Educating Data Management Professionals: A Content Analysis of Job Descriptions

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ABSTRACT

The purpose of this study is to assess the current state of required and desirable qualifications and knowledge described in the job advertisements of data management professionals and related positions. Seventy unique job advertisements were collected from five academic and professional online job lists from January 1, 2015 to April 30, 2015. WordStat, a content-analysis software program, was used to analyze the word/phrase frequency of the job descriptions based on three key factors: the requirement of an MIS/MLS/MLIS degree; prior work experience (the number of years), and the status of job position (limited or permanent appointment). The preliminary results indicate that most job positions require that the successful job candidate must be able to serve faculty and students to collect, manage, and analyze research data with essential qualifications to carry out those tasks. The top phrases regarding expertise, working environments, and qualifications are *social sciences*, *information science*, *higher education*, *research library*, *institutional repositories*, and *metadata*.

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INTRODUCTION

Government agencies and the public have challenged higher education institutions worldwide since the 1990s regarding their curricula and preparation of their graduates' job-ready skills and knowledge (Knight & Yorke, 2002; Teichler & Schomburg, 2013). Additionally, higher education institutions have to examine their curricula to justify rising school budgets and tuition costs as well as to meet accreditation and government oversight standards. Graduates' placement rates are an important indicator of an academic program's performance. In the Library and Information Science (LIS) context, the *Library Journal* (LJ) has been conducting an annual placements and salaries survey of graduates from LIS programs to identify employment trends (Library Journal, 2015). The American Library Association (ALA) also defines librarians' core competencies and accreditation standards (American Library Association, 2009, 2015). Therefore, LIS programs must align professional core skills and knowledge with their education mission, curricula, and graduates' learning outcomes.

In addition to the traditional LIS jobs, LIS professionals are exploring new roles, services, and types of collaborations to support data intensive research in response to the emerging data-oriented economy (Charbonneau, 2013; Tenopir et al., 2011). Joyce (2012) described the development of "digital curation" and "cyberinfrastructure" since the end of the 20th century, and discussed how government agencies and

research communities have embraced these concepts with funding and research activities. Some of those key achievements are the required data management plans by the National Science Foundation (NSF) and the Institute of Museum and Library Services (IMLS). Lyon (2012) emphasized that managing data requires a comprehensive approach that enables effective data sharing, curation, preservation, and reuse. Glassdoor, a U.S. job website, reports that data scientist is one of the top 25 jobs in the U.S. for 2016 ("25 best jobs in America," 2016). With such emerging demands on data management, there is a need to identify the qualifications and responsibilities of such job positions as expected by employers. This study aims to assess the current state of required and desirable knowledge and qualifications as described in the job advertisements of data librarians and related positions in higher education. The results of the study provide insights into developing LIS curricula, preparing graduates for such positions, and enhancing academic librarianship.

LITERATURE REVIEW

CURRICULUM DESIGN AND JOB-READINESS

In order to assess for quality assurance and quality improvement, higher education institutions in the U.S. have been routinely examined by accrediting agencies for over a century (Eaton, 2006). One required standard for higher education institutions when assessing eligibility for federal student aid funds is their student job placement rate. Diamond (1998) emphasized the importance of gathering and

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analyzing data from employers to identify desirable and expected skills in the curriculum design and assessment process. Knight and Yorke (2002) studied the concept of "employability" in the U.K. higher education system and promoted a USEM-based (Understanding, Skills, Efficacy beliefs, and Metacognition) model in the curriculum development process. Another domain-specific study by Wang, Ayres, and Huyton (2009) surveyed graduates' job ready skills in the tourism field in Australia. They collected data from the tourism schools' web sites and through surveying employers, and identified key job-ready skills (i.e., oral communication, relationship management skills, and customer service skills) for the Australian tourism field. Teichler and Schomburg (2013) echoed Knight and Yorke's "employability" concept and pointed out that graduates' job-ready competences should be linked to job requirements.

In the LIS context, the International Federation of Librarian Associations and Institutions (IFLA) endorsed "library school curricula that reflects the developments in the provision of library and information services in the 21st century" in their *Guidelines for Professional Library/ Information Educational Programs* (International Federation of Librarian Associations and Institutions, 2012, p. 1). In the *Core Competencies in Librarianship*, the ALA:

> defines the basic knowledge to be possessed by all persons graduating from an ALA-accredited master's program in library and information studies. Librarians working in school, academic, public, special, and governmental libraries, and in other contexts will need to possess specialized knowledge beyond that specified here. (p.1)

The ALA also adopted its *Standards for Accreditation of Master's Programs in Library and Information Studies* in 2015 to reflect the continuing enhancement of accrediting standards to meet U.S. Department of Education requirements. Since 1999, many LIS educators have conducted studies of emerging LIS job positions to discover key required

competencies and develop needed curricula (i.e., Choi and Rasmussen (2009) analyzed digital librarianship jobs and Koh and Abbas (2015) surveyed Learning Labs and Makerspaces). The following section focuses on the studies on specific LIS job competencies and curriculum design.

LIS CURRICULUM AND COMPETENCIES

Over the last decade, several LIS educators have suggested curricular changes to meet job market demands based on analyses of job announcements. These previous studies are outlined in Table 1 regarding their authors, study periods, data sources, and top required skills and knowledge. Xu and Chen (1999, 2000, 2001) focused on the requirements for systems librarians, while Park, Lu, and Marion (2009) studied the cataloging professionals' jobs, Choi and Rasmussen (2009) studied the skill requirements for digital librarians. Kim, Warga, and Moen (2013) analyzed 110 job advertisements and identified three required qualifications: prior working experience in a library setting, knowledge of metadata standards and repository systems, and project management skills. This study adopted a similar research approach to assess required job responsibilities, prior experience, and basic and preferred qualifications stated in postings for data librarians and related positions. The job analysis was based on several key factors: the status of employers (research organization, private and public university); prior work experience (the number of years); the status of job position (limited or permanent); and the requirement of an MIS/MLS/MLIS degree. Koh and Abbas (2015) surveyed required competencies for LIS professionals in library and museum learning spaces and matched their findings with library associations' competencies (American Library Association, Young Adult Library Service Association, America Association for School Librarians, and Association for Library Services to Children).

Table 1
Studies on emerging LIS jobs.

Study	Date	LIS area	Data sources	Top required skills and knowledge[a]
Xu and Chen	1999, 2000, and 2001	Systems librarianship	Job announcements	• Installation • Internet • Library systems • Operation systems • Telecommunication
Choi and Rasmussen	2009	Digital librarianship	Job announcements	• Computer literacy • Current trends in DL • Current trends in IT • HTML authoring tools • Markup languages
Park, Lu, and Marion	2009	Cataloging librarianship	Job announcements	• Bibliographic utilities • Cataloging standards • Computer skills • Electronic resources • Flexibility • Integrated library systems • Interpersonal communication skills • Management
Kim, Warga, and Moen	2012	Digital curation	Job announcements	• Liaison and support • Personal and interpersonal skills • Project management • Research and trends • Standards and specifications • Tools and applications • Working in an information technology intensive environment
Koh and Abbas	2015	Learning Labs and Makerspaces	Interviews and surveys	• Ability to adapt to changing situations • Ability to advocate for the learning spaces Ability to collaborate • Ability to learn • Ability to serve diverse people • Facilitating learning • Grant writing, fund raising • Management • Program development • Technology literacy

[a] Listed alphabetically.