

# *Content Analysis of an LIS Job Database: A Regional Prototype for a Collaborative Model*

YUNFEI DU

Library and Information Science Program, Wayne State University, Detroit, MI, USA

BARBARA STEIN

School of Library and Information Sciences, University of North Texas, Denton, TX, USA

ROBERT S. MARTIN

School of Library and Information Studies, Texas Woman's University, Denton, TX, USA

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Recently more and more LIS job postings have been distributed to e-mail lists or to recruiters' Web sites. The volatility of electronic media had been creating difficulties for students and LIS educators to estimate overall job trends. An online database at an ALA-accredited library school was designed to allow recruiters to make postings at no cost. In total, 974 library-related advertisements have been posted since 2000. Content analysis reveals most recruiters using this site were from academic libraries (48%) and from public libraries (35%). The

most frequently cited qualifications requested were academic background along with communication, professional and technological skills. Results from the database analysis confirm previous findings based on print media. The study suggests that a job database implemented collaboratively among LIS institutions at a national and international level might serve to match recent graduates with employers while at the same time providing empirical data on the skills required in the marketplace.

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## *Introduction*

Programs of study in Library and Information Studies (LIS) seek to prepare students for professional roles in libraries and other information agencies by providing curricula that develop professional skills and competencies. They also seek to support graduating students in their search for employment. These two apparently disconnected parts of the LIS educator's enterprise have the potential to converge in a synergistic way to comple-

ment each other and inform the development of each respective activity.

On the one hand, LIS programs develop and maintain their curricula based in part on perceived needs of employers who will hire their graduates. Moreover, the accreditation standards require that the curriculum be reviewed continuously and that evaluation of the curriculum involve those served by the program, including employers. Faculty of LIS programs therefore consistently strive to develop data on the perceived needs of their gradu-

Yunfei Du, PhD, Assistant Professor, Library and Information Science Program, Wayne State University, Detroit, MI 48202. E-mail: [yunfei@wayne.edu](mailto:yunfei@wayne.edu).

Barbara Stein, PhD, Professor, School of Library and Information Sciences, University of North Texas, Denton, TX 76203. E-mail: [stein@unt.edu](mailto:stein@unt.edu).

Robert S. Martin, PhD, Lillian Bradshaw Endowed Chair in Library Science, School of Library and Information Studies, Texas Woman's University, Denton, TX 76203. E-mail: [rmartin2@mail.twu.edu](mailto:rmartin2@mail.twu.edu).

ates' employers by seeking advice from advisory boards, conducting surveys and convening focus groups.

One important approach to studying the employment market for LIS graduates is analyzing job advertisements. Analyzing job ads can provide LIS educators with empirical data on recruitment and employment patterns and specifically on the skills and competencies currently being demanded by prospective employers.

On the other hand, placement of graduates is an important service that most LIS programs provide for their students, and a robust track record in placing graduates is often integral to the overall success of the program. Many LIS programs therefore devote substantial resources and energy to the placement function, constructing various mechanisms for connecting graduating students with prospective employers. Traditionally the placement function has been carried out in a variety of ways: counseling students about job prospects; assisting students in preparing vitae and résumés and drafting letters of application; arranging formal and informal learning experiences, including internships and practicums; hosting job fairs with local employers; and encouraging students to participate in professional conferences where they may meet prospective employers.

Students have normally become aware of employment opportunities through traditional channels such as advertisements placed in relevant professional journals. Traditionally, printed journals have been the primary advertising medium for library jobs. In recent years, however, the Internet has allowed employers to advertise and recruit via e-mail lists and websites. This has quickly become a significant mechanism for employers to connect with new graduates of LIS programs. Library schools receiving job announcements and postings from employers usually re-distribute them to students through e-mail lists.

As the practice of using the Internet as a primary means for employers to reach prospective candidates has grown, the ability of educators to collect empirical data from job ads has dwindled: digital advertisements and announcements tend to be volatile, disappearing rapidly and vitiating one's ability to construct reliable data to assess employment trends.

It would be extremely useful, therefore, to construct a mechanism for employers to post job op-

portunities on the World Wide Web at no cost, facilitating direct communication with LIS graduates. At the same time, it would be possible for LIS programs to mine the data from those postings in order to collect and preserve volatile recruitment information and build reliable databases to support analysis. Such databases would allow LIS educational programs to periodically review and modify their curricula according to the needs in the job market, making their graduates more competitive in the employment market.

