The Electronic Library

Measurement of generic core competencies among students of library and information science in Iran

Ehsan Geraei Gholamreza Heidari

Received 27 August 2013
Revised 2 February 2014
11 May 2014
27 July 2014
7 September 2014
23 September 2014
Accepted 30 September 2014

Measurement of generic core competencies among students of library and information science in Iran

Ehsan Geraei and Gholamreza Heidari
Department of Knowledge and Information Science, Shahid Chamran University, Ahwaz, Iran

Abstract

Purpose – The purpose of the present survey is to identify and measure generic core competencies essential for Iranian library and information science (LIS) students.

Design/methodology/approach – The study population included all undergraduate LIS students in Iran, and the sample included all undergraduate LIS students in the three universities of Tehran, Shahid Chamran and Ferdowsi of Mashhad. The study was performed during the second semester (February to May) of the 2010-2011 academic year. After a thorough review of the literature, a pattern for generic core competencies was formulated and, accordingly, a researcher-designed questionnaire was developed and distributed. The final data analysis was carried out using 207 completed questionnaires, and the data were analysed using the SPSS19 software.

Findings – Except for English and management, the major participants' scores mean for the 12 identified generic core competencies were higher than the total mean.

Originality/value – Besides presenting a new theoretical pattern for measuring core generic competencies, especially for students in the LIS field, the study is expected to help higher education planners to channel their efforts into strengthening the examined competencies.

Keywords Iran, Undergraduate students, Library and information science, Competency-based education, Generic core competencies

Paper type Research paper

Introduction

The desire for scientific development and discovery of new spheres of science and knowledge in accord with the technologic evolutions during the past few decades has caused a lot of changes in the teaching of the library and information science (LIS) discipline in Iran. Various decisions and efforts have been made on the necessity of revising and synchronizing LIS content that have even extended to changing the name of the discipline (Fattahi, 2000; Fattahi *et al.*, 2012; Heidari, 2009; Ghayouri, 2010). Current continuing efforts enhancing the discipline's programs seem to refer to the existing shortcomings and missing parts, rather than being optimistically based on the future fundamental needs or even on a dynamic methodological framework. Many LIS professionals believe that critics mostly pursue their personal interests on domination of a type of anti-technology approach.

Despite the variety of approaches and adopted systems in education in the LIS field, only a few research studies have examined the theoretical bases for LIS education

The Electronic Library
Vol. 33 No. 6, 2015
pp. 1016-1030

0264-0473
DOI 10.1108/EL-08-2013-0153

(Heidari, 2009). Fattahi (2000) stressed that, for the LIS education system to be effective, identifying the theoretical and philosophical bases of LIS education and codification of the related rules and frameworks need to be prioritized.

Competency-based education and the identification of the related core competencies could be considered as a main theoretical basis for LIS education. The theory of core competencies is a product of revisions in a university's responsibilities per society and off-campus changes. This theory inspects societal changes, especially economic ones, the labour market and the university's traditional role in transferring knowledge. However, the chief finding of this theory is that it is necessary to teach skills by which LIS students would be able to deal with upcoming challenges (Sharepoor and Fazeli, 2007).

Despite their importance, core competencies for LIS students rarely have been studied systematically in Iran. For example, Heidari (2009), in a quasi-similar study, only referred to the importance of fundamental competencies for librarians and information specialists and Hayati (2008) only studied competencies for public library librarians from their managers' perspective.

Therefore, after a thorough review of texts and deliberation on the content of LIS education, the researchers identified several core competencies and categorized them into two levels: *generic core* competencies (necessary for carrying out professional activities, regardless of place of work) and *specialized core* competencies (concerning LIS and information process management). Due to study limitations and broadness of scope, the present study's aim was to examine generic core competencies in order to formulate a pattern and, on the basis of that pattern, to measure Iranian undergraduate LIS students' core generic competencies.

Thus, the starting point was the identification of core competencies essential for LIS students as "the first step to formulate a successful educational program" (Chan-Lin, 2009) and then to examine a population of undergraduate LIS students in Iran against the identified generic core competencies. The main study questions are as follows:

Q1. What is the generic competency pattern expected of undergraduate LIS students?

Q2. What is the level of generic competencies present in undergraduate LIS students?

Literature review

According to Rodriquez *et al.* (2006), the rapid growth of human resources in the training and development field should be considered as the embryo of increased attention towards core competencies and their standing in the management process of human resources. The term *core competency* was first developed by Selznick (1957) with the aim of outlining special competencies which create competitive advantages for corporations.

In the field of scientific research, the concept of competency was first developed by McClelland, a psychologist at Harvard University, around the 1960s and early 1970s (Cooper *et al.*, 1998). McClelland (1973) considered competencies as an effective key factor in developing learning efficacy. He stated that, during the learning process, measuring competency in lieu of intelligence, was highly efficient. Thus, he introduced the concept of competency in an article entitled "Testing for competence rather than for

intelligence" as the behavioural and psychological characteristic necessary for successful consequences at work and through life.

