 2007) and an “… increasingly converged professional landscape” (Hider et al. 2011). Crucial to these efforts is an understanding of how this professional landscape has changed and what skills are required for the new paths it may afford. This study identifies these “new career paths” with current and future potential employers of mid-career LIS/IM graduates (i.e. those with more than one year’s experience in the field), focusing on what skills these employers associate with the IP skillset through their expressed requirements as stated in job advertisements.
The first task is to propose a definition of “information professional” (IP). Australian and New Zealand Standard Classification of Occupations (ANZSCO) defines the group ‘Information and Organisation Professionals’ as follows:

“Information and Organisation Professionals support organisations, government, individuals and the community by analysing, organising and managing information and data, and by providing advice on policy, business and organisational methods” (Australian Bureau of Statistics 2009).

The U.S. based Special Libraries Association (SLA) report on competencies for Information Professionals of the 21st century offers an alternative but similar definition:

”An Information Professional (“IP”) strategically uses information in his/her job to advance the mission of the organization. The IP accomplishes this through the development, deployment, and management of information resources and services. The IP harnesses technology as a critical tool to accomplish goals” (Abels et al. 2003, p.1)

For the purposes of this study IPs are defined as those who:

assist organisations, government, individuals and the community to employ information strategically by analysing, organising and managing information and data, and by advising on, developing, deploying, and managing information resources, services, policy and technologies.

IPs are frequently referred to by names which refer to the roles they perform. Role-based names were initially developed with reference to ANZSCO “Information and Organisation Professionals sub groups”, and include “Archivists, Curators and Records Managers, Librarians, Management and Organisation Analysts, Intelligence and Policy Analysts and Other Information and Organisation Professionals” (Australian Bureau of Statistics 2009).

The Australian Library and Information Association (ALIA) list of potential roles includes:

librarian, teacher-librarian, library technician, research officer, information consultant, customer service officer, program manager, data researcher, corporate librarian, team leader, community information officer, information or knowledge broker, managing director, library educator, circulation officer, lecturer, web
manager, policy manager, library educator, national librarian, state librarian and parliamentary librarian. (ALIA 2010)

The Special Libraries association (SLA) report notes that “IPs include, but are not limited to librarians, knowledge managers, chief information officers, web developers, information brokers, and consultants” (Abels et al. 2003 p.1). Furthermore other studies have proposed roles for IPs. Ashcroft (2004) considers that librarian’s skills are adaptable to the roles of intranet manager, webmaster, content manager, knowledge manager and competitive intelligence analyst. Fisher’s paper for CILIP (2004) also identified knowledge manager as an IP role, along with information architect. Gordon (2009) notes that “many librarians also pursue newer career paths enabled by technology, which can range from having responsibility for implementing Web 2.0 technologies to managing an institutional repository.” She adds that

Librarianship can also be a great foundation for information-related careers in general; the skills you gain are directly transferable to a number of alternative careers, such as knowledge management, data mining, or competitive intelligence ...

Library vendors... often seek people with library and technical or library and training backgrounds. Some librarians... run research, indexing, records management, database, training, or other information-related businesses. (para. 9)

Descriptions of IP roles in sources such as job advertisements also can enable us to understand the various roles that can be assumed by an IP. Content analysis of job advertisements is an established methodology for researching the needs of employers in the LIS/IM field. As Clyde (2002) states “… job advertisements represent the knowledge and skills that employers would like to have and are prepared to pay for” (p.155). In the last decade alone many studies have been conducted in Australia (Kennan et al. 2006, 2006b, 2006c; Pember 2003), and internationally (Choi and Rasmussen 2009; Clyde 2002; Fisher 2004; Hall and Abell 2006; Park and Lu 2009).

Particularly relevant in the Australian context were the studies undertaken at the University of New South Wales (UNSW). Kennan et al. (2006, 2006b) carried out content analyses of job advertisements collected from the Sydney Morning Herald (SMH) and The Australian,
and their associated job search of web sites over eight weeks in 2004. These studies (especially Kennan et al. 2006c; cf. 2006, 2006b) also compared a subset of the 2004 data (SMH, print advertisements) with snapshots of job advertisements from the Sydney Morning Herald in 1994, 1984 and 1974. Although “data gathering focused on positions calling for professional level LIS skills”, primarily in academic, special and public libraries, it was their “intention to include any identifiable non-traditional positions” and “advertisements which did not specifically mention the word ‘librarian’” were also included if they “used professional level LIS skills.” (Kennan et al. 2006c, p.18, p.22). Indeed they found that “sometimes advertisements look for librarians with these skills; sometimes advertisements look for people with these skills, irrespective of whether they are a librarian or not and whether or not the place of employment is a library” (Kennan et al. 2006c p.34). Job advertisements had changed over the decades from “brief simple ads” in 1974 that “assumed we knew what it meant to be a librarian, to long wordy ads for multi-skilled information related jobs in 2004” (Kennan et al. 2006b, p.129). Key trends over the thirty years to 2004 were:

“a growing lack of clarity about what comprises the established skill set of LIS workers, with the jobs advertised in 1974 all calling for skills and competencies clearly within the LIS domain, whereas by 2004 less than half of positions advertised asked for established LIS skills. Technological change (for example, high incidence of requirements for Web Design and Maintenance, and E-Resources) has profoundly influenced the LIS field of employment, as have Behavioural Characteristics and Interpersonal Skills required to operate in an increasingly technological and changing environment, and Management skills are increasingly in demand” (Kennan et al. 2006, p.189-190).