### *Related studies*

There is abundant research analyzing job advertisements in the library and information professions. Some researchers investigated theories on recruitment and leadership in library settings. For example, Winston (2001) examined LIS recruitment literature and tested the recruitment theories on academic, public and children's librarians. He defined (Winston 2001, 20) the recruitment theory in the field of library and information science as "... the theory associated with the identification of individuals who are likely to be successful and to contribute as leaders in organizations and professions, and is based upon the literature of library and information science, as well as that of other disciplines." He found "interest in working" in library settings is the most important factor affecting recruitment decisions. More recently, Bajjaly (2005) surveyed traditional library recruiters and found the importance of LIS graduates' service orientation as one of the qualifications for jobs in library settings.

Some researchers have focused on the content analysis of different library position ads published in professional journals. For example, Lynch and Smith (2001) examined 220 academic jobs advertised in *College & Research Library News* for the month of March in the years of 1973, 1983, 1988, 1993 and 1998 and compared qualification requirements for all open positions in this 25 year period. They categorized library positions according to ALA job placement services in 1999. They found common requirements among all advertised library jobs: computer skills, instructional technology capabilities and inter-personal communications skills. An ALA-accredited master's degree has been considered the minimum requirement by most academic libraries.

Some articles focused on one specific job title. For example, one study analyzed 127 job postings for heads of reference departments in academic libraries from 1990 to 1999 (White 2000). The study found that similar job titles were used in the majority of the announcements, and less than one half of them mentioned tenure. About 43% of the positions analyzed were in ARL libraries. Salaries were higher than the average academic salary and for the Master of Library Science (MLS) degree. Communications skills were the most frequently sought requirement. Instruction and collection development were the most frequently cited responsibilities. The most desired qualifications also included a second master's degree and supervisory experience.

Chaudhry and Komathi (2001) analyzed 131 cataloging position announcements drawn selectively from the issues of *American Libraries* from 1990–1999. They found that 69% of the jobs advertised were in academic libraries while 9% were in public libraries. More than two-thirds (68%) of the advertised cataloging jobs were entry-level positions. Employers increasingly asked for knowledge of cataloging tools, automated cataloging systems and computing skills.

Another example is a study that examined 223 job announcements published between 1990 and 2000 in *College & Research Libraries News* containing either the word "electronic" or "digital" in position titles (Croneis and Henderson 2002). This analysis of job announcements over the eleven-year period revealed four trends: an increasing number of "electronic" or "digital" position announcements, a greater diversity of functional areas involved, a wider variety of types of institutions placing advertisements and the emergence of distinctions between "electronic" and "digital" positions in terms of job responsibilities.

Researchers have begun analyzing the importance of job ads in electronic formats. For example, Tice (2001) analyzed job advertisements that were posted on AALLNET (the AALL website), the "law-lib" electronic discussion list and in the *Law Librarian's Bulletin Board*. There were 262 posted jobs in 1989–90, 173 postings in 1992–93, 252 positions in 1995–96, and 263 jobs in 1998–99. She concluded that fundamental characteristics of law librarianship jobs, such as the overall number of positions, geographic locations, types of posting institutions, and types of position, have not

changed significantly during the past decade. Additionally, personal skills and the experience required of the applicants appeared to have changed dramatically.

Beile and Adams (2000) examined 900 job announcements from four journals in 1996 to compare with the findings from a previous study by Reser and Schuneman (1992). They found a significant decrease in the volume of advertised jobs in professional cataloging. They found a decline in requiring ALA-accredited degrees, especially for jobs related to computer systems. Ninety-one percent of jobs required ALA-accredited degrees in 1996 versus 98 percent in 1988.

