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Designing a mentoring program for faculty librarians

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Abstract

This article describes the Purdue University Libraries mandatory co-mentoring program. Surveys with all Purdue University Libraries faculty librarians and select follow-up interviews were conducted. This program supports all faculty librarians and differs from other mentoring programs since it is team-based, includes the supervisor, and advises on promotion. These Faculty Review Committees integrate performance reviews with progress toward promotion and have the responsibility to prepare written annual reviews and evaluations, and represent the candidate at the promotion review. The program is considered very effective at Purdue University Libraries and a unique model. This program is also compared to four other ARL co-mentoring programs using a survey and follow-up interviews.

Keywords

Academic libraries, faculty librarians, library management, mentoring

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Introduction

The search for a new librarian is completed. The job offer has been made and accepted; the new librarian's first day has arrived. After the effort to attract a high quality applicant, everyone from the Dean on down wants the new librarian to succeed. In the background is the pending decision of continuing contracts, and possibly promotion and tenure. A crucial step in the career advancement of faculty librarians is mentoring. The literature is clear: mentoring helps, especially for newly hired (Nankivell and Shoolbred, 1997). At Purdue University Libraries, the new librarian would receive mentoring and evaluation for promotion decisions from a group of mentors, referred to as a co-mentoring program in the mentoring literature.

This article is a case study reporting the mentoring team approach at Purdue University Libraries that was designed and implemented in 2009 based on a review of the needs of the Purdue University Libraries rather than on any other existing programs. It is different from many traditional mentoring programs, which are usually one mentor to one mentee

(Goodsett and Walsh, 2015). First, it is a co-mentoring program, one that has more than one tenured librarian, including the supervisor and a full professor, serving as the mentors for one mentee. The second distinctive feature is that the mentoring teams formally advise on contract and promotion decisions.

The first research question for this article is whether this program is unique or distinctive when compared to other ARL Libraries. The second question is whether it is effective in providing feedback and mentoring for career development for librarians at Purdue University Libraries, and the third question is whether the program has had an impact on promotion rates and scholarly productivity. The research method is surveys and follow-up interviews.

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For this paper, we view a mentoring program as a support program to the peer review process that is standard at universities for all faculty members. Most libraries with faculty status develop some support for newly appointed untenured librarians, in either formal or informal ways. If the program is unstructured, even if well-established through tradition, it is an informal program. The program at Purdue University Libraries discussed in this paper is a *formal* mentoring program that provides support for the peer review process and career guidance at the Purdue University Libraries. It was established by library policy, with further guidelines to provide a framework for the process. The Faculty Review Committees (FRCs) are accountable and write reviews. Both mentors and mentees are assigned initially and can be changed after the new librarian's first year.

Literature review

The number of articles, chapters and books on mentoring in libraries is large. An influential early article conducted by the Association of Research Libraries (ARL) in the 1980s surveyed ARL directors who mentor junior librarians. This article defined the role of mentors as developing talent, opening doors, and being a positive role model and teacher/coach. It began a trend in mentoring programs in North American libraries as it found "an analogous correlation between mentoring experience and career success among the leaders of large research libraries in USA and Canada" (Ferriero, 1982: 363). Over 30 years later, a follow-up survey of the ARL members indicated that 83% of the institutions with tenure were offering a mentoring program; however, it is important to note that neither of these two surveys asked questions related to the type of mentoring (Smigielski et al., 2014).

Earlier literature review articles

Mentoring was a relatively new subject in the library literature in the 1990s and the research literature on mentoring that did exist was further developed in the USA than in the UK and Australia at that time (Golian and Galbraith, 1996, Nankivell and Shoolbred, 1997).

The 1999 ARL Spec Kit survey of 113 libraries on mentoring found 26% of academic libraries have mentoring programs. The main focus was to support librarians who were working towards promotion and reappointment or tenure (Wittkopf, 1999).

Mentors had significant experience in the organization, and they volunteered for the role (Osif, 2008). The problem of having enough good mentors in organizations was an issue, and mentors with no

publication record were less effective than those who published. Institutional commitment to mentoring contributed to its success, and formal mentoring was found to be more effective than informal or unstructured programs (Goodsett and Walsh, 2015). Mentoring structures are different among institutions and they take the form of one-on-one mentoring, group, or co-mentoring programs; and the length of the mentoring relationship also varies among institutions (Osif, 2008).

Mentoring programs: Statistics and methods

Librarians generally do not have the training that PhD students receive to prepare them for research, tenure and promotion in the academy and library schools do not prepare librarians for promotion and tenure. This makes academic library mentoring programs even more compelling (Osif, 2008, Wilson et al., 2009).

The number of academic libraries providing formal mentoring programs has risen; however, despite the clear evidence of its effectiveness, the presence of formal mentoring programs in academic libraries is surprisingly low. Most of the surveys have indicated that only half of the institutions that responded have formal mentoring programs. Oud (2008) reported that only 40% of respondents had a formal program to help them transition to a new job and she stressed the importance of having a mentor early on in a new job. Robbeloth et al. (2013) reported that 46% of the libraries they surveyed had formal mentoring programs. Goodsett and Walsh (2015) reported that only 40% of the librarians who participated in their study had mentoring programs available to them at their institutions.

The timeframe for mentorship commitments varied greatly. Some had definite predetermined termination points, for example a six-month program for orientation mentoring, while others lasted until the promotion and tenure decision (Osif, 2008). While mentoring can be as brief as three months or last for three years, Lorenzetti and Powelson (2015) found that two-thirds of the 15 one-on-one and co-mentoring programs in their scoping review had time limits between six months and two years, and that only two programs continued until the mentee received tenure. Many programs specifically limit the timeframe in order to encourage mentors to commit and participate.

Overall, of the mentoring methods used in academic libraries, the most well known and most traditional method is one-on-one mentoring by a senior ranking member for a newer librarian. Many other variations have been developed, and many of them show a greater success rate than this traditional

method (Goodsett and Walsh, 2015). The scoping review study by Lorenzetti and Powelson (2015) found 40 academic library mentoring programs and defined four mentorship models: the most common (53%) was one-on-one, either between a junior and senior librarian. The second most common was a peer mentoring (35%); third was the co-mentoring program (8%); the fourth and least common, was group mentoring by one senior librarian with several mentees (5%). There is research evidence that formal co-mentoring programs are more effective than one-on-one informal mentoring (Knievel et al., 2017).

Benefits

The literature suggests that there are demonstrable benefits to mentoring programs and that it positively impacts the mentors, mentees, and the organization itself. Major benefits for the organization are better retention and enhanced integration of new employees. It also has a positive impact on communication and productivity in the workplace (Goodsett and Walsh, 2015; Osif, 2008). For new librarians mentoring can foster a work environment where they have an influence and impact on their own professional development, and thereby gain more confidence quickly. Other benefits include an enriched professionalism in the workplace and other avenues beyond the supervisor to receive career path support (Knievel et al., 2017; Oud, 2008; Ross, 2013; Wittkopf, 1999). Mentors also benefit by the opportunity to develop and sharpen their leadership experience and to enhance their relationship with newer employees. In addition, they have an opportunity to take a fresh look at their career objectives, and they can learn about new advancements in the profession from people who recently graduated (Goodsett and Walsh, 2015).

Mentoring is a positive factor not only in enhancing retention, but also in supporting promotion. The research points out that employees who have been mentored have higher salaries, get more promotions, and have a higher level of satisfaction in their careers (Harrington and Marshall, 2014). It also enhances scholarly productivity and successful promotion and tenure. Lorenzetti and Powelson (2015: 186) state that: "Mentoring has been linked to outcomes such as tenure, career development, job satisfaction, and organizational and professional connectedness."

Mentoring enhances personal satisfaction and the fostering of relationships. It also helps in the adoption and cultivation of organizational values and goals, which in turn fosters positive attitudes. Employees are more likely to be successful when they understand the organizational culture (Harrington and Marshall,

2014). It also provides psychosocial support as the mentor can be a role model for mentees, which requires a strong commitment on the part of the mentor to create an environment that fosters this positive experience (Goodsett and Walsh, 2015).

Matching of mentor and mentee

The success of a mentoring relationship does depend on the compatibility and rapport between the participants. When mentees and mentors have some input in the matching, it can facilitate this, and there does seem to be a trend toward mentees having some choice in the match. In the ARL study by Wittkopf (1999) only 2% of mentors selected their own mentee and 29% of mentees selected their own mentor. Other research supports the finding that at many university libraries the appointment is made by committees, yet, many libraries do provide options for mentees to change their mentor if the relationship is not productive (Goodsett and Walsh, 2015).

Supervisor as mentor

The trend to include the supervisor seems to have changed since the recent library literature suggests that supervisors are not and should not be part of a mentoring team. In the ARL study, Wittkopf (1999) reported that at 57% of the libraries the mentor was a supervisor or department head. Additionally the study found that the supervisor was kept informed of the mentoring relationship and the activities of the mentee and mentor at 43% of institutions.