One finding of the UNSW studies’ was a requirement for web design and maintenance skills in some library and information-service based roles. This lead to the question:

“What aspects of web management is LIS claiming as its jurisdiction? … a book like Rosenfeld’s and Morville’s (2003) text on information architecture suggests there are [sic] a number of candidates. The level of interest evident in the regular practitioner
literature in LIS would indicate that at least some claim is underway. The ads themselves indicate that they expect the ‘Web Design and Maintenance’ skills to be generally within the existing confines of the LIS or information management context. For example, they specify attributes such as ‘web authoring and content editing for the web’ ... or ‘knowledge and understanding of content management systems’” (Kennan et al. 2006b, p.131).

Information Architecture and/or User-Centred Information Design roles (or “IA/UCD” in job ads) had barely emerged in 2004, although the applicability of “Information Architecture” to the LIS/IM discipline was beginning to be raised. Certainly, a relationship between LIS and web information design (often referred to as “web design” but taken here to mean information design rather than graphical design) received and continues to receive considerable support in the literature (Choi and Rasmussen 2009; Fisher 2004, Gutsche 2010; Hall and Abell 2006; McCarthy 2005; Sanders 2008). Tammaro (2007) notes that “cataloguing and classification skills have much relevance to the web... a more thorough knowledge of the major schemes and their working principles is required to allow a person to adapt and accommodate existing metadata schemes to use, and to possess the basic expertise to construct new schemes” (p.237). Abell and colleagues found that “research suggests that two types of role offer the greatest number of work opportunities in the near future: information architecture and content management” (2006, p.249).

This study revisits the questions posed by Kennan et al. (2006b) concerning what areas of web management skills are relevant to LIS/IM; whether information architecture or content management have in fact emerged in any quantity as role categories in the job market, and to what degree are information architecture and content management skills found to be aligned with other LIS/IM skills.

**RESEARCH QUESTIONS**

1. What current and potential roles exist for Information Professionals in the Australian job market?

2. Which skills appear to be demand and which in decline?
3. How have trends identified as emergent in the 2004 data developed over the intervening six years?

RESEARCH DESIGN

This study uses the technique of content analysis to analyse job advertisements to investigate what roles, and the knowledge and skills within those roles, that employers are advertising when they are searching for information professionals. An assumption underlying this investigation is that the content of job advertisements provides a valid representation of those roles. This section explains how the research was designed and conducted.

DATA COLLECTION

For this study, conducted in 2010, advertisements were sourced from jobs advertised Australia-wide, rather than Sydney only. Furthermore, due to the requirements of the broader project of which this study is a part, paraprofessional roles and teacher librarian roles were included in the 2010 data, but not in the 2004 dataset. Thus, the data collected for this study differed in some key aspects to that of the UNSW studies.

The internet is now arguably the major (although not the only) platform for job advertising. Accordingly, job advertisements were collected from web based sources: ALIA’s employment webpage and the web job-boards Seek and MyCareer. Thus the 2010 dataset was from online sources, while the 2004 dataset included both print and online advertisements. However 2010 advertisements on the Mycareer site were often also published in Fairfax papers, and were sometimes scans of print advertisements.

The literature informed the study’s criteria for selecting which job advertisements to collect. As one aim of the study was to identify future potential employers of LIS graduates, the criterion that job advertisements require LIS/IM qualifications could not be applied. Instead role and skill-based selection criteria were developed. This study used the rule devised by Hall and Abell, that at least “50% of duties should be characterised as information or knowledge management” for a job ad to warrant inclusion (Hall and Abell 2006, p.1). "Information or knowledge management” duties were those employing the types of
information skills currently covered in Australian LIS/IM programs. An additional caveat was that the advertisement should not require qualifications in another discipline. So, for example, advertisements requiring ‘web development’ skills were excluded if they required Computer Science or IT degrees; were more than 50% IT focused; or required skills beyond basic level scripting, encoding and query languages such as HTML, CSS, Javascript and SQL.

Job advertisements selected according to skill-based criteria were included because the job specifications indicated predominantly the kind of knowledge and skills Australian-educated IPs would have.

Two sampling periods were chosen. The first two week period of data collection took place during February/March 2010, following the summer vacation. Further job ads were collected during a one week period in early-mid June 2010, a period when hiring typically increases due to the need to ‘spend it or lose it’ before the imminent end of financial year.

Advertisements were de-duplicated (Kennan 2006), and if a job advertisement was accompanied by a position description document, this was also collected, although only the component (usually selection criteria) referenced by the advertisement was included in the analysis.

