International Journal of Information Science and Management
Vol. 14, No. 2, 2016, 59-81

Analyzing the Market of Newly Emerging IT-Based Jobs in Library and Information Science and Identifying IT Librarian Competencies

Rahim Shahbazi
Assistant Professor, Faculty of Education and Psychology, Azarbaijan Shahid Madani University, Tabriz, Iran
Corresponding author: Shahbazi@azaruniv.edu

Fatmeh Fahimnia
Associate Professor, Department of Information Science & Knowledge Studies, University of Tehran, Tehran, Iran
Email: Fahimnia@ut.ac.ir

Aziz Hedayati Khoshemehr
Assistant Professor, Faculty of Education and Psychology,
Azarbaijan Shahid Madani University, Tabriz, Iran
Email: Aziz.hedayati@azaruniv.edu

Abstract

The main purpose of this paper is to study the IT-based job opportunities for Library and Information Science (LIS) graduates and identify the necessary competencies for an "IT librarian". In a purposeful sampling, 596 advertisements of IT-based librarian jobs for LIS graduates in 10 countries on Indeed.com in 2013 were selected and analyzed. The findings showed that the four job categories, namely "IT Librarian", "Digital Librarian/ Digital Services Librarian", "Metadata Librarian", and "Digital Archivist", have 38% (227), 36% (213), 17% (103), and 9% (53) of the job advertisements respectively. Moreover, the findings revealed that 75 items of knowledge and skills are in the job advertisements of the "IT Librarian" job category. To the authors' knowledge, the present research is the first to comprehensively identify newly emerging IT-based job titles in the field of Library and Information Science. It exhaustively reports the required competencies in the "IT Librarian" job category.

Keywords: Competency, Librarian Jobs, Job Market, IT Librarian, Web Librarian

Introduction

Today, due to globalization and increase of communication in scientific communities, departments and professions which meet the needs of their societies and have advantages over their potential competitors will be able to survive and secure their positions in the job market. Otherwise, they are doomed to failure and extinction (Azizi, 2004; Salehi and Yagmori, 2010; Karami and Momeni, 2011). Library and Information Science (LIS), as one of the academic fields, is not an exception to this. If LIS aims to stabilize its situation and promote the public interest, it has to not only revisit its original goals, functions, and programs but also get prepared for changes. In addition, armed with newly emerging sciences, it should compete with strong competitors (Summers, et al., 1999) such as Computer Science, Information

Technology, and Knowledge Management.

In today's world, a librarian who is competent in IT (IT librarian) and graduates from IS schools has a more "comparative advantage" over the traditional librarian and can earn almost the same amount as does an IT expert (Omrani, 2013). The analysis of job advertisements in *American Libraries Magazine* indicates that the salary of a web librarian who is in charge of websites is more than that of a cataloging librarian (Omrani, 2013; Alimohammadi, 2015).

Seemingly the job market does not intend to draw up a peaceful pact with college graduates, even medical graduates, and usually coordinates its moves with the principle of the employer's maximum benefit (Salehi and Yagmori, 2010). According to the Deputy Minister of Health and Medical Education, for instance, in the Iranian job market, due to the continuous loss of customers and the public interest in their services, general practitioners' dignity is lost (Derakhshani, 2013). Consequently, while choosing LIS, for instance, as a discipline, applicants should pay close attention to such necessary factors of success in the job market as "the number and diversity of available job opportunities", "the economic blooming of the society", "the number of graduates looking for a job", "the number of libraries and information centers", "the required knowledge and skills of graduates and the needs of the job market", so that they can plan appropriately (Mansourian, 2011).

Using comprehensive knowledge about the realities of the job market, LIS planners in Iran and other countries could better plan for opportunities provided by IT and prevent these opportunities from turning into threats. Otherwise, all job opportunities for librarians would be occupied by computer and IT experts within the next few years (Heidari, et al., 2011; Mansourian, 2011). Therefore, it is necessary to have continuous monitoring of available educational realities and the job market in order to help educational planners to improve planning and filling the gap between the job market needs and higher education programs (Goddard, 2003; Azizi, 2004; Farajpahlou and Danesh, 2009; Karami and Momeni, 2011).

The lack of perfect information about the newly emerging IT-based job opportunities and competencies required for these job types are the main focus of the present study. The perfect information about the newly emerging librarian jobs would prevent the national capital (financial and human capital) loss and bring more success[1] for LIS graduates in the job market (Horri and Qazi Mirsaeid, 2007).

It should be noted that finding a job in a country like Iran, due to its particular economic conditions and limited job opportunities, is very difficult. Iran had a negative economic growth in 2012 and more than 7 million unemployed people in the mid-2014. According to the statement made by the Minister of Economy and Finance, the number of the unemployed will rise up to 10 million people, as a result of students' entrance into the job market, in the next few years[2]. In the world, the condition of the job market is not much favorable and there are more than 75 million[3] young unemployed job seekers[4].

Literature review

The librarian, in his traditional role, was assumed to be a person who provides information for patrons by using various tools and techniques (Matthews, 2002). However, with the advent of Information Technology, new careers appeared in the job market and significant changes in a librarian's role emerged (Gottesman, 2002; Graham, 2003).

Considering the effect of IT on the LIS job market, various studies (XU, 1996; Yuan, 1996; Kimberley and Beverly, 1999; Wu, 2000; Beverly, 2001; Clyde, 2002; Pember, 2003; Fisher, 2004; Hall and Abell, 2006; Kennan, et al., 2006a, 2006b; Choi and Rasmussen, 2009; Mathews and Pardue, 2009; Park and Lu, 2009) have been conducted by analyzing the content of job advertisements. These studies, while confirming the impact of IT on LIS careers and job competencies, highlight the need to learn new skills for success in the job market. The review of the above and below literatures (Croneis and Henderson, 2002; Gerolimos and Konsta, 2008; Karbala Aghaie, 2008; Farajpahlou and Danesh, 2009; Nonthacumjane, 2011; Heidari, et al., 2011; Mansourian, 2011; Ocholla and Shongwe, 2013) shows that none of them has fully identified and classified IT-based librarian jobs. In addition, these studies do not give a comprehensive report about competencies (*i.e.* knowledge, skills, and attitudes) related to the IT Librarian job category.

Xu (1996) analyzed job advertisements in *American Libraries Magazine* from 1971 to 1990 to assess the effect of automation on job requirements for catalogers and reference librarians. He found an increasing need for computer skills in both areas. He noted that the demand for oral and written communication skills first appeared in his data between 1976 and 1980.

In addition, Yuan (1996) performed a systematic quantitative analysis of trends in demand for computer-related skills for Academic Librarians from 1974 to 1994. He found out that 13 IT-related skills appearing in job advertisements that included knowledge or skills were bibliographic utilities, automated library systems, online database searching, programming, computer hardware, networks, Internet searching, resources in electronic formats, image technology or multimedia, *etc*.

In a similar study, Croneis and Henderson (2002) conducted the content analysis of job advertisements from 1990 to 2000. The findings demonstrated that, in addition to the need for librarians with traditional skills, the number of advertisements in which the words "digital" or "electronic" were followed by the word "librarian" had increased significantly within those years.