Nine years later, Osif (2008) reported that it was very rare for supervisors to be a mentor for employees under their direction, stating that, if supervisors were to become formal mentors, it could create a conflict of interest. Hicks et al. (2010) supported the view that the role of the supervisor was at cross-purposes with mentoring and that there was the potential for direct conflict between these roles. Similar advice was given in the Novara et al. (2010) article; they explicitly stated the purposeful lack of involvement of the supervisor and advised against supervisor involvement. In the Lorenzetti and Powelson (2015) scoping review study, four out of the 40 libraries specifically stipulated that the supervisor could not play the role of mentor since that might inhibit risk-taking and forthright communication. Additionally the study found only one article where an institution required communication between the supervisor and the mentor. Counter to this trend of excluding supervisors from mentoring, in a major survey in Canada, Harrington and Marshall (2014) asked university and college librarians to select appropriate mentors, and, while

they preferred library colleagues, they also selected supervisors as appropriate mentors.

Factors leading to success of programs

Certain organizational factors contribute to successful mentoring programs. The first is that there has to be a commitment and organizational engagement so that the program is sustained over time (Goodsett and Walsh, 2015). There must also be a big enough pool of mentors and a willingness to participate. The willingness often is enhanced when the organization has a clearly articulated investment in the program and a demonstration that it is as important as other performance expectations (Lorenzetti and Powelson, 2015). A plan or program for matching mentors and mentees needs to be developed. Mentors and mentees must be able to work well together and have mutually understood goals. If not, there needs to be a process for finding a better match (Novara et al., 2010). If the pairing is not mutually beneficial or if they are not invested in the relationship, it cannot be successful (Goodsett and Walsh, 2015).

Case studies of co-mentoring programs

The literature includes several case studies of co-mentoring programs. California State University, Long Beach developed a co-mentoring system called the "Resource Team Model" where three senior librarians mentor a new librarian for a period of six months. The scope of this mentoring includes acculturation and training in the job of librarianship, i.e. collection development, reference, instruction, professional development, and research (Bosch et al., 2010). Texas A&M University Libraries established a mandatory mentoring program in 2005, which required that every untenured librarian be paired with two tenured librarians as mentors. The focus of the mentoring group was specifically on supporting the librarian in research, publication, and progress towards tenure. The tenured librarians received a small amount of money that could be used for meals or in support of a research project. In the annual review process, both the mentor and mentee evaluated the mentoring experience (Stephens et al., 2011).

Purdue University Libraries mentoring program history

Purdue University is a major research institution, a land grant college with a predominant emphasis on engineering, technology, science, agriculture and business, and strong liberal arts and education colleges. The majority of the professional positions in

the Purdue University Libraries are tenure-track. These librarians have full faculty status; they are reviewed under the same policy and expectations of the teaching faculty and have the same three-committee review structure, typical of other research universities. Tenure is granted automatically upon promotion to associate professor.

At the Purdue University Libraries, there has been a long-term recognition of the importance of mentoring. The initial mentoring program was started over 25 years ago. Each assistant or associate professor was matched with a full professor based on common interests or area of responsibility in a one-on-one relationship. All the full professors were encouraged to meet on a regular basis to establish rapport and assist the mentees in all aspects of professional development, especially to guide the mentee along the path to promotion. Each mentor had clearly defined responsibilities: to represent the mentee at all promotion committee meetings, to write the promotion document with input from the mentee librarian, and to present the mentee's case at the first promotion review level. The program had a clear focus on mentoring and a strong involvement and responsibility in the peer evaluation process for promotion and tenure.

Despite a true desire and sincere effort on the part of all librarians, this program was not successful. Two driving forces precipitated a total revamp of the mentoring and the promotion review process. First, the pre-tenured librarians, as a group, expressed their dissatisfaction. They felt that they were not receiving the assistance, encouragement, and the mentoring needed to succeed, and that they lacked understanding of the expectations and control of their promotion preparation. They also expressed frustration with the frequency of the reviews. The second driving force for a change came at the university level: the membership of all first level promotion committees on campus was expanded from only the full professors to include all tenured full and associate professors. The impact in the library was that instead of a review by five to seven full professor librarians the committee expanded in size to nearly 30 librarians.

Developing the Purdue University Libraries model: Faculty review committees (FRCs)

As a result of the feedback from the pre-tenured professors and the change in the membership of the first review committee, the Libraries faculty established a task force in late 2007 to review the responsibilities, structure, and membership of the Libraries' promotion committee. The task force reviewed the literature,

surveyed other departments on campus, and held open meetings with the librarians. The Purdue University Libraries was using two review evaluations: an annual review toward promotion conducted by the full professors and a separate annual supervisor’s review. This parallel process was identified as a problem and the resulting solution was to combine these two processes. The greater challenge was to find a solution to using such a large committee to review all candidates annually. The solution was to create a “Faculty Review Committee” (FRC) for every faculty member that would review the librarian for performance and progress toward promotion. This FRC Program was designed as a formal and mandatory program with the supervisor as a member and coordinator, and the FRC is responsible for guidance and mentoring. In addition to the supervisor, every committee would have a full professor to counsel and guide on promotion questions, and a third tenured faculty member to provide balance and perspective to the team. The Task Force had found no other library or department at Purdue University doing reviews by small committees; rather the concept of “co-mentoring” was developed organically, based on the articulated needs of Purdue University librarians. The program was approved and instituted by the library faculty in August 2009. Since its inception, the program has had only minor changes.

Research questions

Three research questions surfaced. The first question is whether the Purdue University Libraries mentoring program is similar to programs at other academic research libraries. The second question is whether the program meets the faculty members’ needs for mentoring for career development. The third question is whether the FRC program has had an impact on promotion and scholarly activity. To evaluate these three questions, the authors used a mixed method approach: surveys and follow-up interviews. In addition, the authors did an analysis of the promotion rate and the research output productivity of Purdue University librarians. The first survey investigated mentoring at other ARL Libraries. The second survey evaluated the faculty members’ assessment of the Purdue University Libraries FRC program. IRB approval was granted for the study. This paper reports the results of this investigation.

Comparing the Purdue University Libraries FRCs to other mentoring programs at ARL libraries

To investigate the distinctiveness of the program, the authors surveyed the ARL University Librarians/

Table 1. “What type of program is it?”

Answer	%	Count
1 Dyad (one mentor/one mentee).	68.97	20
2 Group (one mentor/several mentees meet as a group)	10.34	3
3 Co-mentor (several (2 or more) mentors/one mentee)	17.24	5
4 Other	3.45	1
Total	100	29

Deans and Associate University Librarians/Deans about mentoring programs at their institutions. A survey of 28 questions was sent out by Jim Mullins, Dean of Purdue University Libraries, on 15 December 2017 to a list of 101 ARL Deans and Directors in the USA and Canada, and a follow-up direct mail invitation was sent to all the Associate Deans of Libraries for those institutions that had not responded. A total of 59 responses were received, for a response rate of 58%. Of the 55 academic research libraries that responded to the survey only 53% of libraries stated that they had a formal mentoring or career development program for their librarians. This percentage is similar to findings in other research studies (Goodsett and Walsh, 2015; Osif, 2008; Oud, 2008; Robbeloth et al., 2013)

Co-mentoring – team approach

This survey of ARL libraries revealed that Purdue University Libraries FRC mentoring program, as a co-mentoring program (one mentee and several mentors), is unusual and distinctive, but not unique among the ARL libraries that responded to this survey. Five research libraries in this study, 17% (including Purdue University Libraries), have co-mentoring programs, they are: Texas A&M University, University of Illinois at Urbana-Champaign, State University of New York at Buffalo, University of Washington, and Purdue University Libraries. The majority of libraries that responded have a one-on-one mentoring program (see Table 1).

Co-mentoring team comparison

To dig deeper into the comparisons of co-mentoring programs, the authors conducted follow-up phone interviews with the four Associate Deans of other ARL programs. The interviews revealed three differences among the co-mentoring teams. First is that none of the other four have supervisors on the committee. A second difference is that at the other institutions the mentoring committee is not involved in contract renewals or promotion decisions. The third

difference is that at the other four institutions there is no effort to appoint a full professor on each mentoring team. These three differences make the Purdue University Libraries FRC mentoring program unusual and distinctive.

Supervisor's role in mentoring

A major aspect of the Purdue University Libraries FRC mentoring program, compared to these four other programs, is that the supervisor is on the mentoring team at Purdue University Libraries and excluded at the other institutions. One interviewee qualified this by stating that they would allow a supervisor to be a mentor, if the mentee requested the supervisor. Another interviewee stated that at their institution the supervisor is viewed as part of the administration and intentionally not appointed to the mentoring team. They are following the normal model as expressed by the Hicks et al. (2010) article, which states that the supervisor's role is to manage staff to meet organizational goals without regard to career development of the employee.

Advising on contract renewals and promotion

Another major difference between the Purdue University Libraries program and the other programs is that the Purdue University Libraries FRCs advise the Dean on contract renewals by submitting a written recommendation for two contract reviews, one at year three and the second at year five. However, since all tenured faculty librarians participate in the formal recommendation for each promotion by voting on each candidate's case, the FRCs do not write promotion recommendations. Instead the FRC members advise and assist the candidate in writing the promotion dossier, and the FRC presents the candidate case at the promotion meeting, where FRC members *orally* provide their input. Following this presentation, all tenured librarians, as members of the promotion committee, cast their votes. This written decision is sent to the Dean who forwards it to the next review committee for their vote.