Competency-based education abstains from a sole focus on functional and discipline-based education, and instead emphasizes synchronous concentration on fostering basic abilities and general skills, such as problem-solving, communications, information management, social interaction and leadership. This type of education aims to, first, acquire knowledge of domain-specific skills and, second, to acquire knowledge of domain-independent skills. A combination of these two skills can effectively prepare students with the ability to cope with challenging specific and general situations at work.

Upon review of the related literature, there's an obvious lack of a single comprehensive definition for competency. However, Kouwenhoven (2003) summarized various definitions into five general categories:

(1) Competency is "the ability to perform at a desired level" according to a given standard. This definition looks at competency as an output.

(2) Competency is "the ability to choose and use the attributes (knowledge, skills, and attitudes)" that are necessary to perform at a desired level.

(3) Competency is the ability to "have special attributes (knowledge, skills and attitudes)" or as an input.

(4) Competency is "the description of what someone can do". This definition looks at competency as an output.

(5) More elaborate definitions of competency include mostly elements from the above four groups.

Various studies have been performed on the core competencies for librarians, information specialists and LIS students. Considering two dimensions of core competencies, major conducted studies in the LIS field could be categorized into three groups:

(1) Studies which dealt with the specific core competencies (Ameen, 2009; Jaber, 2010).

(2) Studies which only investigated generic core competencies (Abu Bakar, 2005).

(3) Studies which considered both competencies simultaneously (Partridge and Hallam, 2004).

Based on Watson and Crick's double-helix model of DNA, Partridge and Hallam (2004) investigated the comparison of DNA's double-helix structure to the competencies of the model information specialist. They stated that both discipline knowledge and generic capabilities were complementarily necessary for successful LIS professionals.

Corrall and O'Brien (2001) showed that legal information professionals need a broad range of professional/technical, managerial/business, personal and transferable competencies in common with other information professionals. Respondents emphasized the importance of personal competencies, such as communication, team-working and training. In another study, Tanloet and Tuamsuk (2011) attempted to create a core competencies' framework for Thai academic library specialists for the ensuing decade (2010 to 2019). Their study showed that Thai academic library

specialists need three core competencies: knowledge, skills and personal attributes to fulfil their duties in the next decade.

However, most reviewed literature supported core competencies, such as information technology (Mahmood, 2003; Abu Bakar, 2005; Jaber, 2010), information services and communications (Middleton, 2003), media literacy, network literacy (Chan-Lin, 2009), interpersonal and communication skills, change in management skills, information management, innovation, adaptability and flexibility, active learning, leadership skills, marketing, project management skills and community engagement (Partridge *et al.*, 2010).

Methodology

The current survey presents a new approach in examining required competencies in the LIS field in Iran and aims to provide a pattern for measuring the generic core competencies needed by undergraduate LIS students. The study is expected to draw attention from managers of higher education and to orient their efforts towards addressing and strengthening LIS students' generic core competencies and, hence, promote their education status in accord with society's ever-increasing environmental changes.

Based on a thorough review of the literature and consulting with some experts in the field, the most important elements of generic core competencies were identified and accordingly a researcher-designed questionnaire was developed. The questionnaire included 12 generic core competencies which were represented in 108 five-point Likert-type questions. Nine questions were assigned to address each competency.

To evaluate the content validity of the questionnaire, the first edition was sent to nine professors in the field of LIS in Iran and the final edition was revised taking their opinions into consideration. The incorporation of a pilot study is one the most popular tools for evaluating the reliability of any research tool. Therefore, the questionnaire was given to 30 LIS students and Cronbach's alpha was calculated for each of the factors. Nunnally (1978, as cited in Kiran and Diljit, 2011) suggested that a Cronbach's alpha value of >0.7 indicates a considerably high reliability. As can be seen in Table I, Cronbach's alpha was satisfactory for all factors.

The 12 identified generic core competencies included: IT, computer literacy, English language, professional ethics, management, research, communication skills, philosophy

Core competency	No. of items	Cronbach's alpha value
Information technology	9	0.89
Computer literacy	9	0.89
English language	9	0.88
Professional ethics	9	0.83
Management	9	0.89
Research skills	9	0.89
Communication skills	9	0.83
Philosophy of science (introduction to theoretical and basic subjects of the discipline)	9	0.89
Foresight (positive understandings of and orientations towards the LIS discipline)	9	0.88
Teamwork	9	0.75
Information literacy	9	0.86
Critical thinking	9	0.87

Table I. Reliability of each measured core competency

of science (understanding of theoretical and basic subjects of the discipline), foresight (positive understanding and commitment toward the discipline), teamwork, information literacy and critical thinking.