Gerolimos and Konsta (2008) investigated job advertisements for LIS in Canada, US, England, and Australia in 2006 and 2007. They found 38 skills and qualifications in reviewing job advertisements. The knowledge and skills of "library automated systems", "the use of software applications", and "the management of web pages" were announced at 27%, 25%, and 25% of the advertisements, respectively.

Furthermore, Choi and Rasmussen (2009) carried out the content analysis of job advertisements from 1999 to 2007. They verified "shifts in staffing needs and required qualifications with a digital focus on collections, services, and technology applications in academic libraries." The results confirmed that a digital librarian was "an emerging position in academic libraries."

Nonthacumjane (2011) conducted a study on the basis of content analysis. The statistical population of this study was published texts and sources on librarians' skills and competencies within 14 years, from 1997 to 2010. The identified skills and competencies were categorized into 3 groups: personal skills, generic skills, and discipline-specific knowledge.

In a recent study, Ocholla and Shongwe (2013) declared that having IT skills was considered to be an essential element in finding a suitable job for LIS graduates. In addition, they noted that the LIS job market had grown and new job titles had emerged. At the end of the paper, they mentioned that a revision of LIS educational programs was necessary.

In Iran, Karbala Aghaie (2008) studied the recruitment status of Alzahra University LIS female graduates in the job market from 1999 to 2001. The findings indicated that 85% of alumni were employed (54% of whom were employed within a year after graduation). Moreover, according to Farajpahlou and Danesh (2009), "In Iran, librarians in the section of Information Science work alongside a computer expert and should any acute IT-related problem arises, this expert will be called on to solve it. The failure to acquire necessary skills and qualifications required to operate the latest IT software during their education is one of the reasons for the inability of librarians in the section of Information Science to fully perform their duties." Heidari, et al. (2011) suggested the necessity of teaching 12 core competencies to the LIS students in Iran. Mansourian, Alipour, and Ghorbani (2013) found that the "educational background", "computer skills", "research activities", "proficient in English", and "communication skills" were considered to be important criteria for graduates' success in the job market. In another research, Mansourian (2011) studied the impact of IT on LIS job market and the creation of new job opportunities. The findings revealed that the development of new technologies has a positive impact on the LIS job market. Therefore, new opportunities and roles are provided for professionals of this discipline. Moreover, by introducing new positions, traditional jobs are not removed from the job market and they exist alongside new jobs. At the end of the study, he suggests that eager researchers study job advertisements in order to complete their studies and investigate required competencies for newly emerging jobs in LIS. The current study is carried out with this aim and aims to answer the following questions in order for further consideration of the job market. Such studies provide better planning and cause more employment for Information Science graduates in the job market.

Research questions

The following questions are addressed in this research:

RQ1. What are newly emerging IT-based job titles for LIS graduates in the job market in 2013?

RQ2. What is the classification of newly emerging IT-based Librarian job titles according to their similarities?

RQ3. What is the competency required for the IT-based librarian on the basis of the content analysis of job opportunities?

Methodology

The current study is an applied research and its method is content analysis. Content analysis[5] has been used in similar studies (Clyde, 2002; Adkins, 2004; Kennan, et al., 2006a; Wu and Li, 2008; Choi and Rasmussen, 2009; Park, Lu, and Marion 2009; Gold and Grotti[6], 2013; Ocholla and Shongwe, 2013; Gerolimos, Malliari, & Iakovidis, 2015). The statistical population of this study was published job advertisements in the field of Library and

Information Science from January to December in 2013.

This study was conducted in multiple steps. In the first step, in order to identify the initial list of newly emerging IT-based librarian[7] jobs, the following resources were used:

- Studies including Yuan, 1996; Croneis and Henderson, 2002; Choi and Rasmussen, 2009; Mansourian, 2011);
- Job finding websites such as American Library Association Website (Joblist.ala.org), American Bureau of Labor Website (Bls.gov), Job Analysis Website (Onetonline.org); and the websites including Simplyhired.com, Monster.com, *etc*. (Table 1).

These job finding websites had notable features which influenced their being selected. First, since the establishment of LIS as one of official academic disciplines, the speed of its development was more in countries where the servers of these websites were located (*i.e.* US, England, Canada, and Australia) than elsewhere (Mansourian, 2011). Second, the English language was used on these websites had made it easier to choose job titles. Furthermore, these websites were up-to-date and, in some cases, covered jobs available in various countries. In other words, these websites, such as Monster.com, had a comprehensive database.

Table 1

List of job finding websites which were used to draw out an initial list of newly emerging IT-based librarian jobs

Row	URL	Country	Row	URL	Country
1	http://www.monster.com	USA	12	http://aallnet.org/	USA
2	http://www.careerjet.co.uk/	UK	13	http://jobhub2me.jobamatic.com	USA
3	http://www.cla.ca	Canada	14	http://joblist.ala.org	
4	http://www.ifla.org/ii/lists/libjobs.htm	Netherlands	15	http://jobs.libraryjournal.com/	USA
5	http://www.indeed.com	USA	16	http://publicboard.libgig.com/	USA
6	http://www.jobisjob.ca/librarian/jobs	Canada	17	http://simplyhired.com	USA
7	https://www.usajobs.gov	USA	18	http://www.alia.org.au/employment/vacancies/	Australia
8	http://www.lisjobs.com/	USA	19	http://www.arl.org/resources/careers/	USA
9	http://www.lisjobnet.com/	UK	20	http://www.beyond.com	USA
10	http://www.cilip.org.uk/jobs-careers/pages/default.aspx	UK	21	http://www.jobisjob.co.za/	South Africa
11	chronicle.com	USA	22	jobsite.co.uk	USA

Table 2

The initial list of newly emerging IT-based librarian jobs/

Jobs Titles/Positions
Communication librarian, Data librarian, Database librarian, Digital and web services librarian, Digital archivist, Digital asset librarian, Digital collections librarian, Digital initiatives librarian, Digital librarian, Digital media librarian, Digital resources librarian, Digital services librarian, Digital system librarian, Director of library and information technology, Director of library technology, Distance services librarian, Electronic information librarian, Electronic resources librarian, Electronic resources management, Electronic services librarian, Electronic/web services librarian, Emerging technologies librarian, E-resources librarian, Global data librarian, Head of systems, university libraries, Head of web services, Information literacy librarian, Information

Jobs Titles/Positions
services librarian, Information technology librarian, Information technology manager, Instructional technology librarian, Integrated technologies librarian, Library systems programmer/analyst, Media asset librarian, Media services librarian, Metadata librarian, Metadata librarian/cataloger, Online librarian, Reference and electronic resources librarian, Resource sharing specialist, Software librarian, Systems and web librarian, Systems librarian, Systems librarian/web librarian, Systems/web services librarian, Technology librarian, Web and user interface librarian, Web librarian, Web librarian/e-resources librarian, Web services librarian

After a preliminary literature review and the analysis of the websites, 50 IT-based librarian job titles were added to Indeed.com, the job finding website, to send the job advertisements to the researchers' email. Indeed.com has been selected because of its up-to-date information, high number of job advertisements, easy management of searching keywords, comprehensive database (covering more than 55 countries' jobs), and capability of sending the result of more than 10 job titles simultaneously. It should be noted that other job finding websites lacked synchronicity in all above-mentioned capabilities; for instance, Simplyhired.com, a famous job finding website, lacked the capability of saving and sending more than 10 job titles simultaneously.