To ensure confirmability and dependability (Lincoln and Guba 1985, p.323, Pickard 2007, p. 21), an auditing approach was necessary. A reference group of professionals whose backgrounds included Library and Information Knowledge Management (IKM) practice and LIS/IM academia provided feedback on data collection and throughout the research process (Bryman 2008, p.378). The data collected was also filtered by a researcher from the original 2004 team (Kennan et al. 2006, 2006b, 2006c) to ensure consistency. To ensure the credibility of the methodology and concepts being developed, two Sydney-based recruiters in the LIS/IM field were also interviewed for triangulation and member validation purposes (Bryman, 2008). A total of 441 advertisements were collected (Table 1).

**TABLE 1. NUMBER OF JOB ADVERTISEMENTS COLLECTED**

<table>
<thead>
<tr>
<th>Job group</th>
<th>Sub group</th>
<th>Count</th>
<th>% age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library (sub-categorised as in Hallam (2008))</td>
<td></td>
<td>172</td>
<td>39</td>
</tr>
<tr>
<td>Public</td>
<td></td>
<td>54</td>
<td>12</td>
</tr>
<tr>
<td>University</td>
<td></td>
<td>42</td>
<td>9</td>
</tr>
</tbody>
</table>
DATA ANALYSIS

Despite the noted differences, the 2004 and 2010 datasets were sufficiently similar to warrant a comparative analysis by using the same analytical methods, content analysis, as the UNSW studies, in order to discern trends in the IP market place over the period 2004 to 2010. Content analysis is a technique through which content, for example text or images, are examined in a systematic way. Content analysis begins with pre-defined categories developed from previous literature, which are iteratively extended and refined through the analysis (Ezzy 2002). The analysis involves counting how often words, phrases or themes appear individually or in combinations. The results are then organised systematically for quantitative analysis of the text’s content. Content analysis is a frequently used descriptive technique (Neuman 2006).

Firstly, the same data analysis programs used by the 2004 study (Provalis Simstat and Wordstat), were used to undertake an analysis of the 2010 data. Initially the categorisation dictionary developed by Kennan et al. (2006, 2006b, 2006c) was used. This categorisation dictionary was created from a combination of sources including:

- counts of the most frequently mentioned terms in the selected advertisements for the 2004 study;
- a literature review; and
- our own knowledge of the LIS industry (Kennan et al. 2006, p.183).
Next, since each of these three sources had changed in the intervening six years, the categorization dictionary was updated to reflect term frequencies in the 2010 data, recent literature and changes in the industry.

A second phase of analysis was then conducted using the updated categorization dictionary. The results of both analyses are presented in the findings below.

FINDINGS

1. COMPARISON USING ORIGINAL CATEGORIZATION DICTIONARY

Table 2 illustrates the categories from the 2004 categorisation dictionary ranked by frequency for the 2004 and 2010 datasets, including the difference in rank order.

Several observations can be made. Firstly, Interpersonal Skills and Behavioural Characteristics remain unchallenged as the most frequently required competencies. Despite the broader range of non-traditional roles reflected in the 2010 dataset, Technical Services (including cataloguing, metadata, collection management and database management) has moved up one rank position while Client Services (including customer, service delivery, user service) has moved up three rank positions, suggesting the applicability of these skills across a wide range of IP roles.

Perhaps most dramatically, Archives and Records Management Skills have moved up ten rank positions in terms of demand, reflecting the widespread needs of both the public and private sectors to comply with more stringent regulatory regimes and governance and reporting requirements (Colwell, 2007; Abell et al. 2006; Hall and Abell 2006).

Requirements for Generic IT Skills have risen three rank positions, while skills with Eresources (digital resources, electronic resources, Factiva, Bloomberg etc) rose two ranks, reflecting the increasing ubiquity of digital information and technology. Programming Languages (HTML, XML, SQL etc) and Web Design and Maintenance rose seven and four rank positions respectively, however, as previously discussed, a wider range of web-based information roles were collected for the 2010 dataset.
Integrated Library Management Systems and Reference Services reflected a significant drop in ranks in the 2010 data, dropping seven and eight rank positions respectively. This will be investigated further in the second phase of analysis.