The population consisted of all undergraduate LIS students in Iran. The sample included all LIS undergraduate students in Tehran, Shahid Chamran and Ferdowsi of Mashhad universities during the 2010-2011 academic year. The selected universities were the major universities with an LIS program at all levels (i.e. BA, MA and PhD). The rationale for selecting the students as the target group of this study is that, in Iran, the responsibility of reviewing and updating LIS at all levels rests with the LIS committee of the Ministry of Science, Research and Technology. This committee is composed of several LIS faculty members from across the country and students are not members of this committee; however, the reason for reviewing and updating is to increase the competence of students. On the other hand, as recruitment of librarians in Iran is done through a countrywide test, the opinion of library management is not considered and managers have no effective role in hiring their librarians. Therefore, as evident in previous studies, it appears that asking for students' opinions before they can enter the active working force and using these surveys to evaluate the effectiveness of changes in the LIS curriculum is of great importance.

The study sample was composed of 328 undergraduate LIS students, including 304 female (92.68 per cent) and 24 male (7.32 per cent) students. The questionnaire was distributed to all the students and 207 questionnaires were returned (a return ratio of 63.11 per cent). The reason for the uneven gender distribution is the fact that, in Iran, women are more interested in enrolling in librarianship and information science courses compared to men.

The study was performed during the second semester (from February to May). Overall, 207 questionnaires were returned. The collected data were analysed by SPSS Version 14, using a descriptive statistical method, ANOVA, MANOVA and Scheffé's test.

Results

Table II shows the participants' demographic characteristics and their academic level. In total, 193 (93.2 per cent) respondents were female and 14 (6.8 per cent) male. The small size of the male sample was because of the fact that the majority of LIS students in Iran are female.

Gender \ Semester	Second	Fourth	Sixth	Eighth	Total	(%)
Female	39	54	65	35	193	93.2
Male	2	4	7	1	14	6.8
Total	41	58	72	36	207	100

Table II. Demographic academic level of participants based on their passed semesters*

Note: *The undergraduate level in Iran includes four academic years. An academic year is divided into two semesters and each semester includes a 17-week period of instruction. Since the study data collection was performed during the second half of the 2010-2011 academic year, there were no first, third, fifth, and seventh semester students.

The mean of all 12 competencies scores for all students was 27 and, for a basis for comparison of the competencies, we used that mean as the study total mean. As Table III shows, the mean of scores obtained by second-semester students for all core competencies was lower than the total mean (i.e. 27). The highest mean (37.86) was on "critical thinking" and was obtained by eighth-semester students, while the lowest corresponded to "research skills" and was obtained by second-semester students.

For possibility of difference between at least two means, repeated measures ANOVA was used. In this method, we used multivariate tests such as Pillai's trace, Wilk's Lambda, Hotelling's trace and Roy's largest root to examine the effects of within-group relations. Table IV reports F ratios at $p < 0.05$.

For detecting any significant difference between at least two core competencies, univariate ANOVA was used. The results in Table V showed that there were significant differences among the students' core competencies from different semesters in all cases.

Scheffé's test was implemented with the aim of comparing the mean scores of core competencies obtained by the students from different semesters. The results of the test reported significant difference for all competencies between the eighth- and second-semester students. In other words, the effect of the education provided by LIS departments on increasing competencies scores is evident (Table VI).

Information technology and computer literacy

The results showed that the mean scores obtained by the LIS freshman students (in semester two) in core competencies of information technology and computer literacy were lower than the total mean (i.e. 27); however, probably because of conducted education in their respected universities, higher-level students had better mean scores. There was a significant difference between mean scores of eighth- and second-semester students' core competencies. Findings by Chan-Lin (2009) showed that there was no meaningful distinction between computer literacy of first-, second-, third- and fourth-year students and those students keep the computer literacy and experience they had when entering the university. However, the findings of this study showed that computer literacy of most first-year students is low and that their computer literacy will meaningfully increase between second and eighth semesters of their education. The reason behind this increase in generic competency can be found in two places. First is the fact that information technology is presented as a separate part of the curriculum of bachelor level courses for librarianship and information science which includes the three-credit courses of "Word processing" (Persian and English) and "Principals of computer science", and the two-credit course of "Introduction to information and communication technologies". The second reason is the incorporation of information technology in most courses and setting computer literacy as their common goal.