The survey indicated that at only one other institution does the co-mentoring team have some input on contract renewals or promotion decisions. To investigate this, the authors specifically asked the four Associate Deans about reports and responsibilities of the co-mentors in the follow-up interviews. The level of input at the other institutions varies, although at none of them is the mentoring committee as involved as at Purdue University Libraries. Three of them have no reports produced by the committee at all. One interviewee stated that they do not ask for reports or hold

mentors accountable. Another interviewee stated that their philosophy is that requiring letters would make the mentors more like supervisors, although the mentors can and usually do write a separate letter of support at the time of promotion. At that institution, all tenured faculty members are invited to write a letter, so the letter from a mentor is just one of these internal letters. At another institution the mentor can and often does act in an advocacy role and can have a "little bit" of input at the promotion meeting. However, there is discussion at this institution at the provost level to change the policy and to ask mentors to recuse themselves from promotion decision meetings. At the fourth institution, the mentors' responsibilities are much more involved. They meet with faculty in liaison department, write up a summary of these meetings omitting names, and submit this report to the promotion committee.

Full professor on mentoring team

At the Purdue University Libraries, every FRC has three members, including a full professor to guide and to advise specifically on promotion. Programs at the other four institutions have smaller teams: only two mentors for each mentee and no effort is made to appoint a full professor on each mentoring team. At one library, the full professors are not serving on any mentoring committees. The interviews of the Associate Deans identified that there are not enough full professors to serve on the committees. At Purdue University Libraries, there are sufficient full professors available for FRCs. The full professors take this responsibility seriously and serve willingly. It is part of the expectations of their rank.

Evaluation of the Faculty Review Committee program

Purdue University Libraries evaluated the FRC program in 2011 and 2017. This research paper reports the findings of the 2017 evaluation of the FRC program. The 2011 evaluation found that the FRC program was very effective in meeting the mentoring and promotion needs of the faculty from both the mentors' and mentees' perspectives. Overall, the FRC mentoring review process was positively received by mentees; they indicated that they received better feedback than in the past, and that the feedback was more specific to that individual. In addition, there was a sense of better communication and fewer mixed messages from the supervisor and the promotion committee. Based on the overall opinion in 2011, the program was considered effective and was continued.

Table 2. “Does the current FRC system provide better mentoring?”

#	Answer	%	Count
1	Yes	78.57	11
2	Neutral	21.43	3
3	No	0.00	0
	Total	100	14

Table 3. “To what degree do you think that your FRC is effective in mentoring?”

#	Answer	%	Count
1	Effective	66.67	18
2	Neutral	29.63	8
3	Ineffective	3.70	1
	Total	100	27

In 2017, the authors evaluated the FRC mentoring program again. This evaluation was motivated because the 2011 survey results were never published and a follow-up to that evaluation was needed for a more robust assessment, which the Dean supported. This time the evaluation was conducted using two surveys, one for all faculty members in their role as mentee and one just for the senior librarians in their role as mentor. These surveys were followed by five interviews with individual librarians from each of the three ranks, assistant (untenured), associate and full professor.

Survey results of all faculty members (in the role of mentee)

The 2017 survey was sent to all 34 faculty members; 30 useable responses were received for a response rate of 88%.

Fourteen of the librarians were on the Purdue University Libraries faculty before the change to the FRC. All but one of these librarians, who have been evaluated under both procedures, felt that the current program was an improvement; one person was neutral; no one felt it was less effective. Of the mentees surveyed, 79% felt that the program provided better mentoring and guidance than the older procedure (see Table 2).

All faculty members said the program was goal-based and combines evaluation of all areas of responsibility (job performance/professional service/research and publication.) When asked specifically about the mentoring provided via the FRC, two-thirds of those who answered this question said it was effective (see Table 3).

Table 4. “Do you feel that you can ask questions, get advice, and engage the FRC in providing mentoring?”

#	Answer	%	Count
1	Yes	92.59	25
2	No	7.41	2
	Total	100	27

Table 5. “What characteristics do you value in a mentor?”

#	Answer	%
1	Confidentiality	16.16
2	Goal focused	13.13
3	Listening and empathy	19.19
4	Physically close enough to meet in-person	3.03
5	Professional knowledge	19.19
6	Provides honest feedback	23.23
7	Teacher	3.03
8	Other	3.03
	Total	100

Of those who answered the question, about whether they could ask questions and get advice and mentoring, 93% said they could (see Table 4).

When the mentors and mentees were asked what characteristics they valued in a mentor, the librarians chose “provides honest feedback” as the top choice, followed by “professional knowledge” and “listening and empathy” (see Table 5).

Survey of FRC members (in the role of mentor)

A different survey was sent to the 16 FRC mentors (supervisors, full professors, and third tenured members), and the response rate was 81%. There is an even distribution of associate professors and full professors. All members said that the annual performance evaluation statements included progress toward promotion; but only 60% of them also said they included evaluation of job responsibilities. Several of the FRCs have provided written reports to the Dean for contract reviews, but no one reported any consensus issues on these contract renewals. Comments indicated that the committees reached consensus easily, even though there was at least one contract that was not renewed during this time period. Similar results were received about promotion reviews. Eight faculty members have been on FRCs during a promotion decision. Seven of them assisted in writing the promotion dossier, and six of them provided verbal input at the promotion decision meeting. The FRC members were unanimously supportive in their response to the question of the effectiveness of the FRCs in providing

Table 6. “Do you feel that the FRC provides acceptable mentoring?”

#	Answer	%	Count
1	Yes	69.23	9
2	Somewhat	30.77	4
3	No	0.00	0
	Total	100	13

performance review and progress towards appointment renewal.

The FRC members reported that acceptable mentoring was occurring for all mentees, with 70% answering yes and no one saying no (see Table 6). This is similar to the response in the survey sent to all faculty members (see Table 3) where two-thirds of those surveyed said acceptable mentoring was occurring, one-third were neutral, and one person said that mentoring via the FRCs was not effective.

Survey follow-up interviews with five Purdue University librarians

The surveys were followed by five interviews with Purdue University librarians: one full professor, two associate professors and two assistant/untentured professors. The interviews clarified that a change could improve the program. The mentees, especially the pre-tenure librarians, wanted more control over who was on their FRC. They felt that the membership was “sort of the luck of the draw,” and they did not have control over this. Since this was an easy change to make, the Libraries Promotion and Tenure Policy was amended during the spring of 2018 to give the candidates the responsibility for changing their full professor and/or tenured member after the first year of employment. Most faculty serve on mentoring teams, and those who are effective mentors seem to enjoy the responsibility and are willing to serve on multiple FRCs. Based on informal discussions, it seems that since this is a team approach, less effective mentors are able to learn from those who are more effective, and reluctant mentors are more willing to try it.

Assessment of the FRC’s impact on promotion of tenure-track librarians

Faculty satisfaction with the FRC program is evident from the surveys. However, another corollary to the program’s success is the reduction of failed promotions. To investigate this we used the years 2003 and 2012 as the pivotal study years. 2003 was the first year of possible impact of the FRC program, because the 2003 hires were the first cohort to have an FRC

Table 7. Number of faculty members hired and promoted during 1993–2002 and 2003–2012.

	Numbers 2003–2012	%	Numbers 1993–2002	% 1993–2002
Hires	18		20	
Promotions	10	56	13	65
Failed promotions	0	0	2	10

working directly with them during their last year before promotion. The 2012 hires were reviewed for promotion in 2018 which is why the cutoff for reviewing publications is 2012. The promotion data from the 10 years between 2003 and 2012 was compared to the promotion data for the 10 years before that date, 1993–2002.

Table 7 shows the percentage of successful promotions and failed promotions during the last 10 years compared to the 10 years before the FRC program. Those faculty members who joined the faculty in 2003 were reviewed for promotion in 2010; they were the first cohort to have an FRC working directly with them during their last year before promotion. The most important statistic this chart reveals is that there has not been an unsuccessful promotion case since the FRCs have been working at least one year with untenured faculty members. In the 10 years prior to the FRC program, there were two unsuccessful cases (see Table 7). The written responses in the survey and the follow-up interviews suggest that untenured faculty members who are unlikely to be promoted receive better and earlier guidance, which leads to a job search and a resignation *prior* to the promotion review.

Assessment of the FRC’s impact on research and publications of all Purdue University librarians

Scholarly productivity is a major component of the assessment for promotion, and an increase in the productivity of the libraries’ faculty members could be evidence of the FRC program’s success. Faculty publications are self-reported by all faculty members; however the authors are confident in these figures because of the strong encouragement to report publications. The FRC program has been in place for nine years. For this evaluation, the authors considered scholarly publications from all faculty, not just untenured, because all faculty have an FRC that encourages scholarly output. Comparing productivity of all scholarly articles produced by all Purdue University librarians (both mentors and mentees) between

Table 8. Impact of FRC on research productivity.

2010–2018	Number of publications	2001–2009	Number of publications
2018	44	2009	24
2017	40	2008	28
2016	42	2007	22
2015	45	2006	22
2014	36	2005	20
2013	31	2004	17
2012	23	2003	23
2011	26	2002	15
2010	33	2001	10

2010 and 2018 with the nine years prior, 2001 and 2009, indicates a significant increase in scholarly productivity. It is important to note that the number of faculty employed at Purdue University Libraries has been relatively consistent during the years of 2001–2018. The table shows there has been a rather steady increase over this 18-year period. The authors recognize that certainly not all of the increase can be contributed to the FRC program. Other possible influences include the increase in funding for travel to present at conferences and financial support to hire graduate assistants. However, this trend does provide inferential support of the positive impact of the FRC program (see Table 8).