In the next step, 596 job opportunities[8] which were available on Indeed.com and related to 10 countries[9] (USA, Canada, England, Australia, South Africa, India, Hong Kong, United Arabic Emirates, Philippine, New Zealand) were analyzed on the basis of their content. It should be mentioned that these job opportunities were chosen purposefully[10]. Then, in order to answer the third research question, 143 IT Librarian category job advertisements out of 227 job opportunities (Table 4), were selected randomly based on the sample size determination formula (Krejcie and Morgan, 1970). After further review, 31 items of job advertisements were excluded because of lack of data and 112 job advertisements were considered for final analysis.

The data collection process took place by means of the checklist and their analysis was done through the SPSS software.

The content of job advertisements related to newly emerging IT-based librarian jobs were first analyzed. Then, titles of competencies (*i.e.* knowledge, skills, and behavioral properties) were entered into an initial researcher-made checklist. After conducting the content analysis of all statistical samples, it was identified that the total number of competencies required for finding an appropriate job in the IT Librarian job category was 82 items.

From among the librarian jobs, the samples having the following conditions were selected:

1. Librarian jobs for the emergence of which IT has paved the way.

2. Librarian jobs the performance of which is impossible without having IT knowledge and skills.

In other words, the samples were limited to the job advertisements, such as those for a Digital librarian and IT librarian, in which it was impossible to employ the applicants without having librarian and IT skills simultaneously.

Findings

In this section, the research findings in relation to the research questions are presented by

using tables. In the next section, discussion, conclusions, and implications regarding the findings are provided.

Table 3 shows that 596 IT-based Librarian job opportunities were reflected on Indeed.com. Out of these advertisements, the systems librarian position with the frequency of 55 (9.2%) is in the first place. Positions of metadata librarian, electronic services librarian, and digital archivist, with the frequencies of 50 (8.4%), 48 (8.1%), and 28 (4.7%) are respectively in the second, third, and fourth places. In addition, Table 3 indicates that 40% of the job advertisements are allocated to the jobs of the rows from 1 to 8.

Table 3
Newly emerging IT-based librarian job titles for LIS graduates

Row	Job Title	Frequency	Percent	Cumulative Percent
1	Systems Librarian	55	9.2	9.2
2	Metadata Librarian	50	8.4	17.6
3	Electronic Resources Librarian	48	8.1	25.7
4	Digital Archivist	28	4.7	30.4
5	Web Services Librarian	16	2.7	33.1
6	Digital Initiatives Librarian	13	2.2	35.2
7	Digital Librarian	12	2.0	37.2
8	Emerging Technologies Librarian	12	2.0	39.3
9	Electronic Services Librarian	11	1.8	41.1
10	Digital Services Librarian	9	1.5	42.6
11	Technology Librarian	9	1.5	44.1
12	Digital Collections Librarian	6	1.0	45.1
13	Digital Resources Librarian	6	1.0	46.1
14	Information Literacy Librarian	6	1.0	47.1
15	Research Data Librarian	6	1.0	48.2
16	Information Technology Librarian	5	.8	49.0
17-20	4 (E-Resources Librarian, Systems Librarian/Web Librarian, *etc*.)	4	2.8	51.8
21 -134	3 and Less (Digital Librarian/Learning Leader, Library and E-Resources Advisor, Metadata Services Librarian, Scholarly Communications Librarian, Software Librarian, Web and Digital Services Librarian, *etc*.)	113	48.2	100.0
	Total	596	100.0	

By classifying job titles in Table 3 into four categories, Table 4 was drawn up. The validity of this classification was approved by seven Iranian assistant professors in Information Science. Table 4 shows that the Systems Librarian/ IT Librarian job category[11] with the frequency of 227 (38%) stands in the first place and the categories of Digital Services Librarian/ Digital Librarian[12], Metadata Librarian,[13] and Digital Archivist with the frequencies of 213 (36%), 103 (14.5%), and 53 (9%) respectively stand in the second, third, and fourth places.

According to Table 5, USA, with 464 IT-based job opportunities, stands in the first place. England and Canada, with 39 job opportunities, stand in the second place. Australia and South Africa, both with 7 IT-based job opportunities, stand in the third place.

Table 4
The categories of newly emerging IT-based librarian jobs by country and frequency

Country	Job Title/ Position Categories				Total
	Systems Librarian / IT librarian	Digital Services Librarian/ Digital Librarian	Metadata Librarian	Digital Archivist	
USA	197	158	94	35	484
UK	11	18	1	9	39
Australia	1	6	0	0	7
Canada	6	19	6	8	39
India	0	2	0	0	2
UAE	2	1	2	0	5
Hong Kong	2	0	0	0	2
South Africa	0	6	0	1	7
Philippines	4	1	0	0	5
New Zealand	4	2	0	0	6
Total	227 (38%)	213 (36%)	103 (17%)	53 (9%)	596

The required knowledge, skills, and abilities differ according to the job types; for instance, an archivist's required knowledge and skills differ from an electronic resource librarian's (Ocholla and Shongwe, 2013). Owing to this fact and the long competency list of the 4 job categories, the current study reports the knowledge and skills required just for the IT librarian/ Systems librarian job category (Table 5).

After a deeper content analysis of 112 job advertisements, 75 items of knowledge and skills were identified and then classified into 6 categories according to their similarities. As already noted, the validity of this classification was also approved by the seven Iranian assistant professors in Information Science. These 6 categories are 1. Computer Basics; 2. Internet, Databases, and Electronic Services; 3. Website Designing and Management; 4. Basic Programming and Database Designing; 5. Computer Networking; and 6. Library Softwares and Computerized Cataloging.

According to Table 5, the frequency and the percentage of the items available in the 1st to the 11th place are as follows:

1. Knowledge of basic concepts of web designing: domain name, hosting, URL, IP address, FTP, hyperlink, concept of sub-domain, free hosting, website, web page, first page, link, web control panel, bandwidth, RSS, podcast, browser plug-in, cookie file, multimedia, weblog, and free chat services – 51 (46%).

2. Knowledge and skills of common software for content management and website creators – 48 (44%).

3. Knowledge of host and domain registration in the network environment; knowledge and skills of file transferring to web servers and the website update; knowledge of free web designing services (including free codes for web development, adding a calendar, poll service, web users counting, adding vertical and horizontal navigation menus to websites, *etc*.) – 47 (42%).

4. Familiarity with the terminology and the basic concepts of computer: the main components of computer and its accessories (including graphics card, audio card, network interface card, motherboard, CPU, monitor, the main memory, secondary memory, DVD writer, Bios, port, PC power supply, scanner, printer, *etc*.), hardware, software, operating system and its different kinds, the history of computer, computer types, information technology, drive, file format, control panel, computer user, computer name, *etc*. – 46 (41%).

5. Knowledge of DHTML/CSS – 45 (40%).

6. Knowledge and skills of installing and using Windows operating system (the latest versions) and Windows troubleshooting, ability to assemble hardware parts (graphics card, audio card, printer, scanner, *etc*.), applications and their troubleshooting – 41 (37%).

7. Communication skills – 38 (34%).

8. Knowledge and skills of the keyboard, appropriate and fast typing, and using Microsoft Word software – 30 (27%).

9. Knowledge and skills of PowerPoint and Excel – 27 (24%).

10. Knowledge of XML and JavaScript languages – 24 (21%).

11. Knowledge and skills of hiding files, file convertor software, locking folder and hard disk, download management, file compression, creating virtual drive, creating Gif, Pdf, and Doc format files; appropriate search methods (basic and advanced) in databases and the Internet, and developing and limiting searching strategies and improving the retrieved results; integrated library systems – 23 (20%).