English language

Despite the gradual improvement of scores (from 24.90 to 29.02), the mean for this competency obtained by eighth semester students is slightly higher (29.02) than the total mean. The reason may lie in the contents presented and the educational methods used. Although focus of teaching English was on special and general English terms and text translation, listening and speaking skills were almost ignored. Contrary to the findings of the current study, findings by Sharepoor *et al.* (2001) showed low generic competency in English language among senior students. The reason behind this difference can be found in the increased number of English courses in the new curriculum of LIS

Core competency	Semester	No. of respondents	Mean	SD
Information technology	Second	41	25.51	5.47
	Fourth	58	31.37	4.13
	Sixth	72	33.30	5.50
	Eighth	36	36.52	5.50
Computer literacy	Second	41	23.85	5.82
	Fourth	58	28.13	5.48
	Sixth	72	29.02	6.62
	Eighth	36	35.77	5.50
English language	Second	41	24.90	4.43
	Fourth	58	26.77	5.63
	Sixth	72	27.09	6.48
	Eighth	36	29.02	5.26
Professional ethics	Second	41	25.26	5.07
	Fourth	58	29.65	5.29
	Sixth	72	30.33	5.24
	Eighth	36	35.86	5.10
Management	Second	41	19.63	4.70
	Fourth	58	25.43	3.97
	Sixth	72	26.54	5.54
	Eighth	36	32.38	6.82
Research skills	Second	41	19.48	4.28
	Fourth	58	25.91	4.88
	Sixth	72	29.05	5.12
	Eighth	36	34.38	6.59
Communication skills	Second	41	24.87	5.31
	Fourth	58	29.96	4.71
	Sixth	72	29.97	5.31
	Eighth	36	35.36	5.55
Philosophy of science (introduction to theoretical and basic subjects of the discipline)	Second	41	23.75	5.95
	Fourth	58	28.12	5.76
	Sixth	72	27.09	5.43
	Eighth	36	33.47	5.04
Foresight (positive understanding of and orientation towards the LIS discipline)	Second	41	25.24	6.29
	Fourth	58	30.62	7.03
	Sixth	72	28.43	6.97
	Eighth	36	34.44	4.27
Teamwork	Second	41	23.70	4.33
	Fourth	58	27.77	6.97
	Sixth	72	29.70	4.99
	Eighth	36	33.97	4.30
Information literacy	Second	41	23.48	4.88
	Fourth	58	28.41	4.19
	Sixth	72	32.31	7.00
	Eighth	36	34.75	5.14
Critical thinking	Second	41	20.24	4.82
	Fourth	58	25.22	5.30
	Sixth	72	26.95	6.32
	Eighth	36	37.86	15.09

Table III.
Average scores obtained by the students in different semesters

compared to previous ones. However, there is still a very small difference between the competency of students in their eighth semester and the average English competency which can be due to paying more attention to reading comprehension skills compared to listening, speaking and writing skills in the current curriculum.

Professional ethics

The eighth-semester students had higher than the total mean scores in professional ethics (35.86) and a significant difference with the second semester scores (MD = −10.59; $p < 0.001$) which depict the efficiency of performed education for this core competency item. The professional ethics code has recently been added to the undergraduate syllabus and an improved status for this core competency in the coming years is expected. Professional ethics is among the forgotten areas of the LIS curriculum. To remedy this situation, the course of "Processional ethics" was added to the LIS curriculum which is expected to increase the generic competency of students in the area of professional and work ethics.

Management

The obtained mean (19.63) for core competencies of management in second-semester students was lower than the total mean and indicated the poor status of management skills among freshman students. Although the obtained mean for this competency for eighth-semester students (32.38) showed a reasonable improvement, some of the consulted experts believed that that mean has much more room to improve. These experts addressed

Table IV. Results of multivariate analysis of the variance (MANOVA) to compare the core competencies scores

Effect	Value	F	Hypothesis df	Error df	Sig.
Pillai's trace	0.89	6.26	39	576	0.001
Wilks' Lambda	0.28	7.54	39	563	0.001
Hotelling's trace	1.87	9.06	39	566	0.001
Roy's largest root	1.51	22.40	13	192	0.001

Table V. Results of univariate analysis of variance (ANOVA) to compare the scores of core competencies obtained by the students from different semesters

Core competency	Sum of squares	df	Mean square	F	Sig.
Information technology	2,594.25	3	864.75	32.70	0.001
Computer literacy	2,769.02	3	923	25.98	0.001
English language	329.61	3	109.87	3.39	0.019
Professional ethics	2,169.38	3	723.12	26.61	0.001
Management	3,169.05	3	1,056.35	38.09	0.001
Research skills	4,631.25	3	1,543.75	57.03	0.001
Communication skill	2,108.80	3	702.93	25.97	0.001
Philosophy of science (introduction to theoretical and basic subjects of the discipline)	1,868.94	3	622.98	19.98	0.001
Foresight (positive understanding of and positive orientation towards the LIS discipline)	1,773.09	3	591.03	14.06	0.001
Teamwork	2,152.67	3	717.55	24.44	0.001
Information literacy	3,072.81	3	1,024.27	32.52	0.001
Critical thinking	6,330.53	3	2,110.17	32.10	0.001