**TABLE 3. 2010 CONTENT ANALYSIS CATEGORIES, WITH EXAMPLES**

<table>
<thead>
<tr>
<th>Category label (ordered by frequency)</th>
<th>2004 rank</th>
<th>2010 rank</th>
<th>Difference in rank</th>
<th>2010 rank order (on frequency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpersonal Skills</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>Interpersonal Skills</td>
</tr>
<tr>
<td>Behavioural Characteristics</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>Behavioural Characteristics</td>
</tr>
<tr>
<td>Management</td>
<td>3</td>
<td>6</td>
<td>-3</td>
<td>Technical Services</td>
</tr>
<tr>
<td>Technical Services</td>
<td>4</td>
<td>3</td>
<td>+1</td>
<td>Client Services</td>
</tr>
<tr>
<td>Environment</td>
<td>5</td>
<td>9</td>
<td>-4</td>
<td>Archives and Records Management</td>
</tr>
<tr>
<td>Reference Services</td>
<td>6</td>
<td>14</td>
<td>-8</td>
<td>Management</td>
</tr>
<tr>
<td>Client Services</td>
<td>7</td>
<td>4</td>
<td>+3</td>
<td>E-resources</td>
</tr>
<tr>
<td>Common Workplace Requirements</td>
<td>8</td>
<td>12</td>
<td>-4</td>
<td>Web Design and Maintenance</td>
</tr>
<tr>
<td>E-resources</td>
<td>9</td>
<td>7</td>
<td>+2</td>
<td>Environment</td>
</tr>
<tr>
<td>Generic Skills</td>
<td>10</td>
<td>16</td>
<td>-6</td>
<td>Generic IT Skills</td>
</tr>
<tr>
<td>Integrated Library Management Systems</td>
<td>11</td>
<td>18</td>
<td>-7</td>
<td>Programming Languages</td>
</tr>
<tr>
<td>Web Design and Maintenance</td>
<td>12</td>
<td>8</td>
<td>+4</td>
<td>Common Workplace Requirements</td>
</tr>
<tr>
<td>Generic IT Skills</td>
<td>13</td>
<td>10</td>
<td>+3</td>
<td>Knowledge Management</td>
</tr>
<tr>
<td>Information Services</td>
<td>14</td>
<td>17</td>
<td>-3</td>
<td>Reference Services</td>
</tr>
<tr>
<td>Archives and Records Management</td>
<td>15</td>
<td>5</td>
<td>+10</td>
<td>Hardware</td>
</tr>
<tr>
<td>Hardware</td>
<td>16</td>
<td>15</td>
<td>+1</td>
<td>Generic Skills</td>
</tr>
<tr>
<td>Knowledge Management</td>
<td>17</td>
<td>13</td>
<td>+4</td>
<td>Information Services</td>
</tr>
<tr>
<td>Programming Languages</td>
<td>18</td>
<td>11</td>
<td>+7</td>
<td>Integrated Library Management Systems</td>
</tr>
</tbody>
</table>

2. **Analysis with updated categorization dictionary**

Changes in categories are presented in the updated categorization dictionary (Table 3).

**TABLE 3. 2010 CONTENT ANALYSIS CATEGORIES, WITH EXAMPLES**

<table>
<thead>
<tr>
<th>Category label</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioural Characteristics</td>
<td>adaptability, lifelong learning, commitment, confidence, work ethic, creativity, time management, enthusiasm, flexibility, problem solving, self-motivation, organisational ability, analytical skills</td>
</tr>
<tr>
<td>Interpersonal Skills</td>
<td>communication skills, collaboration, conflict resolution, mentoring, negotiation, teamwork, listening, written skills</td>
</tr>
<tr>
<td>Client Activities</td>
<td>client/customer/user service, client/customer relationship, client/customer/user support, client/customer/community focus, quality service, service levels, service delivery, support officer, support services, marketing, promotional, presentation skills</td>
</tr>
<tr>
<td>Management</td>
<td>staff management, human resources, change management, recruitment, performance appraisal, supervision, project management/manager, strategic planning, leadership, library management, budgeting, financial management, team leader</td>
</tr>
<tr>
<td>Generic IT Skills</td>
<td>computer, email, information systems, internet, Microsoft, Ms_office, Ms-windows, network, pc, printer, scanner, software, spreadsheet, technology skills, web applications, web technologies, IT, hardware</td>
</tr>
<tr>
<td>Instructional Services</td>
<td>staff/client/customer/user/public training, instructional, lecturer, pedagogical, teacher librarian, trainer, training materials / programs / sessions, information literacy, bibliographic instruction, seminars</td>
</tr>
<tr>
<td>Records</td>
<td>census, disposal, document control, document management, FOI, record analyst / manager / officer / coordinator / keeper, record keeping, records act, records management, sentencing, archiving,</td>
</tr>
<tr>
<td>Management</td>
<td>EDRMS, EDMS, DMS, Filenet, OpenText, Trim, Documentum</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>Reference Services</td>
<td>information retrieval, database/online search, environmental scan, literature search, reader services / advisory service / desk /techniques / librarian / work / interview, research</td>
</tr>
<tr>
<td>Cataloguing, Classification Metadata</td>
<td>AACR2, cataloguer/ing, categorise, classification, classify, controlled vocabularies, encoding standards, LCSH, MESH, Research data commons, subject headings, thesaurus/i, UDC, DDC, MARC, Metadata, Darwin Core, EAD, harvesting, RDA, Dublin, DC, Dewey, Rights Data</td>
</tr>
<tr>
<td>Information and Knowledge Management</td>
<td>information specialist / analyst / manager / director / coordinator, information management / skills / access / aggregation / applications / flow / integrity / lifecycle / practices / strategy / requirements / sharing / solutions / services / types / sources / assets / resources, knowledge management, KM, knowledge manager / analyst / administrator, knowledge / information audit, knowledge centre, corporate information, knowledge base, knowledge sharing</td>
</tr>
<tr>
<td>Library Activities</td>
<td>information desk, library service / operation / program, library technician, exhibitions, outreach, community program / events, shelving, working with children, driving license, displays, programs and events, library activities, reader service, library materials / resources</td>
</tr>
<tr>
<td>Data Services</td>
<td>data management / analysis / cleansing / curation / migration / mining / quality / reuse / model, storage, database</td>
</tr>
<tr>
<td>Business Analysis</td>
<td>functional requirement/specification, gap analysis, process map/model, business / process analysis/analyst, functional/business specification, business requirements, process re-engineering, requirements gathering/specification/analysis, UAT, flow diagrams, use case, workflow, business improvement, continuous improvement</td>
</tr>
<tr>
<td>User-centred Information Design</td>
<td>information architect/ure, CSS, DHTML, HTML, user experience, heuristic review, information design, IA, personas, site map, taxonomy, usability, user centred/centric, accessibility, user journey, user scenario, UX, navigability, web 2.0, wireframe, social media, XML, SEO, web authoring</td>
</tr>
<tr>
<td>Collection Management</td>
<td>acquisition, digital archive/collection, archival materials / program, national/state/trusts/university archive, digital pictures, archivist, heritage, curation, artifacts, preservation, tape librarian, repository, digitisation, scanning, publications, serials, book, accession, binding, collection development / management, deselection, intellectual property, interlending, inter-library, rights management, subscriptions, licensing, copyright, circulation</td>
</tr>
</tbody>
</table>