It should be noted that if we want to make a fair judgment about Table 5, it is necessary to sum up the frequency of the rows from 62 to 73, which are related to the integrated library systems. In this case, its frequency is upgraded to 103 and the first rank in Table 5 is allocated to it.

Table 5

The required knowledge and skills for finding IT librarian /Systems librarian/ Web librarian according to the content analysis of job advertisements

Row	Knowledge and skills	Frequency	Rank
	1. Computer Basics		
1	Familiarity with the terminology and the basic concepts of computer: the main components of computer and its peripherals (including graphics card, audio card, network interface card, motherboard, CPU, monitor, the main memory, secondary memory, DVD writer, BIOS, ports, PC power supply, scanner, printer, *etc*.), hardware, software, operating system and its different kinds, the history of computer, computer types, information technology, drive, file format, control panel, computer user, computer name, *etc*.	46	4

Row	Knowledge and skills	Frequency	Rank
2	Knowledge and skills of hiding files, common file convertor software, locking folder and hard disk, download management software, file compression software, creating virtual drives, writing DVD software, creating files in different formats (for example, Gif, Pdf, and Doc formats)	23	11
3	Knowledge and skills of installing and using Windows operating system (the latest versions) and Windows troubleshooting, installing principles of the hardware (graphics card, audio card, printer, scanner, *etc*.), applications and their troubleshooting	41	6
4	Knowledge and skills of the keyboard, appropriate and fast typing, and using Microsoft Word	30	8
5	Knowledge and skills of typing, layout, and editing a work in Microsoft Publisher	6	26
6	Knowledge and skills of Paint	15	17
7	Knowledge and skills of PowerPoint	27	9
8	Knowledge and skills of Mac OS	3	28
9	Knowledge and skills of ICDL (ECDL)	3	28
10	Knowledge and skills of creating a backup file	16	16
11	Knowledge and skills of restoring, operating system and files (by a backup file) through special kinds of software (such as Acronis True Image)	13	19
12	Knowledge and skills of PC troubleshooting and solving problems (hardware and software)	15	17
13	Knowledge of computer systems potential threats (viruses, worms, *etc*.) and ways of dealing with them	21	12
	2. Internet, Databases, and Electronic Services		
14	Knowledge and skills of appropriate searching methods (basic and advanced) in databases and the Internet, developing and limiting searching strategies, and improving the retrieved results	23	11
15	Knowledge of search engines and their principles and knowledge of directory (Internet guides) and ways of its preparation and utilization	19	13
16	Knowledge of web 2.0 services (social networks, wikis and weblogs)	21	12
17	Knowledge and skills of providing consultation (through calls, email, and chat) and training users	19	14
18	Knowledge of different kinds of databases and ways of registering and gaining access to them	21	12
19	Familiarity with free scientific resource websites (reference sources, scripts, articles, and movies) and ways of using them	14	18
20	Familiarity with digital scientific sources and ways of providing them	16	16
21	Communication skills (oral, written, and body language)	31	7
	3. Website Designing and Management		
22	Knowledge of web designing basic concepts, including domain name, hosting, URL, IP address, FTP, hyperlink, subdomain, free Hosting, website, webpage, homepage, link, bandwidth, RSS, podcast, cookie file,	51	1

Row	Knowledge and skills	Frequency	Rank
	multimedia, blog, and free chat services		
23	Knowledge and skills of web conferencing software's (e.g. Skype)	1	30
24	Knowledge and skills of website designing software (portal software)	49	2
25	Knowledge and skills of creating and editing, graphic files with Photoshop or Visio software	14	18
26	Knowledge and skills of making and editing flash files with Adobe Flash Professional	1	30
27	Knowledge of hosting and domain registration on the web; knowledge and skills of file transferring to web servers; knowledge of free web designing services (including free codes for web development, adding a calendar, poll service, web user counting, adding vertical and horizontal navigation menus for website, *etc*.)	47	3
28	Knowledge and skills of web page designing with Expression Web or FrontPage	13	19
29	Knowledge and skills of web designing with Adobe Dreamweaver	17	15
30	Knowledge and skills of adjusting up a web server with Microsoft Internet Information Services (IIS)	11	21
31	Knowledge of DHTML/CSS	45	5
32	Knowledge of XML	24	10
33	Knowledge of JavaScript	24	10
34	Knowledge and skills of content management by WordPress systems	3	28
35	Knowledge and skills of content management by Drupal systems	12	20
	4. Basic Programming & Database Designing		
36	Knowledge and skills of creating a simple database with Microsoft Access (how to create a simple table), the concept of query, relational database and the principles of creating it, and creating reports and forms	17	15
37	Knowledge of database architecture	4	27
38	Knowledge and skills of SharePoint	8	24
39	Knowledge and skills of Excel	27	9
40	Knowledge and skills of MySQL database management system	11	21
41	Knowledge and skills of Oracle database management system	4	27
42	Knowledge and skills of SQL Server database management system	7	25
43	Knowledge of PHP scripting language	19	14
44	Knowledge of ASP scripting language	3	28
45	Knowledge of VB programming language	2	29
46	Knowledge of Java programming language	10	22
47	Knowledge of Ruby programming language	4	27
48	Knowledge of SQL programming language	8	24
49	Knowledge of Python programming language	9	23
50	Knowledge of Perl programming language	7	25
	5. Computer Networking		
51	Familiarity with the terminology and the concepts of the network: networking equipment, network protocols, client/server; firewall;	13	19

Row	Knowledge and skills	Frequency	Rank
	LAN/WAN networks, IP versions, WiMAX networks, Bluetooth, ADSL; network standards, DHCP servers, Office automation		
52	Knowledge and skills of setting up a Workgroup network	12	20
53	Knowledge and skills of setting up a Client/Server network	10	22
54	Knowledge of network topology	11	21
55	Knowledge of network security	9	23
56	Knowledge and skills of proxy server (e.g. EZProxy)	9	23
57	Knowledge and skills of setting up Wi-Fi networks	8	24
58	Knowledge of sharing files, printers, and setting up Internet access in networks	10	22
59	Knowledge and skills of designing, setting up, maintaining and troubleshooting of a small LAN network (about 100 computers) and the required hardware (including network adaptor, server operating system, network cables, switch, modem/router, access point, *etc*.)	11	21
60	Knowledge and skills of other useful pieces of software in network environment such as Net Support, TeamViewer, or remote desktop	4	27
61	Knowledge and skills of Linux OS	8	24
	6. Computerized Cataloging & Library Software		
62	Knowledge and skills of using Integrated library systems	23	11
63	Knowledge and skills of CONTENTdm ILS (Integrated Library System)	15	17
64	Knowledge and skills of Voyager ILS	8	24
65	Knowledge and skills of Millennium (Sierra) ILS	16	16
66	Knowledge and skills of ALEPH ILS	6	26
67	Knowledge and skills of Sirsidynix ILS	10	22
68	Knowledge and skills of Archivematica (Open-Source Content Management System)	2	29
69	Knowledge and skills of Dspace (Open-Source Content Management System)	11	21
70	Knowledge and skills of Koha (Open-Source Content Management System)	3	28
71	Knowledge and skill of Omeka (Open-Source Content Management System)	6	26
72	Knowledge and skills of Greenstone (Open-Source Content Management System)	2	29
73	Knowledge and skills of ICA-AtoM (Open-Source Content Management System)	1	30
74	Knowledge of Barcode, RFID, and their usage	2	29
75	Knowledge and skills of metadata standards and information organizing tools such as Marc, OCLC, Dublin Core, METS/MODS, LC/NLM, LCSH	16	16

Table 6 shows the behavioral characteristics and personal skills for finding IT librarian/ Systems librarian jobs. Personal skills mean appropriate attitudes, values, and personal traits (Khoo, 2005). According to Table 6, the items of individual and teamwork skills, self-management and self-motivation, problem-solving with the frequencies of 14, 11, and 9 stand

respectively in the first, second, and third place.