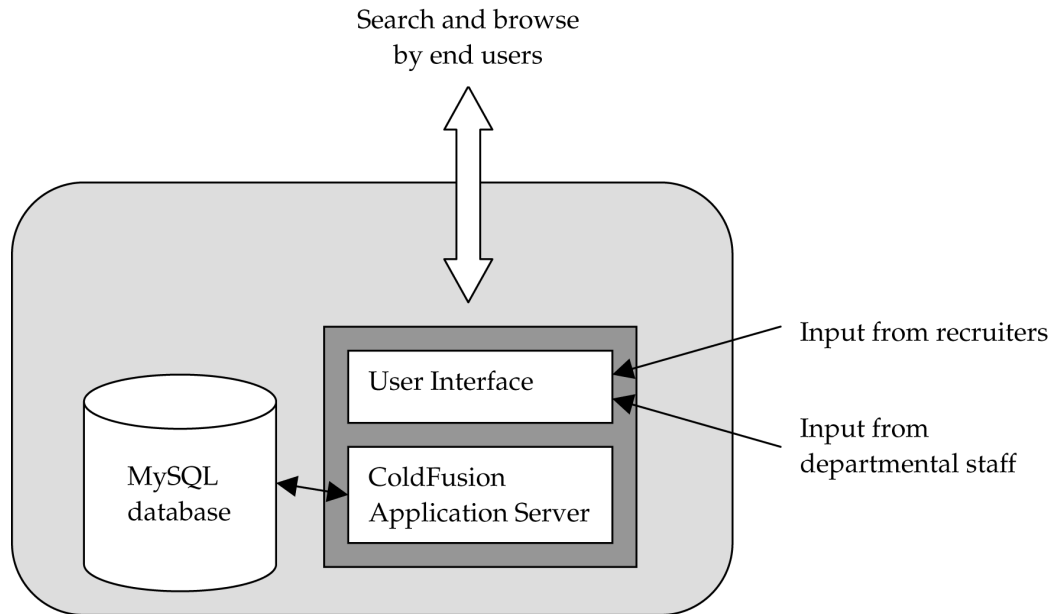
Recent reports suggest digital ads might result in a decline in print-based advertisements. For example, Starr (2004) compared 357 jobs posted in 1983 with 182 jobs in 2003 in *American Libraries* and *Library Journal*. She found nearly a 50% decline in the number of advertisements and suggested the no-or-low-cost advertising venues such as electronic mailing lists, online bulletin boards and employers' own websites as possible reasons.

These studies suggest the desirability of collecting and preserving volatile job advertisements in individual databases. None of previously studies have analyzed library jobs advertised solely in digital formats, especially entry-level positions targeting LIS graduates who have limited library experience.

The expansion of the Internet suggests that researchers should study job advertisements in electronic formats in order to analyze job trends. First of all, there are library jobs posted at the ALA website and in national journals such as *American Libraries*, *Library Journal* and *The Chronicle of Higher Education*; but jobs published in national journals tend to be for senior rather than entry-level positions. It is commonly observed that LIS graduates have often worked as volunteers or interns before moving into part-time librarian positions to gain experience, and then they move to full-time positions. These volunteers, interns or part-time positions are usually advertised locally without utilizing a national search.

Secondly, to save advertising costs, it is common for jobs to be published in abbreviated form in journals, or at for-fee job posting sites with a link to the recruiter's website containing the complete description. The link is subject to removal as soon as the recruitment process is complete. For

Figure 1: Data Flow Diagram of an Online Job Database



example, *American Libraries Hot Jobs Online* publishes daily library jobs (American Library Association 2005). This study sampled 81 positions open in July 2005. Among them, 52 jobs (64%) were posted with a full description, while 29 jobs (36%) were posted as abstracts with a link to the recruiters' websites. Among these 29 jobs, only 10 postings were still at recruiters' websites after three months: 19 of the jobs (66%) disappeared after 3 months. Thus, it appears that jobs published at recruiters' websites are usually deleted when the recruitment process ends. As a result, volatile online postings make it difficult for researchers to analyze trends in the library job market.

This study attempted to bridge that gap by creating an online database for the job postings listed through the website of an ALA-accredited library school. This provided verifiable data for future reference by LIS educators and students. The resulting database is also easy to analyze with statistical software.