The 2004 category E-resources had become redundant, as virtually all advertisements referred to ‘digital’ and/or ‘electronic’ resource environments. Library-specific ‘E-resources’ skills (e.g. Factiva or Dialog) were instead grouped with Library Systems. The library term ‘Technical Services’ was replaced with the category Cataloguing, Classification Metadata in recognition that these skills may apply beyond the library context. Collection Management also became a separate category, due to its significance beyond libraries, in archives and other collecting institutions (for example, media and arts organisations, museums). The 2004 library-oriented category ‘Client Services’ became Client Activities, again in recognition that these skills were required across virtually all IP job advertisements. Library-
specific aspects of ‘Client Services’ and some ‘Generic Skills’ (such as ‘driver’s license’, required only in Library roles) were captured under Library Activities.

‘Knowledge Management’ became Information and Knowledge Management and a new category Data Services was created to capture skills associated with emerging data curation and management roles (Prowse et al. 2008). Instructional Services was a new category representing the requirements to provide instruction, training or teaching in any organizational context. Hardware was now included in the Generic IT Skills category.

The 2004 category ‘Web Design and Maintenance’ was replaced. As previously noted, ‘web design’ is misleading misnomer when the domain of IPs is information design and management for web information delivery. This should not be conflated with graphic design nor web development, but is focused on understanding and capturing user’s information needs in context to ensure effective and meaningful information delivery. LIS/IM training uniquely offers “understanding of the ‘Tools of the mind’ for thinking about and using information”, as well as “experience in applying consistent structure and standards to help people access and use information, all of which is applicable to the development of useful information products” (Orna 2007, p.10). Disintermediation has not eliminated the intermediary role of IPs but relocated it, such that if information delivery occurs via technology, IPs now “need to become involved in tool building in order to be sure that content is accessible in ways that are meaningful to users” (Danner 1998, p.351).

Furthermore, contextualised information needs may involve individual and/or collective sense-making (e.g. the human information practices involved in team workflows). Attempts to implement information management systems, for example, electronic document and record management systems (EDRMS) have “brought to light the highly complex human processes involved in managing document and information management life cycles” (Abell et al. 2006, p.244), suggesting the applicability of LIS/IM skills in the implementation of organisational information architecture, systems and strategy. This practice may overlap somewhat with the Information Systems (IS) domain, but there is an argument to be made that the LIS discipline has a greater historical and jurisdictional claim on analysis of human
sense-making practices than IS, which is more closely aligned with Computing (Danner 1998).

Three new categories were created to reflect these roles for IPs in the new 2010 categories (Table 3):

- **Content Management and Delivery** (managing content in an enterprise or WWW context), including terms from the 2004 “Web Design and Maintenance” category.

- **User-centred Information Design**, or UCID (user-centric structuring of information for delivery to individuals), in which some basic “Programming Languages” from the 2004 category were included, and

- **Business Analysis** (business-centric structuring of information to deliver business objectives).

Applying these categories resulted in the following frequency counts and percentages of case occurrence (i.e. advertisements) per category.