Table 6
The required behavioral characteristics for finding IT librarian/ Systems librarian/ Web librarian jobs, according to the content analysis of job advertisements

Row	Behavioral characteristics	Frequency	Rank
1	Individual and Teamwork skills	14	1
2	Problem-solving	9	3
3	Interest in learning technologies and new tools and compatibility with them	4	5
4	Enthusiasm for working with computer and software	3	6
5	Speed (Time management) & Accuracy in performing tasks	5	4
6	Self-management & Self-motivation	11	2
7	Flexibility	4	5

Discussion and Conclusions

There are various job opportunities for LIS graduates. It seems that the development of new technologies is not regarded as a threat to the LIS discipline in the world and yet it has provided new opportunities and new job titles or positions. Nevertheless, by emerging new positions, traditional librarian jobs are not eliminated and we can still see a great number of these kinds of jobs such as "Librarian, cataloging Librarian, and Reference Librarian" (Mansourian, 2011; Ocholla and Shongwe, 2013). The global popularity of the web and its ease-of-use has caused libraries to make their scientific resources available to audiences through an integrated web-based content management system. In order for their graduates to be more successful, the educational systems of LIS should continuously monitor knowledge and skills required by the labor market (Choi and Rasmussen, 2009) and develop an appropriate plan for it.

There is no doubt that more success in the LIS job market depends on IT competencies (knowledge, skills, and attitudes) (Xu, 2003). In this regard, the present study was carried out to identify the LIS job market and its required IT-related competencies better. Findings showed that there were more than 100 new IT-based librarian job titles in 596 job advertisements from January to December in 2013 (Table 3). After a precise analysis of content, the identified job titles were classified into 4 categories according to their similarities. The job category of IT librarian/ Systems librarian with the frequency of 227 (38%) stands in the first place and the categories of Digital Services Librarian/Digital Librarian, Metadata Librarian, and Digital Archivist with the frequencies of 213 (36%), 103 (14.5%), and 53 (9%) respectively stand in the second, third, and fourth place in terms of their frequency in the job market. Croneis and Henderson (2002) found that the job advertisements carrying the word "digital" or "electronic" in their titles had an increasingly popular trend from 1990 to 2000. In similar studies, Choi and Rasmussen (2009), Tammaro (2009), and Gerolimos and Lu (2009) found that a significant proportion of LIS/IM graduates were employed in traditional library contexts as digital librarians or metadata professionals. Furthermore, Ocholla and Shongwe (2013) stated that the new IT-based librarian job titles had emerged in South Africa's job

market.

In this research, the findings showed that there were 75 items of knowledge and skills in job advertisements for employment as an IT Librarian. Based on the type of services and locations, these items were classified into 6 categories: 1. Basic Computer Skills; 2. Internet, Databases and Electronic Services; 3. Website Designing and Management; 4. Basic Programming and Database Designing; 5. Computer Networking; and 6. Computerized Cataloging and Library software. Moreover, the findings showed that knowledge and skills, including "web designing and management", "basic computer skills (troubleshooting, installing, file converting, etc.)", "communication skills", "Microsoft Office (Word, PowerPoint, and Excel)", "XML and JavaScript", "advanced database searching", and "integrated library systems" were more important criteria for a person to be employed as an IT librarian. Most professional studies emphasized "basic or advanced" IT skills for librarians (Marion, 2001; Huwe, 2004; Khoo, 2005; Gerolimos and Konsta, 2008; Heinrichs and Lim, 2009; Gerolimos, 2009; Wise, Henninger, and Kennan, 2011; Tang, 2013; Raju, 2014).

Marion (2001) found that competencies, including automated library system, computer hardware, highly motivated, e-resources, self-management, interpersonal and communication skills, programming languages, teamwork, and website maintenance were necessary for working in a digital library. These findings are consistent with the results of current research.

The findings of this research are also consistent with the results of the study by Huwe (2004) who found that "librarians must be current with 'web design skills' using HTML, CSS, and XML as well as in web site administration to support a library's development and information content creation requirements."

In a similar study, the University of Melbourne (2008) stated that LIS graduates should be equipped with knowledge and skills such as web development, integrated library systems, Web 2.0, database management, XML management, Z39.50 and Dublin core, database searching, and conservation and archives to succeed in the future job market. Khoo (2005) in a study found a list of the required knowledge and skills for librarians: the web and XML, Windows OS, word processing, spreadsheet, database tools, *etc*. The findings of Gerolimos and Konsta (2008) too were consistent with the findings of the current study. They reported 38 skills and qualifications for success in the job market. In their findings, items such as communication skills, library automated systems, the use of software applications, and the management of websites were announced at 65%, 27%, 25%, and 25% of the advertisements, respectively. 6 years before that, they have anticipated that "*Although ICT skills have a relatively low percentage, we can expect that this will change in the future"* (p. 695).

The findings of the current research could somewhat approve the prediction by Gerolimos and Konsta (2008) because the impact of IT is tangible in the 596 identified job titles. Furthermore, in the content analysis of job advertisements it was realized that approximately half of those advertisements including website designing and management skills, the maintenance of computer systems, and integrated library systems were considered to be the essential items for employment (Table 5).

Heinrichs and Lim (2009) mentioned that specific skills, including web design, multimedia, computer skills, database, spreadsheet, presentation, and word processing were emerging requirements for librarians in the era. Moreover, they concluded that "to meet the

needs and requirements of patrons, libraries need to retrain existing librarians and hire new librarians with specific skills and competencies."

Gerolimos (2009) found that teaching communication, networking, markup languages, metadata, web page design, digitizing, and databases were visible in 20% of LIS programs. In addition, Wise et al. (2011) showed that generic IT skills, metadata, and library systems skills were mentioned in 52.2%, 14.9%, and 14.7% of job advertisements, respectively, which is in consistent with the findings of the current study. Web designing and management skills were considered necessary in other professional literatures (Clyde, 2002; Kennan, et al., 2006b; Shank, 2006; Mathews and Pardue; 2009; Raju, 2014). In a recent study, Tang (2013) demonstrated that "computer skills" were mentioned in 71% of job advertisements. Furthermore, the level of IT skills has increased for librarians over the decades, particularly in the areas of design, creation, and maintenance of websites. Moreover, before the early 1990s, the computer skills referred to in job advertisements were detailed as a simple competency with Microsoft Office applications. However, after the mid-1990s, advanced skills such as web page design, HTML, and video conferencing appeared in the advertisements.