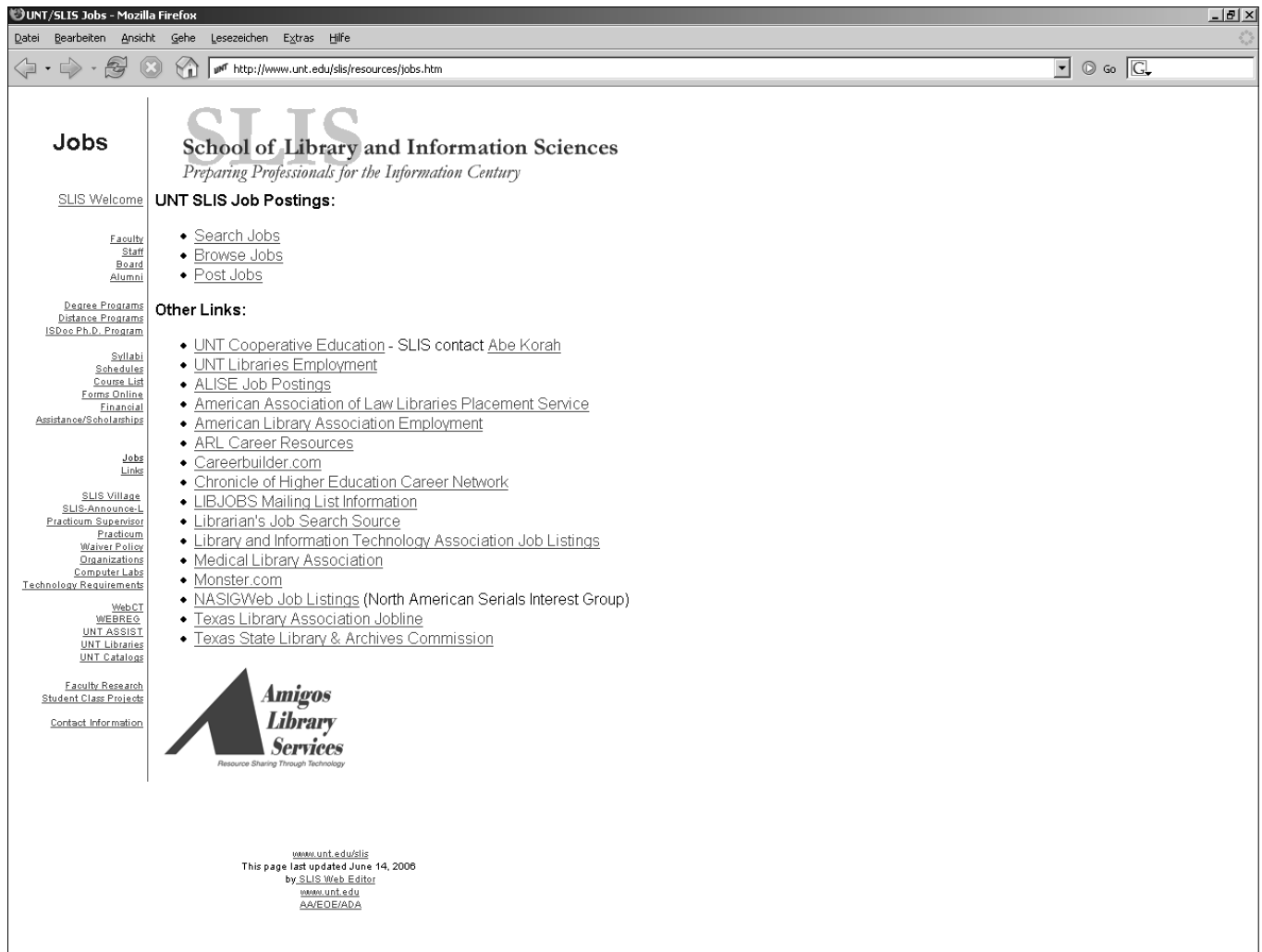
Building an online database provides researchers with snapshots of the current recruitment market. The database-driven website used in this study can be more suitable for local students who are searching for entry level or part-time jobs, usually directed toward local residents. It should be noted a free job-posting site often attracts postings

from different types of libraries over a much wider geographical area.

### Methodology

The overall purpose of this study was to evaluate how reliably online databases can capture and save job postings in electronic format, thus facilitating the study of trends in the library job market. This study addressed the following research questions: (1) can online job databases be reliable vehicles to advertise library-related jobs? (2) what are the most frequently requested skills for entry-level library positions?

In 2000, an LIS job database was created to collect job advertisements at an ALA-accredited library school's website. The site was hosted on the university Web server and was maintained by the webmaster. Any recruiter on the Internet could make postings to this site without human intervention. Library school staff who received recruitment information could "cut & paste" and/or add such information into the online database. The database accumulated more than 974 entries by January 2006. One should be aware of the potential bias of sampling data from one location. This bias might be minimal, however. The site was programmed so that any recruiter could make a post-

Figure 2: Job Advertisements Collected (URL: <http://www.unt.edu/slis/resources/jobs.htm>)

ing over the Internet without geographical limitations. A large sample was collected and since the job postings were largely for entry-level positions aimed at students and recent graduates, the requested skills might logically be similar to those required in libraries in other geographic areas.