Conclusion

The answer to the question whether the Purdue University Libraries program is distinctive and has unique elements is yes, based on those ARL libraries that responded to the survey. Most ARL libraries, that have a mentoring program, have a one-on-one program similar to the program Purdue University Libraries had prior to 2009. Our survey only identified four other ARL libraries with co-mentoring programs; none are structured similarly to Purdue University Libraries program. A more important difference is that the Purdue University Libraries program includes the supervisor on the mentoring team. The literature review indicates a drop in the acceptance of the supervisor as a mentor since the ARL study in 1999 (Wittkopf, 1999). In general, the articles in the literature review do not recommend that the supervisor be a mentor. However, at Purdue University Libraries, this is considered one of the strengths, and mentoring a direct report is a major part of the supervisor's responsibilities. Including the supervisor on the mentoring team makes the conversation and recommendations to the mentee an open discussion. The mentee is not in the position of receiving

multiple, sometimes conflicting directives from the supervisor and other mentors. If there are different opinions, they can be discussed openly at the FRC meeting.

A second difference between the Purdue University Libraries program and the other four co-mentoring programs is the responsibility of the FRC to advise on contract renewals and promotions. This responsibility of the FRCs increases the status and formality of the committee, and the Purdue University librarian surveys and the interviews indicated satisfaction with the integration of the mentoring in the review process.

A third difference is that at Purdue University Libraries every FRC has a full professor. Prior to the FRC program, a significant amount of the full professors' time was devoted to the review process. The FRC program distributes this workload among the full professors and the associate professors. The authors did not include a question in the survey about workload; however, no-one mentioned this in either the survey or the follow-up interviews.

To summarize, the FRC mentoring program at Purdue University Libraries is distinctive because it is a formal co-mentoring team approach with three mentors for every mentee and because the membership includes the supervisor and a full professor. These FRC committees have formal and clear responsibilities to guide and mentor the career development of every librarian and the authority to recommend contract renewals and to provide oral evaluation at the promotion meeting. FRCs are accountable; they write recommendations for the mentee and the Library Dean. Purdue University Libraries has discovered during this investigation of the FRC program that it is important that the committee membership be flexible. The flexibility of the teams was recently enhanced based on the 2017 study to give every mentee control over the choice of full professor and third member.

The Purdue University Libraries Faculty Review Committee was specifically designed to meet the needs and resources available at Purdue University Libraries. Some of the aspects of the program could be adapted by other libraries, while other aspects might not work in every setting. Our recommendation is that other libraries assess their needs and mine our program for ideas that might be implemented.

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Supplemental material

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Transformational and transactional leadership and knowledge sharing in Nigerian university libraries

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Abstract

This study aims to investigate the influence of transformational and transactional leadership styles on the knowledge-sharing practices of librarians. It adopted a quantitative approach and a questionnaire formed the main instrument of data collection. Data collected from 216 librarians in different private, state and federal university libraries in Nigeria was analysed using multiple regression techniques and Tukey's post-hoc test of honestly significant difference. The findings revealed that transformational leadership impacted knowledge sharing more than transactional leadership styles. Therefore, this study provides empirical evidence that transformational and transactional leadership behaviours are required to enhance the knowledge-sharing activities of librarians in Nigeria.

Keywords

Transformational leadership, transactional leadership, leadership development, knowledge sharing, university libraries, Nigeria

Introduction

The environment in which university libraries are operating today is changing rapidly, thus forcing these libraries to find new ways of operating, with their attendant challenges. This means that the new ways of operation are likely to create challenges in organizational structure, management practices and leadership. As observed by Maponya (2004), the most successful university library is the one that utilizes its human and knowledge resources to achieve its vision and mission. Masa'deh et al. (2014) describe human and knowledge resources as an organization's most prized position.

Effective management of human resources depends on the organizational leadership. This is due to the fact that leaders play a vital role in providing guidance for employees and establishing procedures for the continuous professional development of

employees (Chu and Lai, 2011; Odumeru and Ifeanyi, 2013). In addition, leaders are instrumental to the integration, sharing and use of knowledge in organizations (Mushtaq and Bokhari, 2011). However, Masa'deh et al. (2016) observe that researchers have studied the concept of leadership over the years and have paid great attention to its various types, but less attention has been paid to two widely spread types of leadership – namely, transformational and transactional leadership. Transformational leadership is the process of developing employees for the purpose of achieving the goals of an organization so that the employees can contribute to the development of the

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organization (Masa'deh et al., 2016). This means that transformational leadership is a means to an end where the methods employed to develop the employees are more important than the organizational goals. Transactional leadership is concerned with building a good relationship with each employee or a reciprocal relationship between organizational leaders and their subordinates (Vito et al., 2014). In order to build this relationship, some form of values must be exchanged between leaders and subordinates. The values have been described as economic, political and psychological (Ravichandran et al., 2007).

Knowledge resources have become one of the most important resources for an organization. It is not easy to manage knowledge effectively, and the sharing of this knowledge is an equally challenging process (Kanaan et al., 2013; Masa'deh et al., 2014). Most organizational knowledge is stored in the minds of employees and, in order for an organization to use this knowledge, it must be shared among the employees. The sharing of knowledge can help to create new knowledge, refine old knowledge and/or synthesize knowledge for future use in the organization (Fong et al., 2011; Masa'deh, 2013). Apart from leading an organization to gain a competitive advantage, knowledge sharing leads to innovative ideas and services (Fathi et al., 2011).

Despite the benefits of knowledge sharing, university libraries in Nigeria are confronted with the challenges of poor funding, user demands for more services and overstretched information resources (Igbo and Imo, 2011). Knowledge sharing is really needed because no single library can meet all the needs of its community or satisfy its users with the resources within its walls. According to Ejedafiru (2010), the worth of a library today is increasingly being measured by the services it offers in terms of helping clients to access universal information, rather than its respective collection. With this in mind, university libraries need to forge partnerships in establishing online information-sharing networks for expanded access to information (Ejedafiru, 2010; Jain, 2007). However, it has been reported that knowledge-sharing initiatives have not been formally embraced in many academic libraries (Parirokh et al., 2006). Maponya (2004) also observes that many knowledge-sharing activities in academic libraries are largely uncoordinated, thus sharing knowledge among librarians has always been informal and usually via verbal conversations. In Nigeria, the situation is the same, and this largely accounts for the inconsistencies in reported findings on knowledge sharing among librarians in university libraries. For instance, Onifade's (2015) study shows that librarians in

university libraries in Nigeria shared a small amount of knowledge on matters such as library users, serials usage and library automation, indicating that knowledge sharing among librarians was low. This study is supported by Akparobore's (2015) work, which also reports a low degree of knowledge sharing among librarians in university libraries in Nigeria. In a similar study, Awodoyin et al. (2016) found that knowledge sharing among librarians in Nigerian academic libraries was high, thus contradicting the studies by Onifade (2015) and Akparobore (2015). This situation suggests that these libraries should reconsider their knowledge-sharing capabilities for the purpose of meeting the needs of library users. Studies have shown that leadership plays a role in knowledge sharing, and that there exists a positive relationship between transformational and transactional leadership styles and knowledge sharing, but this relationship appears not to have been studied sufficiently with regard to libraries (Analoui et al., 2013; Birasnav, 2014). The purpose of this study is therefore to investigate the influence of transformational and transactional leadership styles on knowledge sharing among librarians in university libraries in Nigeria. The investigation is guided by three main questions: (1) Does a transformational leadership style influence knowledge sharing? (2) Does a transactional leadership style influence knowledge sharing? (3) Does the institution type influence knowledge sharing?

Literature review

This section reviews the literature on transformational and transactional leadership, as well as the conceptual framework adopted for this study.

Transformational leadership

Transformational leadership has been accepted as an important leadership style. This can be seen from the interest in transformation leadership shown by researchers and scholars for more than 25 years (Bass, 1985; Brunch and Walter, 2007; Burns, 1978; Long et al., 2014). The reason for this interest in transformational leadership is obvious. First, transformational leadership can be applied to different cultural settings (Ivey and Kline, 2010). Second, it can lead to a better and more positive relationship between a supervisor and their subordinates (Masa'deh et al., 2016). And third, transformational leadership is reported to have a strong association with several individual as well as organizational outcomes (Cheung and Wong, 2011; Omar and Hussin, 2013).

Transformational leadership can be defined as 'the process of developing people who accomplish

goals and objectives that in turn lead to the development of the organization' (Masa'deh et al., 2016: 683). Masa'deh et al. (2016) further state that an emphasis should be placed on the methods for achieving these goals. The emphasis on such methods is what distinguishes transformational leadership from other types of leadership. Rao (2014) concludes that these methods include idealized influence, inspirational motivation, intellectual stimulation and individualized consideration. These four different methods of transformational leadership, otherwise known as transformational leadership behaviours, have been defined, clarified and explained by Burns (1978), Bass (1985), and Piccolo and Colquitt (2006). These authors have summarized these behaviours thus: idealized influence is the degree to which leaders behave that causes their followers to identify with them, implying that the way a leader behaves in an organization, especially if the leader behaves charismatically, is most likely to influence their subordinates; inspirational motivation is the degree to which visions formulated by the leader(s) are appealing to or meet the expectations of subordinates; intellectual stimulation is the degree to which leaders encourage their followers to challenge assumptions, take risks and apply new methods of solving problems; and individualized consideration is the degree to which leaders attend to followers' needs, act as mentors or coaches, and listen to followers' concerns.