Knowledge and skills, including metadata, "database designing and DBMS", "content management system", and integrated library systems (ILS) were discussed in other studies (Tennant, 1999; Kwasik, 2002; Lovato-Grassman, 2003; Orme, 2008; Howard, 2009; Choi and Rasmussen, 2009; Nonthacumjane, 2011). Communication skills were also considered important in many other papers (Steele and Guha, 1998; Ashcroft, 2004; Fisher, 2004; Luo, 2007; Gerolimos and Konsta, 2008; Raju, 2014).

The findings of the current study indicate that individual and teamwork skills, self-management and self-motivation, and problem-solving with the frequencies of 14, 11, and 9 respectively stand in the first, second, and third place. The findings are consistent with the results of the research conducted at the University of Melbourne (2008) which demonstrated that employees in academic libraries should already have or obtain the following skills: flexibility, adaptability, eagerness and quick learning, proactive and innovation, marketing and promotion, collaboration and team-orientedness, problem-solving skills, and mentoring skills.

In other studies, (Xu, 1996; Feret and Marcinek, 1999; Goulding, et al., 1999; Lynch and Smith, 2001; Kwasik, 2002; Lovato-Grassman, 2003; Khoo, 2005; Myburgh, 2005; Shank, 2006; Gerolimos and Konsta, 2008; O'Connor and Li, 2008; Orme, 2008; Choi and Rasmussen, 2009, Howard, 2009; Howard, 2010; Nonthacumjane, 2010, Nonthacumjane, 2011, Gold and Grotti, 2013; Ocholla and Shongwe, 2013; Raju, 2014), skills and personality traits mentioned above were thoroughly discussed. These studies emphasized that skills and personality traits, including problem-solving, flexibility, adaptability, collaboration and teamwork, and self-motivation, were important for a librarian and his success in the job market.

As mentioned previously, the applicants must acquire the necessary knowledge, skills, and attitudes through the educational system to get prepared to be an IT. A prerequisite to training an ideal employee through the educational system is the permanent monitoring of the job market and wise planning. The findings of this research provide valuable information about newly emerging IT-based librarian jobs and can be used by educational planners in Iran

and other countries.

It should be noted that the domain of the current study was just limited to the accessible advertisements on Indeed.com, the English language, and the aforementioned 10 countries. Moreover, a large number of advertisements that were reflected in other resources or websites were not analyzed in this study.

While studying and analyzing job opportunities, it was found that some of the samples had repeated information which had already been published by different job hunting websites and this issue caused delays in our research.

According to the research findings, and with emphasis on Iran, the following suggestions are offered:

1. Approving and implementing the LIS master program under the subtitle of "Information Technology" in Iran;

2. Deeply analyzing the required skills for each of the introduced jobs in the current paper;

3. Investigating the job market of LIS in Iran and comparing it with other similar countries[1];

4. To hold workshops on "Communication Skills", "Web Designing and Management", and "Skills of Computer Networking" by the Iranian Association of LIS, in order to increase knowledge and empower librarians.

Implications

Our findings demonstrated that IT-based emerging library careers could be classified into four major job groups in the global job market. The authors suggest that the LIS academic departments in Iran provide the students with the information about "IT Librarian", "Electronic Resources/Services librarian", "Digital Archivist", and "Metadata Librarian".

Considering the incompetency of the LIS programs in Iran (Heidari, et al., 2011; Mansourian, 2011), LIS departments need to benefit from the existing capacity in IT and Computer Science departments. The IT departments should serve as educational companions. Furthermore, LIS departments, should extend their pool of candidates to IT and engineering graduates and should not focus exclusively on the humanities.

Moreover, the findings indicated that in order to land a job in the IT Librarian job category, a candidate needs to satisfy 82 items of competency (such as communication skills, Web Designing, *etc.*). The authors cannot confidently assert that the LIS education, particularly in Iran and the countries in the same development band, needs to focus on fostering and developing strong verbal and non-verbal communication skills. In spite of the current ascendancy of technology in modern libraries, establishing proper communication is still extremely influential in improving the status of libraries as well as boosting the social standing of librarians.

The Education Planning Committee on LIS in Iran should take into consideration the 82 competency items identified in this research. The curriculum improvement on the basis of the realities of the global job market will contribute to graduates' more success.

Endnotes

1. In 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, 2005).

2. The first report of the Iranian Minister of Economic Affairs and Finance about the reality of economic condition of country: "Economic growth is close to zero, 7 million jobseekers" (Alef.ir Website; Shahrivar the 3rd, 1393; Code: 254654).

3. The latest report of the Statistical Center of Iran about unemployment rate (Alef.ir Website; Farvardin the 25th, 1393; Code: 184375).

4. "What is the Unemployment Rate in the World?" (According to Economist, Fararu.com Website, Ordibehesht the 11th, 1392; Code: 148282).

5. In one study, White (1999) summarized that content analysis studies of position announcement could be sorted into one of the following three types: "those looking at specific types of positions ..., those analyzing specific skills mentioned in position advertisements, and those studying more general issues."

6. Gold and Grotti (2013) mention that the library profession has used content analysis to examine job advertisements for many decades.

7. It means, a job which requires knowledge and skills in LIS and Information Technology. In other words, these kinds of jobs are influenced significantly by Information Technology.

8. Out of 596 job opportunities, 484 job advertisements were related to the USA and 112 items to other countries.

9. Due to not having English websites or IT-Based librarian job opportunities in 2013, the other 45 countries were omitted from statistical analysis.

10. In this method of sampling, the researcher considers definite criteria for sampling and on that basis, he selects the appropriate cases (Mansourian, 2011).

11. Job titles such as Systems Librarian, Web Services Librarian, Technology Librarian, Information Technology Librarian, Integrated Technologies Librarian, Site Librarian, Systems Librarian/Web Librarian, Head of Web Services Library, Software Librarian, Academic Technology Librarian, Computer Systems Librarian, and Systems and Web Librarian were classified under this category.

12. Job titles such as Digital Librarian, Electronic Resources librarian, Digital Resources librarian, Digital Services Librarian, Electronic Services Librarian, Digital Collections Librarian, Database Librarian, E-Resources Librarian, Digital Content Librarian, E-Learning Librarian, Electronic Resource Specialist, Serials and Electronic Resources Librarian, Communication Librarian, Digital Initiatives Librarian, Information Literacy Librarian, and Resource Sharing Specialist were classified under this category.

13. Job titles such as Metadata Librarian, Metadata Services Librarian, Catalog/Metadata Librarian, Cataloging/Metadata Librarian, Metadata Librarian/Cataloger, and Metadata/Cataloging Librarian were classified under this category.

14. In this research, the global job market has been studied. After using some Persian job hunting websites, including Avval.ir, Lisna.ir, and Estekhdam.com, no newly emerging IT-

based librarian jobs in the Iranian job market were identified to be compared with other countries.

References

Adkins, D. (2004). Changes in public library youth services: A content analysis of youth service job advertisements. Public Library Quarterly, 23(3), 59–73, Available at: http://search.ebscohost.com/login.aspx?direct=true&db=lii&AN=502920590&site=ehost-live [accessed Feb 3, 2014]

Aliakbarzadeh, H. (1998). Librarians of the 21st century. Faslnameh Ketab (In Persian), 8(1), 98-105.