**TABLE 4. 2010 CATEGORIES RANKED BY % CASE OCCURRENCE**

<table>
<thead>
<tr>
<th>Category</th>
<th>FREQUENCY</th>
<th>n CASES</th>
<th>% CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioural Characteristics</td>
<td>1048</td>
<td>331</td>
<td>76.1%</td>
</tr>
<tr>
<td>Interpersonal Skills</td>
<td>909</td>
<td>323</td>
<td>74.3%</td>
</tr>
<tr>
<td>Generic IT Skills</td>
<td>575</td>
<td>227</td>
<td>52.2%</td>
</tr>
<tr>
<td>Client Activities</td>
<td>444</td>
<td>221</td>
<td>50.8%</td>
</tr>
<tr>
<td>Management</td>
<td>481</td>
<td>215</td>
<td>49.4%</td>
</tr>
<tr>
<td>Information and Knowledge Management</td>
<td>497</td>
<td>176</td>
<td>40.5%</td>
</tr>
<tr>
<td>Reference Services</td>
<td>295</td>
<td>138</td>
<td>31.7%</td>
</tr>
<tr>
<td>Records Management</td>
<td>754</td>
<td>132</td>
<td>30.3%</td>
</tr>
<tr>
<td>Instructional Services</td>
<td>431</td>
<td>131</td>
<td>30.1%</td>
</tr>
<tr>
<td>Library Activities</td>
<td>294</td>
<td>130</td>
<td>29.9%</td>
</tr>
<tr>
<td>Content Management &amp; Delivery</td>
<td>463</td>
<td>122</td>
<td>28.0%</td>
</tr>
<tr>
<td>Collection Management</td>
<td>279</td>
<td>121</td>
<td>27.8%</td>
</tr>
<tr>
<td>Business Analysis</td>
<td>263</td>
<td>117</td>
<td>26.9%</td>
</tr>
<tr>
<td>User-centred Information Design</td>
<td>513</td>
<td>116</td>
<td>26.7%</td>
</tr>
<tr>
<td>Data Services</td>
<td>288</td>
<td>106</td>
<td>24.4%</td>
</tr>
<tr>
<td>Cataloguing Classification Metadata</td>
<td>144</td>
<td>65</td>
<td>14.9%</td>
</tr>
<tr>
<td>Library Systems</td>
<td>140</td>
<td>64</td>
<td>14.7%</td>
</tr>
</tbody>
</table>
Table 4 shows that the first five skills called for across the 2010 dataset are generic skills (Behavioural Characteristics, Interpersonal Skills, Generic IT Skills, Client Activities and Management) rather than skills that could be considered the jurisdiction of the information professions (Information and Knowledge Management, Reference Services, Collection Management, etc.) (Kennan et al. 2006c), so it would appear that “the move to the generic” (Kennan et al. 2006b, p.130) remains a factor.

The top ranked ‘jurisdictional’ skill, perhaps because of the generality of its terms (refer to Table 3), is “Information and Knowledge Management”. In this analysis of the data, “Reference Services” ranks relatively highly among jurisdictional skills, perhaps because of the inclusion of ‘research’ skills, which were in demand across a number of roles. This was born out in interviews with recruiters in the LIS/IM market, who cited research as a growth area.

“Records Management”, while representing only 20% of jobs collected, was represented in 30.3% of cases, reflecting the impact of legislative requirements with regard to record-keeping on other LIS/IM roles. Examples of this included librarian and information management job advertisements which, while not nominally records management roles, included aspects of record keeping among IPs’ duties.

‘Instructional’ skills were required in 30.1% of the entire dataset, far more than the 6% accounted for by teacher librarian positions (Table 1), which are inherently instructional. Requirements for instructional skills were noted in interviews with recruiters as experiencing an increase in demand across a range of IP roles, whether in libraries, corporate information management or records management roles:

“... every role just about, there’s a training aspect.”

“Most roles these days have some element of training, particularly if they’re in a senior position”

Library roles represented 39% of the job advertisements collected (Table 1) and 29.9% of jobs mentioned requirements for experience with generic “Library Activities”. “Collection Management” terms were identified in only 28% of advertisements, possibly due to the
larger representation of other forms of information management, such as content management and records management in the dataset.

The incidence of requirements in the categories “Content Management & Delivery”, “Business Analysis” and “UCID” ranged between 28% and 26.7% of cases. This suggests, as previously discussed, that involvement in creating enablers or “tools” for information delivery in context may indeed be a relevant concern for IPs. Data Services requirements, (24.4% of cases), may be more a reflection of the inclusion of the term “database” in this category, rather than an increasing requirement for data manipulation or curation skills. Further study would be required to determine trends in this area.

The relatively low incidence of requirements for “Cataloguing, Classification and Metadata” skills (14.9%) was inconsistent with interviews with recruiters who indicated that cataloguing skills were required in the market. However the interviews also implied that this may be more of a supply-side issue rather than an issue of demand. The recruiters reported that Libraries increasingly purchase catalogues from commercial sources, thus denying many librarians the opportunity to develop solid cataloguing skills, so that when cataloguing skills are sought (often by Library database providers), this experience is hard to come by.

The low requirement for “Library Systems” experience (14.7%) can also perhaps be explained by reference to recruiter interviews:

“It (recruitment) used to be very much focused on particular systems, but that has eased up a little... I think people have just got used to the idea that there are more than a few systems that can do these things, and those sorts of skills are transferable.”

This was not the case in records management advertisements, of which almost half (47%) ‘required’ or ‘preferred’ experience with an EDRMS, often named specifically. This may reflect that the Records Management field, in comparison with Librarianship, is at an early stage of its evolution. As regards Content management systems, approximately 20% of the roles described as “Other IM Roles” (Table 1) required CMS experience, sometimes specifying the CMS by name. This is a significant percentage considering the wide range of
roles included in this group of advertisements, and also suggests an immature field of practice, where this expertise cannot be assumed.