Aside from the above methods or ways of facilitating the process of developing people, there are other factors that are considered instrumental in the effectiveness of transformational leadership (Pawar and Eastman, 1997). Pawar and Eastman (1997) state that these factors include the organization's openness to change, the degree to which the transformational process is actually undertaken, and the transformational leader's capabilities for undertaking the appropriate process.

Transactional leadership

Transactional leadership is perceived to be built on reciprocal relationships between leaders and their subordinates (Vito et al., 2014), or to involve some values or rewards – economic, political and psychological – that are usually exchanged (Ravichandran et al., 2007). It may also include the material and psychic needs that are satisfied when the expected work performance is achieved (Sarros and Santora, 2011). These values, in whichever form, are negotiated and, as a rule, ought to be accepted by the subordinates or followers from their leaders (Liu et al.,

2011). Simply put, transactional leadership has short-term outcomes (Rowold and Schlotz, 2009) and often creates room for negotiation (Vito et al., 2014). This form of leadership has been criticized for its failure to help develop followers' innovative and creative skills (Dai et al., 2013).

Transactional leadership has two components – namely, contingent reward and management by exception (Erkutlu, 2008; Obiwuru et al., 2011). A leader applying contingent reward is expected to explain to their followers what needs to be rewarded (Erkutlu, 2008). Contingent reward is usually driven by negotiation or bargaining, which is usually based on an understanding between the leader and their subordinates of how organizational goals are to be met (Limsila and Ogunlana, 2008). Because of the clarifications, expectations, negotiations and agreements that characterize contingent reward, it has been described as a constructive form of behaviour (Obiwuru et al., 2011). While contingent reward is constructive, management by exception is a corrective form of behaviour (Obiwuru et al., 2011). Obiwuru et al. (2011) conclude that there are two forms of management by exception – namely, active management by exception and passive management by exception. A leader applying active management by exception will monitor the performance of their followers so as to take corrective action whenever they perform below expectations (Erkutlu, 2008; Limsila and Ogunlana, 2008) or to take preventive steps to avoid problems occurring (Xirasagar, 2008). Xirasagar (2008) concludes that corrective or preventive actions are carried out by a leader before problems occur. In passive management by exception, problems must occur before corrective action is taken (Birasnav, 2014). In other words, a leader applying passive management by exception prefers to offer a solution when a problem occurs (Erkutlu, 2008; Limsila and Ogunlana, 2008).

Knowledge sharing

The knowledge-economy era has made knowledge an important resource. The success of any organization in this era depends on its ability to manage its knowledge assets because knowledge is now regarded as one of an organization's key resources (Masa'deh, 2013; Masa'deh and Shannak, 2012). Although knowledge may be regarded as a complex entity (Clarke and Rollo, 2001), it is categorized into two parts – namely, explicit knowledge and tacit knowledge. Explicit knowledge can be written down or transmitted from one employee to another (Pan and Scarborough, 1999). It is generally described as

codified or documented knowledge. Tacit knowledge is developed through such activities as person-to-person conversations, personal experience and storytelling (Singh, 2008). It is usually difficult to codify or articulate and cannot be written down. Further, Platts and Yeung (2000) state that tacit knowledge is not easily accessible when compared to explicit knowledge. Tacit knowledge resides in the heads of employees, which makes it difficult to be described or transferred from one person to another. According to Bollinger and Smith (2001), tacit knowledge consists of lessons learned, know-how, rules of thumb and intuition.

Given the importance of knowledge, organizations are now integrating knowledge management into their business strategies. More specifically, knowledge sharing has become a tool that many organizations are using to leverage their knowledge assets (Geiger and Schreyögg, 2012; Masa'deh, 2012). Knowledge sharing as part of processes of knowledge management has become crucial because organizational knowledge needs to be transferred and shared. Knowledge sharing is defined as 'the process where individuals mutually exchange their knowledge (explicit and tacit) and jointly create new knowledge, and this translates individual knowledge into organizational knowledge' (Van den Hooff and De Ridder, 2004: 118). Knowledge sharing provides benefits to organizations, including improved customer service (Ma et al., 2008), improved innovative capacity (Cao and Xiang, 2012) and improved organizational performance (Vorakulpipat and Rezgui, 2008). Despite these benefits, organizations face challenges with knowledge sharing such as the tacit nature of employees' knowledge and the willingness of employees to share their knowledge (Amayah, 2013). Knowledge is power and, for this reason, many employees may not be willing to share their knowledge (Teh and Sun, 2012). This situation may likely result in sharing inaccurate or false information, which affects employees as well as organizational competitiveness (Casimir et al., 2012). Masa'deh et al. (2016) have noted that knowledge sharing among employees in an organization can be enhanced by understanding the situations that motivate employees to share knowledge. Some of these motivations include personal growth, money, recognition, a sense of accomplishment and operational autonomy (Tseng and Huang, 2011). Knowledge has also been reported to be influenced by various organizational, leadership and individual factors (Masa'deh et al., 2016).

Knowledge sharing in libraries is defined as the sharing of explicit knowledge and tacit knowledge (Kumaresan, 2010). According to Kumaresan

(2010), explicit knowledge is knowledge which is written down or encoded in some fashion, whereas tacit knowledge is knowledge which exists in the minds of individuals. Knowledge sharing benefits libraries in many ways. It enhances innovation in libraries, helps to expand the resource base of libraries, and improves library efficiency and effectiveness (Awodoyin et al., 2016).

In university libraries, different kinds of knowledge are shared. According to Awodoyin et al. (2016), stored knowledge can be shared among librarians through collaboration on assigned tasks. This implies that university libraries are required to move from their traditional information role to a resource-based and collaborative role to provide effective services for their users. The digital age is rapidly transforming the method through which information is provided to users. The Internet has actually become a tool for knowledge sharing. There are many free online resources that libraries are now sharing or transferring to users to meet their needs. In their study, Okonedo and Popoola (2012) report that librarians also share knowledge about new trends in librarianship. The experience gained in this way can help them to perform their job effectively. Awodoyin et al. (2016) found that librarians share knowledge about scholarly communications, serials usage, technology use in libraries, information sources, reader services, and information delivery and access. Ejedafiru (2010) also asserts that university libraries share resources. Furthermore, Smith (2001) states that knowledge in itself can be categorized into public knowledge (or explicit knowledge), which is known, taught and shared regularly; personal knowledge (or tacit knowledge), which exists in individuals' minds; and shared knowledge (or knowledge shared by knowledge workers in their work).

Although knowledge sharing is beneficial to university libraries, it is often, as reported by Rawung et al. (2015), not an easy and simple process, and therefore requires an additional factor. The existence of leadership is expected to be a factor in solving this problem (Rawung et al., 2015). Previous studies have supported the proposition that a leader functions as a main factor in accelerating knowledge sharing in an organization (Singh, 2008; Srivastava et al., 2006; Xue et al., 2010). The reasons for this are not far-fetched. First, when a leader is empowered positively, it impacts on knowledge sharing (Srivastava et al., 2006; Xue et al., 2010). Second, when a leader creates an atmosphere of trust, motivates staff or pays attention to staff complaints, such behaviours encourage knowledge sharing (Rawung et al., 2015). Third, studies have revealed that transformational and

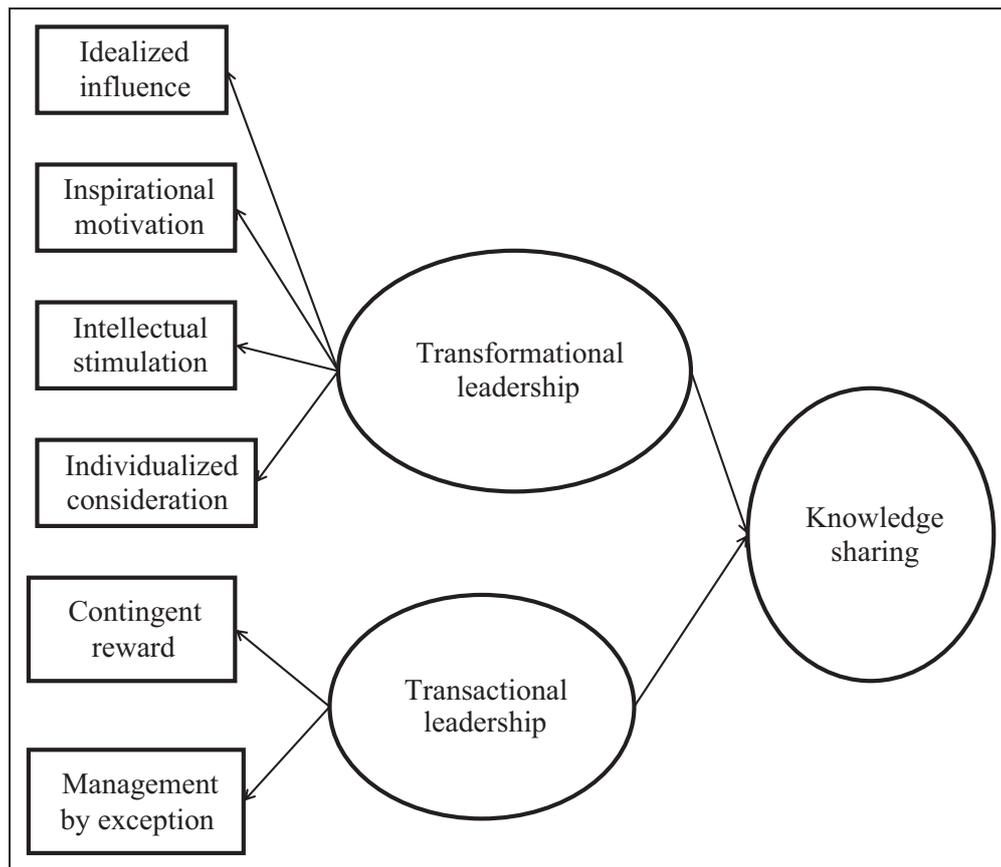


Figure 1. Conceptual framework.