### *Data collection*

The job advertisements collected can be accessed at the URL: <http://www.unt.edu/slis/resources/jobs.htm> (see Figure 2). There were eleven database fields in the online form: Available Date, Contact Name, Institution /Business Name, Address, City, State, Zip, E-mail, URL, Work Phone and Position Description. As soon as the job posting was entered, it was available to the public for brows-

ing or searching by keywords. After 30 days, the posting became unavailable to the public but was saved in the database for future analysis.

As illustrated in Figure 1, recruiters could post job advertisements through a Web interface. Job postings were saved in a MySQL database that enabled students to browse or search by keywords. MySQL is a popular open source database for online applications. Data from MySQL can easily be converted to a desktop database software program like Microsoft Access and can be analyzed using statistical tools like SPSS. The site was written in ColdFusion, a scripting language that had been used in previous applications (Adobe Systems Incorporated 2006; Du and Martin 2004). In the current study, only the database fields of City, State, Zip and Position Description were carried into the statistical analysis. All personal identifica-

Table 1: Comparison of Different Libraries Advertising

Type of Libraries	Database	American Libraries
Academic Libraries	459 (47%)	2,274 (60%)
Public Libraries	339 (35%)	1,224 (32%)
School Libraries	69 (7%)	45 (1%)
Library Education	2 (0.002%)	86 (2%)
Special/law/medical	105 (11%)	123 (3%)
Total	974 (100%)	3,774 (100%)

Note: Jobs advertised between January 2000 and November 2005.

tion information was removed from the final data analysis.

### Data analysis

Content analysis was the methodology used in this study. Content analysis is a research technique used for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use (Krippendorf 2004). Descriptive statistics were reported on all job positions. For all job descriptions, the most frequently required skills and competencies were extracted and their frequencies counted. In addition, a comparison between keywords and their frequencies from the database and a sample from a national journal was conducted.

By January 2006, there were 1,301 job advertisements published in the database. Among them 974 were permanent library positions and 327 postings were duplicate, temporary or irrelevant to library and information professionals. These 327 postings were excluded from the current study. In order to compare the jobs published in the database with those from professional journals, a sample was chosen from job advertisements in *American Libraries* covering the same time period for a total of 3,577 jobs, of which 2,274 were academic library positions. Table 1 shows the distribution of libraries that were advertising.

In the online database, 82% of recruiters were academic and public libraries. These libraries were made up of 459 academic libraries, 339 public libraries (including 62 children and youth service positions), 69 school libraries (7%) and 105 special libraries and other libraries or information agencies, including law libraries, governmental librar-

Table 2: Geographical Distribution of Jobs in the Database

Region	Database*	American Libraries**
New England	3	9
Middle Atlantic	13	24
East North Central	35	28
West North Central	36	22
South Atlantic	42	53
East South Central	16	16
West South Central	735	21
Mountain	65	20
Pacific	29	28

Note: \*N = 974 from the local database. \*\*N = 222 from stratified-random sampling of 3,774 postings from *American Libraries*. One out of eleven issues per year was randomly selected using Microsoft Excel's "RAND" function. The March 2000, November 2001, April 2002, June-July 2003, April 2004 and September 2005 issues were selected.

ies and vendors *et al.* By comparison, 3,498 (92%) of the postings published in *American Libraries* were from academic and public libraries. An additional 108 postings (2%) were from library and information schools. Based on this sample, jobs in the database were more diverse than those in the print journal. Since academic and public libraries were advertised most in the database used in this study, one might draw the conclusion that academic and public libraries hire the most librarians. Care should be taken in reaching this conclusion, however, because school districts often post such job notices within their own systems.

The study compared the geographical distribution of jobs published in the local database using *American Libraries* as the national norm. Table 2 illustrates the geographic distribution of posted jobs.