**CO-OCCURRENCE AND MULTIVARIATE ANALYSIS**

Although frequency counts may be informative, they tend to favour terms which occur commonly due to extraneous factors such as the relative ‘wordiness’ of advertisements or the number of cases collected for each employment group (refer Table 1). The use of correlations, rather than raw frequency counts, compensates for this and enables analysis of the structure of the workplace by showing the relationships between categories. For example, particular sets of categories are clustered together, such as data services and records management, or interpersonal skills and client activities, indicating that certain roles require these related skill categories.

As in the 2004 studies (Kennan et al. 2006, 2006b, 2006c), this analysis was accomplished using Provalis Wordstat. Term co-occurrence matrices, based on the number of cases in which categories co-occur, were computed and converted into similarity (correlation) values, a measure of the relative similarity of terms. The multivariate techniques of cluster analysis and multidimensional scaling (MDS) were then used to identify clusters of categories with similar co-occurrence patterns and to generate a map representing the underlying dimensions of these categories.

Cluster analysis looks at the similarities between categories based on average linkage, using a hierarchical agglomerative process (Hair et al 1998; Vaughan 2001). It begins by treating each dictionary category as a cluster, then combines the first two categories with the highest similarity into a cluster, and continues this process iteratively. The output of this process is a dendrogram (Figure 1), a visualisation of the clustering process showing the successive clustering of categories in terms of similarity.

In Figure 1, the generic skills (Behavioural, Interpersonal, Client Activities, Managerial, Generic IT, in which the first two and the last three are more similar to one another) are clustered together, and chained with the Jurisdictional Skills in this cluster, Information and Knowledge Management and Reference Services, both of which are highly client focused.
activities, requiring a broad range of both personal and IT skills. Together, this cluster is relatively similar to the three following clusters.

The second cluster is Collection Management, Instructional Services and Library Activities, with the latter two showing a higher degree of similarity. In the third cluster, Data Services is closely correlated with Records Management, reflecting the stronger custodial focus of Records Management with concerns for the ‘capture’ and storage, integrity and preservation of evidentiary documents and records.

The three categories Business Analysis, Content Management and Delivery (CMD) and User-centred Information Design (UCID) are clustered together, perhaps due to their common concern with facilitating information delivery systems to meet contextual information needs. Although linked with the user-centred CMD and UCID categories, the Business Analysis category is less similar to them. However, taken as a whole, this cluster exhibits a high degree of similarity with the three preceding clusters, notably Records Management / Data Services and Collection Management, with their information management process focus, and Reference Services, with its focus on meeting information needs.

Finally, Cataloguing, Classification and Metadata, and Library Systems, which the case frequency data indicated are outliers in this particular dataset, are less similar to all preceding clusters.
FIGURE 1. CLUSTER ANALYSIS OF 2010 DATA

BEHAVIOURAL CHARACTERISTICS
INTERPERSONAL SKILLS
CLIENT ACTIVITIES
MANAGEMENT
GENERIC IT SKILLS
INFORMATION AND KNOWLEDGE MANAGEMENT
REFERENCE SERVICES
COLLECTION MANAGEMENT
INSTRUCTIONAL SERVICES
LIBRARY ACTIVITIES
DATA SERVICES
RECORD MANAGEMENT
BUSINESS ANALYSIS
CONTENT MANAGEMENT & DELIVERY
USER-CENTRED INFORMATION DESIGN
CATALOGUING CLASSIFICATION METADATA
LIBRARY SYSTEMS

SIMILARITY INDEX: JACCARD'S COEFFICIENT (OCCURRENCE)
The MDS technique is often utilised jointly with cluster analysis to visualise similarity / dissimilarity of data categories in $n$ dimensions (usually 2 or 3). The categories are mapped in $n$-dimensional space, with physical distance representing similarities / dissimilarities between categories. An optimal MDS solution should achieve an r-squared correlation ("RSQ", the amount of variance) approaching 1 and a low ‘stress’ (the amount of distortion of the data required to fit the solution). Stress can also be used as an indicator of the optimal number of dimensions required by the solution.

Reflecting the diversity of roles in the 2010 data relative to the 2004 data, a 3-dimensional solution was found to be the best fit (Stress = 0.20, RSQ=0.90). Because of the difficulty in representing three dimensions in a two dimensional medium, this is represented in three diagrams; a perspective view, an XY axis view, and a ZY axis view.
FIGURE 2. PERSPECTIVE VIEW OF 2010 DATA IN 3 DIMENSIONS

FIGURE 3. DIMENSIONS X AND Y OF 2010 DATA
Figure 3 above shows the X and Y dimensions of the data. The Y axis clearly seems to orient role categories on a continuum of generic ‘people skills’ requirements at the top (Client Activities, Management, Behavioural Characteristics, Instructional Services, etc.) to ‘technical’ or jurisdictional skill requirements at the bottom (i.e. Library Systems, Content Management and Delivery, Data Services and Cataloguing, Classification and Metadata).

The X axis appears to orient role categories on a continuum relating to organisational type, with more corporate or business focused roles on the left (i.e. Business Analysis, User-centered Information Design, Content Management and Delivery), ranging to collecting institution roles on the right (i.e. Library Activities, Collection Management, Instructional Services and Library Systems).