transactional leadership styles are found to have a positive influence on knowledge sharing in organizations (Bock and Kim, 2002; Bryant, 2003; Crawford, 2005; Rawung et al., 2015). Transformational leaders inspire, stimulate and motivate, as well as encourage employees to share knowledge, whereas transactional leaders use rewards and correctional measures to facilitate knowledge-sharing activities among staff.

Conceptual framework

This study proposes the research model in Figure 1 to show the relationship between the research variables. The independent variables in the research model are transformational leadership and transactional leadership, whereas knowledge sharing is the dependent variable. The relationships between the research variables are hypothesized through H1, H1(a), H1(b), H1(c), H1(d), H2, H2(a) and H2(b). The research model helps to demonstrate that knowledge sharing among librarians will increase depending on the extent to which library managers adopt transformational and transactional leadership styles.

Transformational leadership and knowledge sharing. Studies have shown that a transformational

leadership style influences knowledge sharing (see Li et al., 2014; Liu and DeFrank, 2013; Shao et al., 2012). Baytok et al.'s (2014) study demonstrates that transformational leadership has a positive relationship with knowledge-sharing practices. A related study by Yaghoubi et al. (2014) found that transformational leadership has a positive influence on knowledge creation and sharing. Another study, on the influence of organizational culture and transformational leadership on knowledge sharing, by Mushtaq and Bokhari (2011) found that both variables play an important role in enhancing knowledge sharing among employees. Furthermore, Al-Husseini and Elbeltagi (2012) state that all of the transformational leadership variables or measures have a positive influence on knowledge sharing, but intellectual stimulation has the strongest effect, which means that transformational leadership can enhance an organizational climate that facilitates knowledge sharing (Salo, 2009). Authors such as Bryant (2003) and Shi (2010) have agreed that an organizational climate promotes knowledge sharing in organizations. Drawing from the studies reported here, despite their being conducted outside a library environment, the following hypotheses are proposed:

H1: Transformational leadership has a positive influence on knowledge sharing.

H1(a): Idealized influence has a positive influence on job performance.

H1(b): Inspirational motivation has a positive influence on knowledge sharing.

H1(c): Intellectual motivation has a positive influence on knowledge sharing.

H1(d): Individualized consideration has a positive influence on knowledge sharing.

Transactional leadership and knowledge sharing. Some studies have revealed that transactional leadership has a significant positive influence on knowledge sharing (Analoui et al., 2013; Birasnav, 2014; Riaz and Khalili, 2014). Chen and Barnes (2006) found that contingent reward has a significantly positive correlation with knowledge sharing. Analoui et al.'s (2013) study reveals that transactional leadership correlates significantly with knowledge sharing and dissemination. Masa'deh et al. (2016) found that a positive relationship exists between transactional leadership and knowledge sharing. Thus, the following hypotheses are proposed on the influence of transactional leadership on knowledge sharing in a university library environment:

H2: Transactional leadership has a positive influence on knowledge sharing.

H2(a): Contingent reward has a positive influence on knowledge sharing.

H2(b): Management by exception has a positive influence on knowledge sharing.

Research methodology

This study proposes five hypotheses with the aim of determining the impacts of transformational leadership and transactional leadership on the knowledge sharing of librarians in university libraries in Nigeria. A quantitative approach underpinned by a positivist philosophy was adopted. There are strategies of inquiry associated with quantitative research that invoke a positivist world view. They include experimental, quasi-experimental and correlational surveys (Punch, 2005). While experimental and quasi-experimental research designs deal with comparisons between groups, a correlational survey is concerned with relationships between variables. Punch (2005: 78–79) further identifies two aspects of relationships between variables – namely, regression and correlation. In regression, the focus of the research is on a

dependent variable and to study its relationship with a number of independent variables. The general objective is to account for variance in the dependent variable and to see how the different independent variables contribute either relatively or jointly in accounting for that variance. The requirements are that the researcher must define and measure the independent variables, as well as the dependent variable. In correlation, the focus of the research is more on making a detailed study of the relationship between variables than accounting for variance. We account for variance by studying relationships with other variables. The present study is based on regression. While the focus of the research is on knowledge sharing (dependent variable), it also attempts to investigate the relationship between knowledge sharing and two independent variables – namely, transformational and transactional leadership styles – and to see how transformational and transactional leadership styles account for variance in knowledge sharing among librarians.

The items developed for the constructs of our research model were obtained from prior research. These items provided a valued source for data gathering, as their reliability and validity had been verified through Cronbach's alpha procedures and peer reviews, respectively. The variables for transformational leadership were obtained from Dai et al. (2013) and Masa'deh et al. (2016), and those for knowledge sharing from Vuori and Okkonen (2012) and Masa'deh et al. (2016). Moreover, Table 1 shows the constructs that were measured and the questions measuring each construct.

The population of the study includes librarians in university libraries in Nigeria. These libraries are grouped into private, state and federal libraries, as defined by their funding bodies. The librarians who work in these libraries are the respondents, and they are categorized into sectional heads, divisional heads and other academic librarians who do not perform any managerial roles. Divisional heads are supervised by the university librarian; sectional heads are supervised by divisional heads; and the other academic librarians who do not perform any managerial roles are supervised by sectional heads. A survey questionnaire was used to gather data for this study. The questionnaire items were reviewed by three experts in library and information science in order to identify problems with wording, content and ambiguity. After some changes were made based on their suggestions, the modified questionnaire was piloted with 15 randomly selected librarians in order to determine its reliability index using the Cronbach's alpha procedure as shown in Table 1. These librarians were excluded from the study. Copies of the questionnaire were mailed by

Table 1. Item measures of constructs and Cronbach's alpha.

Construct	Code	Measurement item	Cronbach's alpha
Transformational leadership	TFL		0.86
	TFL1	My supervisor understands my situation and provides assistance	
	TFL2	My supervisor encourages me to take on challenges	
	TFL3	My supervisor overcomes any work-related challenges	
	TFL4	My supervisor makes efforts to fulfil the vision of the library	
	TFL5	My supervisor encourages me to think about work-related problems from a new perspective	
	TFL6	My supervisor encourages me to always rethink assumptions or opinions	
	TFL7	My supervisor helps me to complete my work	
Transactional leadership	TSL		0.82
	TSL1	My supervisor reprimands me when I fail to complete my work	
	TSL2	My supervisor records my mistakes	
	TSL3	My supervisor rewards my hard work	
Knowledge sharing	KS		0.87
	KS1	We share knowledge necessary for our job	
	KS2	We exchange knowledge that will help us to achieve our goals	
	KS3	We use the information systems that we developed to share knowledge	
	KS4	We promote sharing of knowledge between the library and other units of the university	
	KS5	Knowledge is shared between supervisors and followers	
	KS6	The library supports knowledge sharing	
KS7	There are opportunities for knowledge sharing in my library		

post to university librarians with specific instructions to distribute them to divisional heads, sectional heads and other academic librarians (in that order). University librarians were chosen because they are the directors of their respective libraries and it is within their powers to appoint sectional and divisional heads; they could also identify academic librarians who are not performing any managerial roles. Another reason for using university librarians to distribute the instrument was that they were not part of the study by virtue of their position as the chief executives of the university library or library directors. A letter was sent out to all the university librarians in the country requesting their assistance in the distribution of the questionnaire; only 50 of them agreed. A total of 500 copies of the questionnaire were sent by post to the 50 university librarians who agreed to distribute the questionnaire. Out of the 500 copies distributed, 266 were returned; of these, 216 were found to be correctly completed and were used for the study. This gave a response rate of 53.2%.

Since the study relied on multiple measures of the study variables, the reliability analysis was done using the Cronbach's alpha coefficient (Hair et al., 2010) to establish or assess the degree of consistency between

these multiple measures or research constructs. Some scholars (see Bagozzi and Yi, 1988) have suggested that the value of all indicators or dimensional scales should be above the recommended value of 0.60. Table 1 shows that all of the Cronbach's alpha values for each of the three constructs of this study exceeded the recommended value of 0.60, which indicates that the instrument was reliable.