The database included 974 jobs from 40 states; however, 735 (76%) of the jobs were from the West South Central, mostly Texas, while jobs from *American Libraries* were evenly distributed throughout different regions. Since the website was hosted at an ALA-accredited school in the State of Texas, it was expected more libraries from Texas and surrounding states would post jobs in order to recruit local graduates. There is a potential bias on the distribution of the jobs in the database. One cannot infer that the job market was more prosperous in Texas than other places. However, if library education institutions from different regions were to

Table 3: Academic Positions Advertised by Job Title

Title	Texas	Non-Texas
A	12	5
A1	2	3
A2	5	3
A3	15	16
Subtotal in A	34 (12%)	61 (36%)
D	115	58
E1	14	17
E2	1	1
F	32	21
H	12	9
I	23	12
J	33	14
Subtotal in A	230 (80%)	132(77%)
Combination	24 (8%)	12 (7%)
Total	288	171

Note: A (A1, A2, A3) – administrative positions; D – reference; E (E1, E2) – instruction; F – technical services; H – collection development; I – special collections; J – systems; combination – positions with combined duties from A to J

build similar online job databases collaboratively, a less biased and more reliable comparison of data might be achieved.

In order to survey requested skills in recent job announcements, detailed academic librarian positions from the dataset were analyzed. These positions were the largest segment of the database and were among the most commonly advertised jobs in printed journals such as *American Libraries*. Jobs were coded according to the categories from the 1999 ALA conference job placement center, as suggested by Lynch and Smith (2001, 409). Table 3 illustrates the different academic library positions.

From Table 3, one can see that the non-Texas job advertisements were distributed very closely to Lynch and Smith's sample (2001) with administrative positions (36% vs. 38% reported by Lynch and Smith). However, more positions were skewed toward entry-level and daily library functions such as reference, instruction, cataloging and information technologies (77% vs. 36% reported by Lynch and Smith). It is safe to conclude that jobs published in the online database were targeted more toward recent LIS graduates who might have limited library experience.

Table 4: Job Skills in the Database

Keywords	Texas (N=288)	Non-Texas (N=171)
<i>Academic background</i>		
ALA	192	146
MLS/MLIS/MSIS	132	225
<i>Communication skills</i>		
Instruction	283	276
Communication	218	150
Management	140	161
Interpersonal	81	74
<i>Professional/technology skills</i>		
Electronic	296	183
Cataloging/cataloger	234	152
Collection development	199	151
Acquisition	59	40
OCLC	46	39
Voyager	41	9
MARC	36	21
AACR	23	16
Metadata	22	34
Unix	20	9
Digitization	17	16
LCSH	16	8
XML	13	11
Distance Learning	2	10

Note: The Cosine Correlation Coefficient of the two groups was .95. The formula was  $\text{Similarity}(Q, D_i) = \frac{\sum (w_{qj} * d_{ij})}{\text{Square Root}(\sum (d_{ij}^2) * \sum (w_{qj}^2))}$ , in which  $d_{ij}$  represents term frequency in Texas postings  $D_i$ , and  $w_{qj}$  represents term frequency in non-Texas postings  $Q$ . The Pearson's Correlation Coefficient between jobs from Texas and non-Texas was .89 ( $p=0.001$ ).

In order to see the difference between job skills posted from Texas and from other states, keywords were extracted from job postings for both locations and the study compared the correlation of the frequencies of keywords between the two groups. A Cosine Correlation Coefficient was calculated to compare document similarity as suggested by Salton and McGill (1983) and Meadow (1992). For comparison, a Pearson Correlation Coefficient of keywords from the two groups was also reported. Keywords were selected to represent attributes of job descriptions based on the library literature that

was published on job analysis. To reduce human error and assure the validity of the content analysis, two researchers independently coded the job descriptions, removing stopwords such as "website" or "opportunity." The results were merged as shown in Table 4.

Table 4 illustrates the job skills and competencies appearing most frequently in academic libraries (N=459). The dataset suggested three themes regarding frequently requested skills and competencies: Academic Background, Communication Skills and Professional/Technology Skills. An example of Academic Background is an MLS degree from an ALA-accredited library school. Communication skills include the functions of "Instructional" and "Interpersonal" skills. Traditional library professional skills such as "collection development," "cataloging" and "MARC" records are still required. The Cosine Correlation Coefficient (Similarity=.95) and the statistically significant correlation coefficient ( $r=0.89$ ,  $p=.001$ ) from Table 4 suggest that there is no statistical difference in job requirements from within and outside the State of Texas. Thus it appears that the overrepresentation of jobs in Texas may not alter the findings. Recruiters usually advertise locally, especially for entry-level and part-time positions. Further research is needed to study the distribution of jobs across different geographical locations. Data from different sources, such as print and electronic job postings across different regions and countries (Ocholla 2001; Willard, Wilson, and Cole 2003), could be synthesized.