Alimohammadi, D. (2015). Bachelor of "Information Science" in Iran, in the proceedings of Dr. Abbas Horri Commemoration. Tehran: National Library of I. R. of Iran.

Ashcroft, L. (2004). Developing competencies, critical analysis and personal transferable skills in future information professionals. Library Review, 53, 82-88.

Azizi, N. (2004). Employment and Higher Education. In N. G. Ghourchian, H. Arasteh & P. Jafari (Eds.), Encyclopedia of Higher Education (Vol. 1, pp. 145-153). Tehran:The Grand Persian Encyclopedia Foundation

Beverly, P. L. (2001). The changing nature of work in academic libraries. College & Research Libraries, 62(5), 407-420.

Choi, Y., & Rasmussen, E. (2006). What Is Needed to Educate Future Digital Librarians: A Study of Current Practice and Staffing Patterns in Academic and Research Libraries. D-lib magazine, 12(9), 3.

Choi, Y., & Rasmussen, E. (2009). What qualifications and skills are important for digital librarian positions in academic libraries? A job advertisement analysis. The Journal of Academic Librarianship, 35(52), 457–467.

Clyde, L. A. (2002). An instructional role for librarians: an overview and content analysis of job advertisements, Australian Academic & Research Libraries, 33(3), 150-167.

Croneis, K. S., & Henderson, P. (2002). Electronic and digital librarian positions: A content analysis of announcements from 1990 through 2000. The Journal of Academic Librarianship, 28(4), 232-237.

Derakhshani, F. (2013). Decline of General Practitioner's Dignity in Iran", Interview with Fars News Agency (2013.5.26). Date of Visit: 2014.6.27, available at: www.farsnews.com/newstext.php?nn=13920526000036 [accessed 3 Jan, 2015]

Diyani, M. H. (2011). The Challenges in Implementing New Curriculum for BA Level of Library and Information Science. Ketabe Mah Kolliyat (In Persian), 14(9), 20-27.

Farajpahlou, A., & Danesh, F. (2009). Job description requirements for systems librarians in Iranian university libraries. The Electronic Library, 27(1), 58-73.

Feret, B., & Marcinek, M. (1999). The future of the academic library and the academic librarian: A Delphi study. Library Career Development, 7(107), 91–107.

Fisher, B. (2004). Workforce skills development: The professional imperative for information services in the United Kingdom. Paper read at the ALIA 2004 Biennial Conference, Gold Coast, Australia (21-24 September).

Genoni, P., & Kerry, S. (2005). Graduate employment outcomes for qualifying Library and

Records Management Courses at Curtin University of Technology. Australian Library Journal, 54, 336-352.

Gerolimos, M. (2009). Skills developed through LIS education. Library Review, 58(7), 527-540.

Gerolimos, M., & Konsta, R. (2008). Librarians' skills and qualifications in a modern information environment. Library Management, 29(8), 691-699.

Gerolimos, M., Malliari, A., & Iakovidis, P. (2015). Skills in the market: an analysis of skills and qualifications for American librarians. Library Review, 64 (1), 21-35.

Goddard, L. (2003). The integrated librarian: IT in the systems office. Library Hi Tech, 21(3), 309-16.

Gold, M. L., & Grotti, M. G. (2013). Do Job Advertisements Reflect ACRL's Standards for Proficiencies for Instruction Librarians and Coordinators? A Content Analysis. The Journal of Academic Librarianship, 39(6), 558-565.

Goswami, B., & Hangsing, P. (2012). Relevance of the rising job market for LIS professionals versus competencies needed with reference to Indian context. Trends in Information Management, 8(2), 54-74.

Gottesman, L. (2002). Digital reference: Bringing the reference desk to cyberspace. Library of Congress Information Bulletin, 61(4), 56-59.

Goulding, A., Bromham, B., Hannabuss, S., & Cramer, D., (1999). Supply and demand: the workforce needs of library and information services and personal qualities of new professionals. Journal of Librarianship and Information Science, 31(4), 212-223.

Graham, K. (2003). When the library becomes the largest computer lab on campus: Supporting productivity software in an academic environment. College & Research Libraries News, 64(7), 462-464.

Hall, H., & Abell, A. (2006). Who is managing information? Opportunities in the e-Information market place. In Online Information 2006. London, UK: Learned Information Europe Ltd.

Hassani, A. (2013). General Director of Higher Education Expansion, Interview, Mehr the 29th. Available at http://www.mehrnews.com/detail/News/2159200 [accessed 5 Feb, 2014]

Heinrichs, H., & Lim, J. (2009). Emerging requirements of computer related competencies for librarians. Library & Information Science Research, 31, 101–106.

Heydari, G., Farajpahlou, A., Osareh, F., & Geraei, E., (2011). The impact of Higher education on the Key Competencies of Library and Information Science BA students: The case study of Ferdowsi University of Mashhad", The Journal of National Studies of Librarianship and Information Organizing (In Persian), 93, 50-53.

Horri, A., & Qazi Mirsaeed, S. J. (2007). The Impact of Internal factors on Attitudes of the Country's Librarians and Medical Information Officers Based on their Positions in the future of the Career. Journal of Health Management (In Persian), 10(3), 51-58.

Howard, K. (2009). (Digital library) education or (digital) library education? An Australian perspective, (Master's thesis). Oslo University College; Tallinn University and the University of Parma.

Howard, K. (2010). Programming not required: skills & knowledge for the digital library

environment. Australian Academic & Research Libraries, 41(4), 260-275.

Huwe, T. K. (2004). Keep those web skills current. Computers in Libraries, 24(8), 40−42.

Karami, M. & Momeni M. H. (2011). Global Marketplace and its Impact on Curriculum Design. Journal of Curriculum Studies (In Persian), 6 (21), 67-100.

Karbala Aghaie, M. (2008). The Employment Status of Female Graduates of Library and Information Science in the Depression Years of University Graduates Employment in Job Market. Faslname Ketab (In Persian), 76, 73-90.

Kennan, M., Cole, F., Willard, P., Wilson, C., & Marion, L., (2006a). Changing workplace demands: What job ads tell us?" Aslib Proceedings, 58, 179-196.

Kennan, M., Willard, P., & Wilson, C., (2006b). What do they want? A study of changing employer expectations of information professionals. Australian and Academic Research Libraries, 37, 17-37.

Khoo, C. (2005). Educating LIS professionals for Singapore. In Celebrating 50 years of librarianship in Malaysia and Singapore, 26–37. Singapore: Library Association of Singapore. Available at: http://www3.ntu.edu.sg/home/assgkhoo/papers/Khoo. LIS_education_for_Singapore.2005.pdf [accessed 3 May, 2014]

Kimberley R., & Beverly P. L. (1999). The changing nature of work in academic libraries, in racing toward tomorrow, Proceedings of the Ninth National Conference of the Association of College and Research Libraries, Chicago, IL, April 8-11, Ed. H. A. Thompson (Chicago: Association of College and Research Libraries, 1999), 264-270, retrieved from http://www.ala.org/ala/acrl/acrlevents/lynch99.pdf [accessed 3 Feb, 2014]

Krejcie, R., & Morgan, D. W. (1970). Determining sample size for research activities. Educational and Psychological Measurement, 30, 607-610.