In order to determine the relationship between the two independent variables (transformational leadership and transactional leadership) and the dependent variable (knowledge sharing), where these variables have been measured on a five-point Likert scale ranging from 'Strongly disagree = 1' to 'Strongly agree = 5', a descriptive analysis of the research variables was made and a multiple regression analysis was carried out to test the research hypotheses.

Findings

Table 2 shows the demographic information of the respondents. The number of female librarians (50.9%) who participated in the study was more than the male librarians (49.1%). However, the majority of the librarians came from federal university libraries

Table 2. Demographic information of the respondents.

Variable	Category	Frequency	Percentage
Gender	Male	106	49.1
	Female	110	50.9
	Total	216	100
Institution type	Private	60	27.8
	State	70	32.4
	Federal	86	39.8
	Total	216	100
Position	Head of division	72	33.3
	Head of section	56	26.0
	Other librarians	88	40.7
	Total	216	100

(39.8%), while librarians from state and private university libraries accounted for 32.4% and 27.8%, respectively. The categories of the librarians who participated in this study were mainly heads of division (33.3%), heads of section (26.0%) and other academic librarians (40.7%) who did not perform any managerial roles.

Table 3(a) shows the descriptive statistical analysis of the study variables. In order to describe the responses, and thus the attitude of the respondents towards each question they were asked in the survey, the mean (M) and standard deviation (SD) were estimated. While the mean shows the central tendency of the data, the standard deviation measures the degree of variability in the data (Sekaran, 2003). A small standard deviation for a set of values indicates that these values are close to the mean, while a large standard deviation indicates the opposite. The level of each item was determined by the following formula: the highest point in the Likert scale minus the lowest point in the Likert scale, divided by the number of levels used – or $(5 - 1)/3 = 1.33$, where 1.00–2.33 was interpreted as ‘low’, 2.34–3.67 reflected ‘moderate’ and 3.68–5.00 reflected ‘high’. The findings reveal that transformational leadership ($M = 3.57$, $SD = 0.96$), transactional leadership ($M = 3.53$, $SD = 0.97$) and knowledge sharing ($M = 3.67$, $SD = 0.98$) are moderately applied to improve services in university libraries in Nigeria.

The highly applied transformational behaviours as perceived by the respondents are as follows: ‘My supervisor makes efforts to fulfil the vision of the library’ ($M = 4.10$, $SD = 0.91$); ‘My supervisor encourages me to think about work-related problems from a new perspective’ ($M = 4.02$, $SD = 0.97$); ‘My supervisor encourages me to take on challenges’ ($M = 3.89$, $SD = 1.06$); and ‘My supervisor takes

time to understand my needs’ ($M = 3.86$, $SD = 0.97$). As perceived by the respondents, the highly applied transactional behaviours are: ‘My supervisor rewards my hard work’ ($M = 3.88$, $SD = 0.91$) and ‘My supervisor assures me of a special reward when I show good work performance’ ($M = 3.85$, $SD = 0.96$). With regard to knowledge sharing, the respondents perceived the highly applied activities to be as follows: ‘We share knowledge necessary for our job’ ($M = 3.76$, $SD = 0.91$); ‘We exchange knowledge that will help us to achieve our goals’ ($M = 4.09$, $SD = 0.95$); ‘The library supports knowledge sharing’ ($M = 4.00$, $SD = 0.91$); and ‘There are opportunities for knowledge sharing in my library’ ($M = 3.72$, $SD = 1.01$). In conclusion, both transformational and transactional leadership behaviours have the potential to influence knowledge-sharing practices in university libraries.

Table 3(b) displays the summary of the descriptive analysis of the dimensions of the research constructs. While intellectual stimulation ($M = 3.72$, $SD = 0.98$) has the highest mean score among the dimensions of transformational leadership ($M = 3.57$, $SD = 0.96$), contingent reward ($M = 3.87$, $SD = 0.94$) has a higher mean score than management by exception ($M = 3.20$, $SD = 1.17$) within the dimensions of transactional leadership. However, between the dimensions of transformational and transactional leadership styles, contingent reward has the highest mean score. The difference between the mean scores of the dimensions of transformational and transactional leadership is an indication of the impacts of both leadership styles on knowledge sharing, with a moderate mean score ($M = 3.67$, $SD = 0.98$).

Hypothesis testing

In order to test the hypotheses developed for this study, a multiple regression technique was used. Further, the level of significance was chosen to be 0.05, and the probability value (p -value) obtained from the statistical hypothesis test is considered to be the decision rule for rejecting the null hypothesis (Creswell, 2009). If the p -value is less than or equal to 0.05, the null hypothesis will be rejected and the alternative hypothesis will be accepted or supported. However, if the p -value is greater than 0.05, the null hypothesis cannot be rejected and the alternative hypothesis will not be supported. In addition, the normality of the independent variables and the absence of multicollinearity were checked. Multicollinearity is usually revealed through a multiple regression technique in which the independent variables are found to be highly correlated. Pallant (2005) maintains that most of the values should be

Table 3(a). Descriptive analysis of research variables.

Item measure	M	SD	Level	Order
<i>Transformational leadership</i>				
My supervisor understands my situation and provides assistance	3.19	1.13	Moderate	6
My supervisor encourages me to take on challenges	3.89	1.06	High	3
My supervisor overcomes any work-related challenges	3.06	0.92	Moderate	7
My supervisor makes efforts to fulfil the vision of the library	4.10	0.91	High	1
My supervisor encourages me to think about work-related problems from a new perspective	4.02	0.97	High	2
My supervisor encourages me to always rethink assumptions or opinions	3.42	0.98	Moderate	5
My supervisor helps me to complete my work	3.01	0.91	Moderate	8
My supervisor takes time to understand my needs	3.86	0.97	High	4
Overall mean	3.57	0.96	Moderate	
<i>Transactional leadership</i>				
My supervisor reprimands me when I fail to complete my work	3.31	1.32	Moderate	3
My supervisor records my mistakes	3.08	1.02	Moderate	4
My supervisor rewards my hard work	3.88	0.91	High	1
My supervisor assures me of a special reward when I show good work performance	3.85	0.96	High	2
Overall mean	3.53	0.97	Moderate	
<i>Knowledge sharing</i>				
We share knowledge necessary for our job	3.76	0.91	High	3
We exchange knowledge that will help us to achieve our goals	4.09	0.95	High	1
We use the information systems that we developed to share knowledge	3.39	1.19	Moderate	5
We promote sharing of knowledge between the library and other units of the university	3.35	1.00	Moderate	7
Knowledge is shared between supervisors and followers	3.36	1.01	Moderate	6
The library supports knowledge sharing	4.00	0.91	High	2
There are opportunities for knowledge sharing in my library	3.72	1.01	High	4
Overall mean	3.67	0.98	Moderate	

Table 3(b). Summary of descriptive analysis of research variables.

Research variable	Number of items	M	SD	Level
Transformational leadership	8	3.57	0.96	Moderate
<i>Idealized influence</i>	2	3.54	1.05	Moderate
<i>Inspirational motivation</i>	2	3.58	0.91	Moderate
<i>Intellectual stimulation</i>	2	3.72	0.98	Moderate
<i>Individualized consideration</i>	2	3.44	0.94	Moderate
Transactional leadership	4	3.53	0.97	Moderate
<i>Management by exception</i>	2	3.20	1.17	Moderate
<i>Contingent reward</i>	2	3.87	0.94	High
Knowledge sharing	7	3.67	0.98	Moderate

inside the adequate ranges of normality (i.e. -1.0 to $+1.0$). For this purpose, skewness and the variance inflation factor were investigated. The results of this investigation are shown in Table 4.

As can be seen in Table 4, the skewness values were within the normal values of -1.0 to $+1.0$, suggesting that the independent variables are normal. The variance inflation factor values were less than the critical value (10), which is common in most studies (Masa'deh, 2013) and suggests no multicollinearity problem among the independent variables.

Table 4. Skewness and variance inflation factor for the independent variables.

Variable	Skewness	Variance inflation factor
Idealized influence	0.68	2.48
Inspirational motivation	0.48	2.42
Intellectual stimulation	0.76	2.53
Individualized consideration	0.42	2.57
Contingent reward	0.56	2.48
Management by exception	0.43	2.54

Table 5(a). Influence of transformational leadership on knowledge sharing.

Construct	<i>r</i>	<i>r</i> ²	<i>F</i>	Sig. (<i>F</i>)	β	<i>t</i>	Sig. (<i>t</i>)
Idealized influence	0.735	0.634	151.32	0.000	0.256	3.59	0.000
Inspirational motivation					0.205	2.42	0.031
Intellectual stimulation					0.436	7.64	0.000
Individualized consideration					0.281	4.61	0.000

Table 5(b). Influence of transactional leadership on knowledge sharing.

Construct	<i>r</i>	<i>r</i> ²	<i>F</i>	Sig. (<i>F</i>)	β	<i>t</i>	Sig. (<i>t</i>)
Contingent reward	0.716	0.594	148.43	0.000	0.234	3.36	0.000
Management by exception					0.107	2.56	0.024

Table 6. Summary of the proposed results for the theoretical model.