Figure 4 shows the Z and Y dimensions of the data. The Z axis can be seen as a continuum between different practice foci, with an information delivery focus on the left and an information management focus on the right. The information delivery categories on the left have a greater orientation towards the ‘sense-making’ roles, such as Reference Services, User-centred Information Design and Instructional Services. Library Systems may appear an
odd inclusion here, but further analysis showed that library systems skills were mentioned in the context of user-centred information delivery.

On the right of the Z axis, a stronger Information Management focus is shown through skill-sets such as Records Management, Data Services and Information and Knowledge Management. One might expect that Knowledge Management skills would locate the Information and Knowledge Management category closer to the “sense making” side of the map. This discrepancy is likely due to the small number of roles directly expressing knowledge management requirements (20 advertisements, or <0.05% of the jobs collected), and proportionally higher number of jobs focusing on information management skills.

**FIGURE 4. DIMENSIONS Z AND Y OF 2010 DATA**

LIMITATIONS
The jobs collected for this study cannot be considered a full set of data for the periods described, given that jobs may be advertised via other sources, such as newspapers or referral networks. Although a sample of 441 job advertisements were collected, the periods over which data was collected were too short to provide definite conclusions, although this study provides clear indications of possible trends for future research.

It is also recognized that two interviews with recruiters cannot be considered a representative sample, and that as both recruiters were Sydney-based, their comments reflect on their local labour market only. However interview data was used not as a basis from which to draw conclusions, but rather to triangulate content analysis findings.

As previously discussed, differing parameters for data collection made it difficult to directly compare the 2010 data with the 2004 data in specific cases. For example, the inclusion of teacher-librarian roles made it impossible to draw conclusions on trends concerning instructional skills, an area in which the UNSW studies had found a “puzzling” downward trend (Kennan et al. 2006, p.187). Nonetheless, it is possible to observe several other trends from data comparison.

**CONCLUSIONS**

Much has been made of the effects of disintermediation on the LIS/IM profession. This study found that while a range of information delivery systems (Content Management Systems, EDRMS, Intranet/Web sites etc.) have made inroads into the role of the IP as intermediary, job advertisements showed strong requirements for the core skills of IPs. One unequivocal trend indicated by this study was a strengthening demand for Records Management skills. In Records, as in other information sub-fields, there was an emphasis on skills not only in managing records through a life cycle, but in understanding human information practices and processes in a record-keeping context.

This study has proposed that core LIS competencies (i.e. a user-centred approach to eliciting information needs, an understanding of contextual factors in individual and collective sense-making, and knowledge of information behaviours) can be leveraged towards effective information content and delivery in a variety of traditional and non-traditional information contexts. A strong market was found for these skills within traditional and non-traditional
employers, suggesting opportunities for IPs with potential employers including those who seek skills in content management, information architecture, user experience design and user requirements analysis in information systems contexts. How clearly the claim to this kind of work has been ‘staked’ by the LIS/IM profession is arguable however. The LIS/IM recruiter interviewees reported seeking Content Management and Business Analysis skills for some roles. However, although both acknowledged Information Architecture might be a valid area of practice for the LIS/IM profession, they noted that Information Architects were not often sought by their client base. Moreover, one stated that Information Architecture or Business Analysis roles might be filled collaboratively with their agency’s IT service, suggesting that the Information Systems domain may be perceived as having more claim to this area of practice, by the recruiter and the IPs on their database. It is equally unclear to what extent employers in these domains see LIS/IM graduates as candidates, since the majority (79%) of these job advertisements did not specify any qualifications requirements. Of those which did, a wide range of disciplinary (LIS, IM, IS, Communications, Computer Science, IT, Psychology) and non-disciplinary (HCI, Usability, Information Architecture) qualifications were specified, suggesting that this area of practice is still “up for grabs” in terms of jurisdictional competition (Abbott 1998, in Kennan et al. 2006, p.191). How the perceptions of recruiters, employers, and LIS/IM graduate professionals themselves affect the take-up of these opportunities is thus a question for further research.

Six years later, the “move to the generic” detected in the 2004 job advertisement data (Kennan et al. 2006, 2006b, 2006c), reflected in requirements for good interpersonal and communication skills, adaptability and flexibility, IT skills and management capabilities, is now firmly entrenched as the new ‘basic specification’ for job applicants. There was also some evidence of increased requirements for training and research skills across a variety of IP roles.

These trends were supported in recruiter interviews and the following quote gives some insight into why:

“We've always wanted certainly flexibility, and adaptability and versatility in your [sic] candidates, but we're seeing more and more where they're needing to have
exposure to different types of positions, because more often than not, a job is not just a job that is cut and dried. It has more flexibility to it as well. And you need someone who’s going to be able to multi-task, but also to adapt to different possibilities within that role... Organisations are now starting to expect more from their staff in terms of a broader range of skills, bringing a broader range of IT skills to their jobs, training qualifications and experience, supervisory experience, marketing experience, ...and good communication skills.”

As suggested by the data, it appears that changing work practices have led to job definitions which no longer rigidly demarcate role functions. As a result, a wider range of skills is now required of IPs. What this means for educators of Librarianship and Information Management professionals is a question for another paper. However, this study suggests that for those Information Professionals who can adapt to these changes, the Australian job market offers considerable opportunity.

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