Academic library positions required more advanced technology skills than previously. Basic computer skills, such as using Microsoft Office and creating Web pages, were common qualifications. This echoes the findings of Deeken and Thomas (2006) that computer skills are now considered a "given" for new hires. However, many previously perceived advanced information technology skills, such as those related to systems, databases and UNIX operating systems, appeared frequently in many academic library postings. The following description from one of the job advertisements represents a typical range of requested skills:

Position Description: XXX University Libraries. LIBRARIAN I – This is a permanent part-time position for the Fall and Spring semesters (Aug. – May). Work hours are Sunday through Thursday 8:00pm – midnight. This posi-

tion provides print and electronic business reference and computing software services for students, faculty, and staff. Primary responsibilities include, but are not limited to: on-line searching, as well as traditional library research and support for faculty, staff, and students; work with users in locating information and materials; supervising student desk assistants; processing reserve materials; managing public services for the XXX library; and supporting hardware and software available in the computer labs. The ideal candidate must have an MLS, MLIS or MSIS from an ALA-accredited library school. A minimum of one year business or education experience preferred. Candidate must demonstrate strong interpersonal and communications skills with a strong proficiency in Microsoft Office Suite.

Even though most of the jobs in the database were entry-level, there are still some leadership expectations for library positions, such as multitasking, fundraising, and academic integrity (Hernon, Powell and Young 2004). Given the condition that some recruiters tend to post jobs for entry-level positions directly to library schools, this study suggests that it may be more relevant to study patterns of diverse, entry-level jobs using a local job-posting database rather than centralized national job databases. It is recommended that library education programs build local online job databases across the country, which can be aggregated to create national and international-level job banks that could be used by students, faculty, and libraries over the Internet. This would provide data, especially data related to entry-level positions that could be used in forecasting trends in the profession.

In order to serve traditional libraries more effectively, it may be desirable for LIS educators to adjust their curricula with respect to market needs. It appears that LIS programs need to meet the demand for training in technology skills, such as Web skills. However, at the same time, more emphasis on traditional librarian skills appears to be needed as well, especially on management, interpersonal communication, collection development, cataloging and other related library services.

### Conclusion

The similarity between job postings published to the database and in print media, as well as the internal consistency suggested by jobs from Texas, suggests that online job databases are reliable vehicles to advertise library-related jobs. The results

imply that the online database serves as a complement to national job posting databases such as *American Libraries* and the ALA job hotlines. Such databases capture volatile job advertisements in digital formats and provide us with future library career trends in local settings. Content analysis of job postings revealed three themes of desired qualifications: academic background, communication skills and professional/technology skills. Even for entry-level positions, an ALA-Accredited master's degree is still among the most important qualifications. Lynch and Smith's 2001 finding of the three most critical qualifications for librarians appears to still be valid today: new library school graduates are expected to have technological, instructional and communication skills. But the specific technological skills expected today are more advanced than those previously sought.

Library educators benefit from informed predictions on future trends in the job market for their graduates. Understanding market trends may help LIS programs adjust their curricula to fit market needs. It appears technology skills are expected, with new hires needing to understand everything from Web, HTML and Databases to Digitization and Knowledge Management. It is expected that technologically savvy graduates may change the image of librarians for the public, enhance the retention of librarians and help librarians to be paid better in the future. This speculation will need to be addressed in additional research.

More research is needed to assess how the library workforce is changing in the 21<sup>st</sup> century. What used to be considered "traditional" library skills still appear to be required, but at the same time, there is an increasing emphasis on the need for technology in all areas of the library job market. Literature suggests this pattern may be typical of other countries as well (Willard, Wilson and Cole 2003, 225). A follow up study to synthesize related studies from around the world would be extremely useful.

Finally, this study recommends that other LIS programs implement an online process similar to the one used in this study. Certainly more efforts are needed on interface design and usability-testing (Jeng 2005), but this approach serves the needs of the employer community by providing a mechanism to directly reach students and recent graduates who are potential applicants for their positions. It simultaneously serves the needs of

LIS educators by generating real empirical data to use in assessing and improving their curricula, so that students and society at large can be better served. If such systems are built with care, data can be interoperable, allowing LIS educators to construct a national or international database for employment trends and recruitment patterns with which to improve the curriculum design. This might prove a potent and useful predictor of future job market trends.

### Acknowledgement

The authors thank Min Ren for his assistance with analyzing the data.

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*Editorial history:*

*paper received 30 October 2006;*

*accepted 7 January 2007.*