Core competency	Semester	Statistical indicators comparison groups	Mean difference (MD)	Std. Err	Sig.
Information technology	Second	Fourth	−5.97*	1.05	0.001
		Sixth	−7.79*	1	0.001
		Eighth	−11.01*	1.74	0.001
	Fourth	Sixth	−1.18	0.91	0.260
		Eighth	−5.03*	1.09	0.001
	Sixth	Eighth	−3.22*	1.04	0.026
Computer literacy	Second	Fourth	−4.24*	1.22	0.005
		Sixth	−5.17*	1.16	0.001
		Eighth	−11.92*	1.36	0.001
	Fourth	Sixth	0.74	1.05	0.910
		Eighth	−7.49*	1.26	0.001
	Sixth	Eighth	−6.75*	1.21	0.001
English language	Second	Fourth	−1.92	1.16	0.430
		Sixth	−2.19	1.11	0.270
		Eighth	−4.12*	1.30	0.020
	Fourth	Sixth	−0.27	1	0.990
		Eighth	−2.20	1.21	0.350
	Sixth	Eighth	−1.93	1.16	0.430
Professional ethics	Second	Fourth	−4.34*	1.06	0.001
		Sixth	−5.06*	1.01	0.001
		Eighth	−10.59*	1.19	0.001
	Fourth	Sixth	−0.71	0.92	0.850
		Eighth	−6.24*	1.10	0.001
	Sixth	Eighth	−5.52*	1.06	0.001
Management	Second	Fourth	−5.76*	1.07	0.001
		Sixth	−6.90*	1.03	0.001
		Eighth	−12.75*	1.20	0.001
	Fourth	Sixth	−1.13	0.93	0.680
		Eighth	−6.98*	1.21	0.001
	Sixth	Eighth	−5.84*	1.07	0.001
Research skills	Second	Fourth	−6.49*	1.06	0.001
		Sixth	−9.56*	1.01	0.001
		Eighth	−14.90*	1.18	0.001
	Fourth	Sixth	−3.07*	0.92	0.013
		Eighth	−8.40*	1.10	0.001
	Sixth	Eighth	−5.33*	1.06	0.001
Communication skills	Second	Fourth	−5.13*	1.06	0.001
		Sixth	−5.09*	1.01	0.001
		Eighth	−10.48*	1.18	0.001
	Fourth	Sixth	0.45	0.92	0.100
		Eighth	−5.34*	1.10	0.001
	Sixth	Eighth	−5.38*	1.06	0.001
Philosophy of science (introduction to theoretical and basic subjects of the discipline)	Second	Fourth	−4.33*	1.14	0.003
		Sixth	−3.34*	1.09	0.027
		Eighth	−9.71*	1.27	0.001
	Fourth	Sixth	0.99	0.98	0.800
		Eighth	−5.38*	1.18	0.001
	Sixth	Eighth	−6.37*	1.13	0.001

Table VI.
Results of scheffé's test and comparison of core competencies' scores

(*continued*)

Core competency	Semester	Statistical indicators comparison groups	Mean difference (MD)	Std. Err	Sig.
Foresight (positive understanding of and positive orientation towards the LIS discipline)	Second	Fourth	−5.32*	1.32	0.001
		Sixth	−3.18	1.26	0.100
		Eighth	−9.20*	1.48	0.001
	Fourth	Sixth	2.16	1.14	0.310
		Eighth	−3.84	1.37	0.054
	Sixth	Eighth	−6.01*	1.32	0.001
Teamwork	Second	Fourth	−3.99*	1.10	0.006
		Sixth	−6.10*	1.06	0.001
		Eighth	−10.26*	1.23	0.001
	Fourth	Sixth	−2	0.96	0.220
		Eighth	−6.27*	1.15	0.001
	Sixth	Eighth	−4.26*	1.10	0.002
Information literacy	Second	Fourth	−4.96*	1.14	0.001
		Sixth	−8.83*	1.09	0.001
		Eighth	−11.26*	1.28	0.001
	Fourth	Sixth	−3.86*	0.99	0.002
		Eighth	−6.29*	1.19	0.001
	Sixth	Eighth	−2.43	1.14	0.210
Critical thinking	Second	Fourth	−4.82*	1.66	0.040
		Sixth	−6.71*	1.58	0.001
		Eighth	−17.61*	1.85	0.001
	Fourth	Sixth	−1.88	1.43	0.063
		Eighth	−12.79*	1.72	0.001
	Sixth	Eighth	−10.90*	1.65	0.001

Note: *mean difference is meaningful with $p < 0.05$

Table VI.

various related issues in Iran, including lack of updated content in management, insufficiency of the credits related to the essential elements of management, unprofessional emphasis over limited aspects of traditional management and ignorance of teaching personal management concepts.