Kumar, K. (2009). The Research Methods in Library and Information Science. Translated by Fatemeh Raha Dust, Tehran; Iran National Library.

Kwasik, H. (2002). Qualifications for a serials librarian in an electronic environment. Serials Review, 28(1), 33-37.

Lovato-Grassman, B. (2003). Librarians in the twenty-first century. In Bridges, K., Expectations of librarians in the twenty-first century. Westport, CT: Greenwood Press.

Luo, L. (2007). Chat reference competencies: identification from a literature review and librarian interviews. Reference Services Review, 35(2), 195-209.

Lynch, B., & Smith, K. (2001). The changing nature of work in academic libraries. College and Research Libraries, 62, 407–420, available at: http://crl.acrl.org/content/62/5/407.full.pdfþhtml [accessed 17 Jan, 2014]

Mansouri, A., & Pashtunizadeh, M. (2007). In-service Training for Librarians of Modern Era. Faslname Ketab (In Persian), 18(2), 13-24.

Mansourian, Y. (2011). 100 Jobs for Librarians; Modern Positions in Libraries and Information Centers. National Studies of Library and Information Organizing (In Persian), 87, 88-103.

Mansourian, Y. (2011). The Specialized and Interdisciplinary Trends in Library and Information Science. Ketabe Mah (Kolliyat), 14(9), 58-63 (In Persian).

Mansourian, Y., Alipour, O., & Ghorbani, R. (2013). The Attitudes of PhD Students and Graduates of Library and Information Science about The Prospect of this Discipline's Job

Opportunity. National Studies of Library and Information Organizing (In Persian), 124(1), 150-165.

Marion, L. (2001). Digital Librarian, Cybrarian, or Librarian with Specialized Skills: Who Will Staff Digital Libraries? Available at: la.org/acrl/sites/ala.org.acrl/files/content/ conferences/pdf/marion.pdf [accessed 21 Jan, 2015]

Matthews, J. R. (2002). The bottom line: Determining and communicating the value of the special library. Westport, CT: Libraries Unlimited.

Mathews, J. M., & Pardue, H. (2009). The presence of IT skills sets in librarian position announcements. College and Research Libraries, 70, 250−257.

Myburgh, S. (2005). The new information professional: How to thrive in the information age doing what you love. Oxford: Chandos.

Nonthacumjane, P. (2010). Essential competencies of an information professional working in a digital library environment, in the opinions of Norwegian and Thai Library and Information Science educators (Master's thesis). Oslo University College; Tallinn University and the University of Parma.

Nonthacumjane, P. (2011). Key skills and competencies of a new generation of LIS professionals. IFLA Journal, 37(4), 280–288.

Ocholla, D., & Shongwe, M. (2013). An analysis of the library and information science (LIS) job market in South Africa. South African Journal of Libraries and Information Science, 79(1), 35–43.

O'Connor, S., & Li, M. (2008). Skills for future university librarians (pre-publication). Retrieved from: http://repository.lib.polyu.edu.hk/jspui/bitstream/10397/513/1/ Skills%20for%20the%20future%20Tushuguan_26%20June%2008%20final%20revised.pdf [accessed 16 Feb, 2014]

Omrani, S. (2013). We are pears. We are so delicious; The Social Status of Library Science Career and its Obstacles. (Sokhane Hafte, Number 142), available at: lisna.ir, Mordad the 14th.

Orme, V. (2008). You will be: a study of job advertisements, to determine employer's requirements for LIS professionals in the UK in 2007. Library Review, 57(8), 619–633.

Park, J., & Lu, C. (2009). Metadata professionals: Roles and competencies as reflected in job announcements. Cataloging & Classification Quarterly, 47, 145-160.

Park, J., Lu, C., & Marion, L. (2009). Cataloging professionals in the digital environment: A content analysis of job descriptions. Journal of the American Society for Information Science and Technology, 60(4), 844–857.

Pember, M. (2003). Content analysis of record keeping job advertisements in Western Australia: Knowledge and skills required by employers. Australian Academic and Research Libraries, 34, 194-210.

Raju, J. (2014). Knowledge and skills for the digital era academic library. The Journal of Academic Librarianship, 40(2), 163–170.

Robinson, W. C. (1993). Academic library collection development and management positions: announcements in college & research libraries news from 1980 through 1991. Library Resources & Technical Services, 37(52), 134-146.

Salehi, O., & Yagmori, S. (2010). Study of labor market needed skills in the curricula of higher education, considering the global economy. Journal of Curriculum studies (In Persian), 6(4), 165-188.

Shank, J. D. (2006). The blended librarian: A job announcement analysis of the newly emerging position of instructional design librarian. College & Research Libraries, 67(6), 514-524.

Smith, K., & Lynch, B. (1999). The changing nature of work in academic libraries. ACRL Ninth National Conference, April 8-11, Detroit, Michigan.

Steele, C., & Guha, M. (1998). Staffing the Digital Library of the 21st Century, available at: http://anulib.anu.edu.au/about/steele/digital_library.html [accessed 7 Jan, 2014]

Summers, R. Oppenheim, C., Meadows, J., McKnight, C., & Kinnell, M. (1999). The Information Science in 2010: The View Point of University of Loughborough. Translated by Alireza Bahman Abadi. Selected Papers on Basic History and Philosophy of Information Science (2002), Compiled by Alireza Bahman Abadi. Tehran: Iran National Library.

Tammaro, A. (2007). A curriculum for digital librarians: A reflection on the European debate. New Library World, 108, 229-246.

Taheri, S. M., & Alai, M. (2011). The Comparative Study of Library and Information Science disciplines in England, Canada, and America with Iran. With emphasis on their impact on the production rate of science in international arena. The journal of Danesh Shenasi (In Persian), 5(16), 82-96.

Tang, Y. (2013). Distance Education Librarians in the United States: A Study of Job Announcements. The Journal of Academic Librarianship, 39(6), 500-505.

Tennant, R. (1999), "Digital libraries: Skills for the new millennium". Library Journal, 124(1), 39-49.

University of Melbourne (2008). Future skills for academic librarians: research and research and training paper for Information Futures Commission. Retrieved March 15, 2014, available at: www.informationfutures.unimelb.edu.au/_data/assets/pdf_file/0010/105103/15-research20080509.pdf [accessed 7 Jan, 2013]

White, G. W. (1999). Academic Subject Specialists Positions in the United States: A Content Analysis of Announcements from 1990 through 1998. Journal of Academic Librarianship, 25, 373-381.

Wise, S., Henninger, M., & Kennan, M. A. (2011). Changing trends in LIS job advertisements. Australian Academic & Research Libraries, 42(4), 268-295.

Wu, Y. D. (2000). Where are librarians headed in the 21st century? Journal of Educational Media & Library Science, 37, 349−357.

Wu, L., & Li, P. (2008). What do they want? A content analysis of medical library association reference job announcements. Journal of the Medical Library Association, 96(4), 378–381.

Xu, H. (1996). The impact of automation on job requirements and qualifications for catalogers and reference librarians in academic libraries. Library Resources & Technical Services, 40, 9-31.

Xu, H. (2003). Information technology courses and their relationship to faculty in different

professional ranks in library and information science programs. Library & Information Science Research, 25, 207−222.

Yuan, Z. (1996). Analysis of trends in demand for computer-related skills for academic librarians from 1974 to 1994. College and Research Libraries, 57, 259-272.