Research skills

The results indicated a significant difference (MD = −14.90; $p < 0.001$) between the mean of research skills of eighth- and second-semester students. As the main skill needed for all LIS students, this competency appears to have attracted sufficient attention and its requirements are fulfilled. Similar to the findings of the current study, findings by Middleton (2003) showed that the generic competency of librarians in "using analytical statistics" which is useful in the area of research is very poor. Therefore, it is important to pay attention to the diversity and continuity of content provided in different semesters to increase the generic competency of students in the areas of writing and research. However, the content of the courses on "Academic writing" is largely similar to that of "Basic research in librarianship and information science" (Dayyani, 2012) which can lead to undesirable effects.

Communication skills

The significant difference (MD = −10.48; $p < 0.001$) between core communication skills in eighth- and second-semester students depicted the improvement through the periods of instructions. The report by Middleton (2003) on the high command of communication in LIS graduate students was in agreement with the current study findings. A study by Buttlar and Du Mont (1996) showed that the ability to use verbal skills in presentations is among one of the competencies needed for novice and expert librarians alike and, although employers prefer to hire people with soft skills, such as communication skills, such skills are not taught in LIS courses. General skills such as communication skills were among the necessary skills lacking in new LIS graduates in Iran.

Philosophy of science (introduction to theoretical and basic subjects of the discipline)

Because freshman students almost always do not have knowledge about the theoretical aspects of the LIS discipline, they gained a low mean score (23.75). Eighth-semester students obtained a better score (33.47), higher than the total mean. As Mansourian (2009) demonstrated, the majority of freshman LIS students in Iran not only lack a real understanding of their discipline but also only have a vague and uncertain view of their future job. The findings of the current study are similar to those by Mansourian (2009), in that most students in their first semester of their freshman year have an unrealistic understanding regarding their field of study and are uncertain about their future jobs. However, after the second semester and by using inquiry-based learning, students stated that they now know the main areas covered by LIS in society and were capable of comparing their field of study to other fields to rationally evaluate its characteristics. Another important point in these results was the increased belief on the part of the students in the usefulness of their field of study and their desire to continue their studies at higher levels of education. Findings by Akbari and Afshar (2011) showed that, although most students chose this field without proper knowledge, however reluctantly, they come to like their field of study later in their education.

Foresight (positive understanding of and positive orientation towards the LIS discipline)

A positive understanding and clear orientation towards the discipline and efficient education on theoretical and basic subject matters for acquiring the creative ability for confronting future challenges and understanding opportunities are closely associated with each other (Sharepoor *et al.*, 2001). The program content, quality of education and available facilities are effective factors for creating a positive understanding of the discipline. In our study, eighth-semester students obtained higher mean scores (34.44) than the total mean which revealed their acceptable academic status and quality of received education.

Teamwork

Compared to the total mean (27), the higher mean of teamwork competency (33.97) obtained by eighth-semester students and the significant difference with that of second-semester students illustrated an improvement in teamwork competency considering accomplished programs. Findings by Sharepoor *et al.* (2001) showed a high average score for the "ability of conducting group projects" in senior students compared to the average score of other students. Paying more attention to the generic competency

of group work in the course of "Library management" can help improve the competency of graduates in this area.

Information literacy

The results for the information literacy item demonstrated that the second semester students mean score (33.48) was lower than the total mean. It revealed a significant difference (MD = −11.26; $p < 0.001$) between the information literacy mean for second- and eighth-semester students. The result showed a remarkable effect of received education on the improvement of the students' information literacy. Siamak (2011) reported that the information literacy of freshman LIS students was below average and that a meaningful difference existed between the information literacy of freshman students and graduates. Combined with results of this study, the results show that the university has an important role to play in improving the students' information literacy competency.

Critical thinking

The top–down or classic education system in Iran, especially prior to university, mostly helps strengthen moralities and learning basic, memorisable facts, with less attention toward nurturing critical thinking, a sense of criticism and creativity. The obtained low mean (20.24) by second-semester students for the critical thinking core competency is vital evidence of the influence of the pre-university educational system in Iran. It seems that an instruction system based on critical thinking elements and using problem-based learning methods could be helpful. The eighth-semester students' mean for this item was more than the total mean and had a significant difference with second-semester students' (MD = −17.61; $p < 0.001$). It seems that the foundation of the Iranian education system at primary levels (elementary, middle and high school) and higher education in general is more concerned with increasing the knowledge and mnemonics of the students, and that the betterment of analytical and critical thinking is often ignored. Several previous studies confirmed the improvement of analytical and critical thinking skills in university graduates compared to freshman students (Javidi-Kalateh and Abdoli, 2011).

Conclusion

The first step in the development of a curriculum to help librarianship students gain the necessary competencies is to understand the pattern of necessary competencies for these students. This competency pattern can have several uses in every educational system, including training needs assessment, creation and evaluation of the curriculum, teaching effectiveness and planning for the individual growth and development of the students. In other words, one can say that the creation of an educational system is based on competency patterns.

The study results for generic core competencies for LIS undergraduate students in Iran was in agreement with other research conducted by Mahmood (2003); Middleton (2003); Abu Bakar (2005); Partridge and Hallam (2004); Chan-Lin (2009); Jaber (2010) and Partridge *et al.* (2010). We should note that some researchers studied generic and specialized levels of core competencies together, while the present survey considered only generic core competencies.

In general, the findings indicated that from all considered core competencies, the mean scores for second-semester students were lower than the total mean. The means of

core competencies for eighth-semester students were higher than other students. Regarding all 12 core competencies, means for second-semester students were significantly different from obtained means by eighth-semester students. The current study findings showed the effects of an LIS education on the improvement of core competencies. However, the consulted experts believed that there is yet a long way to go and a lot of potentials to be addressed.

The idea behind the desire for the improvement of core competencies, such as communication skills, teamwork and critical thinking, is to shift from the explicit to concealed or implicit curriculum (Eisner, 1985) which motivates students and empowers their ability for innovation and creativity. The concealed curriculum is an interaction between the learning environment, the dominant educational culture at the university and the knowledge of faculty members and instruction materials regarding the students' ability and knowledge. This curriculum is, in many aspects, more effective than the explicit curriculum (Mohammadimehr and Fathi Vajargah, 2008). The following approaches can be used to improve the core competencies in the curriculum of librarianship and information science for undergraduate students in Iran:

- Addressing each one of the competencies in a separate general or specialized course.
- Addressing each one of the competencies as the overall goal of the entire curriculum; for example, using knowledge of computers, information technology and information literacy for finishing class assignments.

In short, adopting educational theories such as competency-based education and identification and strengthening core competencies can be useful for current and future LIS programs. Educators must remember that an innovative and up-to-date curriculum is only one of the factors affecting an educational course. Additionally, education is a process which is affected by many different factors, such as student selection methods, the number of students present in each class, educational facilities, the content presented and the style of presentation.

The current study targeted identification of the generic core competencies and, hereafter, the examination of LIS students' 12 core competencies. Overall, the study depicted that for a successful education program, educators must address generic core competencies and understand the needs and abilities, societal conditions and, eventually, our ever-changing environment. Then, prior to a comprehensive planning for fulfilling on campus and off-campus expectations, the discipline-specific core competences as a complementary helix should be addressed. The designed pattern can serve as the basis for a successful curriculum specifically for the LIS field.

Iranian LIS faculties at other universities could conduct studies similar to this one to judge the effect of their curricula on the improvement of the students' core competencies with increased certainty and confidence. Another study suggestion is the development of core competency patterns for LIS students on a professional level to complete the double-helix model of Iranian librarianship and information science specialists.

References

Abu Bakar, A.B. (2005), "IT competencies in academic libraries: the Malaysian experience", *Library Review*, Vol. 54 No. 4, pp. 267-277.

Akbari, A. and Afshar, E. (2011), "The professional self-concept of LIS bachelor of arts graduates: an exploratory investigation", *National Studies on Librarianship and Information Organization*, Vol. 22 No. 1, pp. 46-54.

Ameen, K. (2009), "Needed competencies for collection managers and their development: perceptions of university librarians", *Library Management*, Vol. 30 Nos 4/5, pp. 266-275.

Buttlar, L. and Du Mont, R. (1996), "Library and information science competency revisited", *Journal of Education for Library and Information Science*, Vol. 37 No. 1, pp. 11-46.

Chan-Lin, L. (2009), "Development of a competency questionnaire for LIS undergraduates at Fu-Jen Catholic university", *Journal of Educational Media & Library Sciences*, Vol. 47 No. 1, pp. 5-17.

Cooper, S., Lawrence, E., Kierstead, J., Lynch, B. and Luce, S. (1998), "Competencies", available at: www.refa.de/INTERNATIONA/cbt-hp.htm (accessed 12 September 2012).

Corrall, S. and O'Brien, J. (2011), "Developing the legal information professional: a study of competency, education and training needs", *Aslib Proceedings: New Information Perspectives*, Vol. 63 Nos 2/3, pp. 295-320.

Dayyani, M.H. (2012), "Changes in the MA curriculum of librarianship and information sciences in Iran", *International Journal of Information Science and Management*, Vol. 4 No. 1, pp. 87-101.

Eisner, E. (1985), *The Educational Imagination*, MacMillan Publishing Company, New York, NY.

Fattahi, R. (2000), "A pattern for revision and reconstruction of library and information science education in Iran according to the new evolutions in information environments", *Library and Information Science Environments*, Vol. 3 No. 1, pp. 21-44.

Fattahi, R., Parirokh, M., Davarpanah, M.R. and Azad, A. (2012), "The new MA curriculum for librarianship and information science: the report of a research project", *International Journal of Information Science and Management*, Vol. 4 No. 2, pp. 69-81.

Ghayouri, Z. (2010), "Survey of library and information science professionals' perspective about change in title, content, education of the discipline", *Master's dissertation*, Department of Library and Information Science, University of Tarbiat Modarres, Tehran.

Hayati, Z. (2008), "Competency definition for Iranian library and information professionals in public library", *International Journal of Information Science & Technology*, Vol. 6 No. 1, pp. 73-86.

Heidari, G.R. (2009), "Library and information science in Iran: obstacles and solutions", *Library and Information Science*, Vol. 14 No. 2, pp. 71-106.

Jaber, N.H. (2010), "Measuring Omani information professionals' competencies from the professionals' perspectives", *The Electronic Library*, Vol. 28 No. 2, pp. 263-275.

Javidi-Kalateh, T. and Abdoli, A. (2011), "The development of critical thinking in students of Ferdowsi university of Mashhad", *Studies in Education and Psychology*, Vol. 11 No. 2, pp. 103-121.

Kiran, K. and Diljit, S. (2011), "Antecedents of customer loyalty: does service quality suffice?", *Malaysian Journal of Library and Information Science*, Vol. 16 No. 2, pp. 95-113.

Kouwenhoven, W. (2003), *Designing for Competence in Mozambique: Towards a Competence-based Curriculum for the Faculty of Education of the Eduardo Mondlane University*, Print Partners Ipskamp, Enschede.

McClelland, D. (1973), "Testing for competence rather than for intelligence", *American Psychologist*, Vol. 28 No. 1, pp. 1-14.

Mahmood, K. (2003), "A comparison between needed competencies of academic librarians and LIS curricula in Pakistan", *The Electronic Library*, Vol. 21 No. 2, pp. 99-109.

Mansourian, Y. (2009), "Evolving perceptions of LIS students about their discipline: an action research with inquiry-based learning approach", *Library Review*, Vol. 59 No. 3, pp. 185-197.

Middleton, M. (2003), "Skills expectations of library graduates", *New Library World*, Vol. 104 Nos 1184/1185, pp. 42-56.

Mohammadimehr, M. and Fathi Vajargah, K. (2008), "The place of concealed curriculum in permanent medical education", *The Magazine of Education Strategies of the Center for Medical Science Development and Studies, Baqiyatallah University of Medical Sciences*, Vol. 1 No. 1, pp. 48-53.

Nunnally, J.C. (1978), *Psychometric Theory*, 2nd ed., McGraw-Hill, New York, NY.

Partridge, H. and Hallam, G. (2004), "The double helix: a personal account of the discovery of the structure of [the information professional's] DNA", paper presented at ALIA, 19 June, Sydney, available at: http://conferences.alia.org.au/alia2004/pdfs/partridge.h.paper.pdf (accessed 12 September 2012).

Partridge, H., Menzies, V., Lee, J. and Munro, C. (2010), "The contemporary librarian: skills, knowledge and attributes required in a world of emerging technologies", *Library & Information Science Research*, Vol. 32 No. 4, pp. 265-271.

Rodriquez, D., Patel, R., Bright, A., Gregory, D. and Gowing, M.K. (2006), "Developing competency models to promote integrated human resource practices", *Human Resource Management*, Vol. 41 No. 3, pp. 309-324.

Selznick, P. (1957), *Leadership in Administration: A Sociological Interpretation, Row*, Peterson and Company, New York, NY.

Sharepoor, M. and Fazeli, M. (2007), *Science Sociology and Scientific Associations in Iran*, Cultural and Social Studies Center, Ministry of Science, Research and Technology; Office for Social Planning and Cultural Studies, Tehran (in Persian).

Sharepoor, M., Fazeli, M. and Salehi, S. (2001), "Study of core competencies among students (case study: Sharif university of technology, Tehran university and Mazandaran university)", Social Sciences Letter No. 18 (in Persian), Tehran.

Siamak, M. (2011), "Impact of academic life on information literacy of LIS undergraduate students", *National Studies on Librarianship and Information Organization*, Vol. 21 No. 4, pp. 54-71.

Tanloet, P. and Tuamsuk, K. (2011), "Core competencies for information professionals of Thai academic libraries in the next decade (A. D. 2010-2019)", *The International Information and Library Review*, Vol. 43 No. 3, pp. 122-129.

Corresponding author
Ehsan Geraei can be contacted at: ehsan.geraei@gmail.com