Research hypothesis	Coefficient value	<i>t</i> -value	<i>p</i> -value	Empirical evidence
H1(a): Idealized influence–knowledge sharing	0.256	3.59	0.000	Supported
H1(b): Inspirational motivation–knowledge sharing	0.205	2.42	0.031	Supported
H1(c): Intellectual stimulation–knowledge sharing	0.436	7.64	0.000	Supported
H1(d): Individualized consideration–knowledge sharing	0.281	4.61	0.000	Supported
H2(a): Contingent reward–knowledge sharing	0.235	3.36	0.000	Supported
H2(b): Management by exception–knowledge sharing	0.106	2.56	0.024	Supported

Table 5(a) shows the influence of transformational leadership on knowledge sharing. The findings reveal that, apart from having a strong and positive relationship with knowledge sharing ($r = 0.735, p < 0.05$), transformational leadership has a significant influence on knowledge sharing ($F = 151.32, p < 0.05$). As shown in Table 5(a), transformational leadership accounted for 63% of the variations in knowledge sharing among the librarians. Furthermore, the transformational leadership variables – idealized influence ($\beta = 0.256, t = 3.59, p < 0.05$), inspirational motivation ($\beta = 0.205, t = 2.42, p < 0.05$), intellectual stimulation ($\beta = 0.436, t = 7.64, p < 0.05$) and individualized consideration ($\beta = 0.281, t = 4.61, p < 0.05$) – have a significant and positive influence on knowledge sharing. Of all these variables, intellectual stimulation ($\beta = 0.436, t = 7.64, p < 0.05$) has the strongest influence on knowledge sharing.

Table 5(b) shows the influence of transactional leadership on knowledge sharing. The findings reveal that transactional leadership has a positive relationship with knowledge sharing ($r = 0.716, p < 0.05$). As shown in Table 5(b), transactional leadership also has a strong and significant influence on knowledge sharing ($F = 148.43, p < 0.05$). The findings show that transactional leadership accounted for 59% of the variations in knowledge sharing among the librarians. The two variables of transactional leadership –

contingent reward ($\beta = 0.234, t = 3.36, p < 0.05$) and management by exception ($\beta = 0.107, t = 2.56, p < 0.05$) – have a significant and positive influence on knowledge sharing. Moreover, contingent reward ($\beta = 0.234, t = 3.36, p < 0.05$) was found to have a stronger influence on knowledge sharing. Comparing Table 4 and Tables 5(a) and 5(b), it can be inferred that most of the variations in knowledge sharing among librarians are attributable to transformational leadership behaviours as opposed to transactional leadership behaviours. This means that transformational leadership styles contribute more than transactional leadership styles towards knowledge sharing among librarians in university libraries in Nigeria.

Table 6 displays the summary of the proposed results for the theoretical model. The findings reveal that the data collected supports the model's hypotheses. This means that the hypotheses involving the transformational leadership variables – H1(a), H1(b), H1(c) and H1(d) – have been confirmed as guided by the deductive reasoning on which this study was based. Hence, idealized influence, inspirational motivation, intellectual stimulation and individualized consideration have a significant influence on knowledge sharing as revealed by their different regression weights. Also, the transactional variables as reflected in H2(a) and H2(b) have been confirmed, which means that contingent reward and management

Table 7(a). One-way ANOVA test results for knowledge sharing based on type of institution.

Dependent variable	Institution type	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i> -value	<i>p</i> -value
Knowledge sharing	Private	60	71.72	15.05	12.07	0.000
	State	70	81.49	14.12		
	Federal	86	88.28	5.98		

Table 7(b). Summary of ANOVA results.

Dependent variable	Source of variation	Sum of square	<i>df</i>	Mean square	<i>F</i> -value	<i>p</i> -value
Knowledge sharing	Between groups	4226.04	2	2133.02	12.07	0.000
	Within groups	21,028.06	213	176.71		
	Total	25,294.10	215			

df: degree of freedom.

Table 7(c). Results of the post-hoc test (Tukey's honestly significant difference).

Dependent variable	Institution type (I)	Institution type (J)	Mean difference (I – J)	Standard error	Significance
Knowledge sharing	Private universities	State	-9.49245*	2.92861	0.060
		Federal	-16.56432*	3.83064	0.000
	State universities	Private	9.49242*	2.92861	0.060
		Federal	-6.79241	2.25322	0.412
	Federal universities	Private	16.56432*	3.83064	0.000
		State	6.79241	2.25322	0.412

*Significant at 0.05 probability level ($p < 0.05$).

by exception have a significant influence on knowledge sharing.

In order to determine whether institution type is a factor influencing knowledge sharing, a one-way ANOVA test was used. The results of this test are shown in Tables 7(a) and 7(b). The findings reveal that the *F*-value of 12.07 is significant ($p < 0.05$), as shown in Table 7(b). This means that the mean scores of the respondents differed significantly. The results also show that the mean scores of knowledge sharing are higher among respondents from the federal university libraries ($M = 88.28$, $SD = 5.98$) and lower among the respondents from state university libraries ($M = 81.49$, $SD = 14.12$), as shown in Table 7(a).

In order to find out how one institution differed from another institution, a post-hoc test based on Tukey's honestly significant difference was conducted. The results are shown in Table 7(c). Table 7(c) reveals that the mean difference was highly significant at 0.05 probability levels between private and federal university libraries ($p < 0.05$). Similarly, a highly significant difference was found between private and state institutions ($p < 0.05$). The mean difference was not significant between state and federal institutions ($p > 0.05$). The conclusion to be drawn from this is that there is a partial significance in the

mean scores of knowledge sharing between the various types of university libraries.

Discussion of the findings

In this study, we set out to answer three research questions regarding the influence of transformational and transactional leadership on knowledge sharing among librarians. The first research question was answered with a strong relationship being found between transformational leadership and knowledge sharing. The second research question was addressed whereby a strong relationship was found between transactional leadership and knowledge sharing. The third research question was answered with a partial relationship being found between institution type and knowledge sharing.

According to the results of this study, there is a positive association between transformational leadership and knowledge sharing. This result supports previous studies in this area which have found a positive and strong relationship between transformational leadership and knowledge sharing (Baytok et al., 2014; Mushtaq and Bokhari, 2011). Furthermore, the results of the hypothesis testing revealed that the four components of transformational leadership – as

reflected in H1(a), H1(b), H1(c) and H1(d) – have a strong influence on knowledge sharing. This finding is in line with the study by Al-Husseini and Elbeltagi (2012), which found that the four components of transformational leadership have a strong effect on knowledge sharing. These findings indicate that transformational leaders can promote knowledge sharing. This promotion can be achieved by influencing, motivating, stimulating and encouraging staff to initiate knowledge sharing (Bryant, 2003; Masa'deh et al., 2016; Shi, 2010).

It is clear from the literature that transactional leadership and knowledge sharing are positively related. For instance, Analoui et al. (2013) found that transactional leadership is positively and significantly related to the components of knowledge management, which include knowledge sharing. Specifically, Chen and Barnes (2011) found that contingent reward has a positive and significant association with knowledge sharing. The results of these studies are consistent with the findings of the present study, where a positive and significant association has been found between transactional leadership and knowledge sharing. Consequently, H2(a) and H2(b) were supported, implying that contingent reward and management by exception positively and significantly influence knowledge sharing. These findings indicate that transactional leaders can use contingent reward to motivate employees to share knowledge. This helps to allay employees' fears that they will lose out when they share their knowledge. Moreover, knowing that one will be given something in exchange for any knowledge shared will increase one's desire to share knowledge and reduce the fears that make one reluctant to share knowledge. Transactional leaders' most important strategy is the reward that they provide for the purpose of achieving organizational goals (Limsila and Ogunlana, 2008).

The literature has also revealed that knowledge sharing is affected by organizational, leadership and individual factors (Søndergaard et al., 2007). This study further attempted to investigate the influence of institution type on knowledge sharing. The findings reveal that there is a partial significance in the mean scores of knowledge sharing between the various types of institution. This finding supports a similar study – conducted outside the library environment – by Masa'deh (2013), which found a partial influence of institution type on knowledge sharing. The results of the present study might have been influenced by the level of development in terms of human and knowledge resources in private, state and federal university libraries in Nigeria. While leadership can be used to transform organizational resources, its effects

can make some organizations do better than others (Mehra et al., 2006), and leaders can also move organizations to the point where knowledge can be integrated, shared and used innovatively (Mushtaq and Bokhari, 2011). Furthermore, the mean score for knowledge sharing in federal university libraries was found to be higher than in state university libraries. This finding is not surprising because federal universities in Nigeria receive more funding than state universities. More funding of a university library is most likely to translate into more knowledge activities and new innovative services. For instance, many of the institutional or knowledge repositories that we have today in Nigerian university libraries are from federal government-funded universities. It may also be argued that, due to less funding, the level of technological development in state universities in Nigeria cannot be compared with that of the federal universities. Technology plays a role in the knowledge management of an organization. As noted by Islam et al. (2015: 72), there is now a trend towards the application of emerging technologies to facilitate knowledge sharing in many service organizations. Apart from technology, which may have accounted for more knowledge sharing in federal university libraries in Nigeria, it can also be argued in support of this finding that it is most likely that librarians in these libraries may have enjoyed more top leadership or management support than their counterparts in state-owned universities. This is because the results of the present study support the extant literature, which contends that leaders play an important role in organizational knowledge sharing (Islam et al., 2011; Kerr and Clegg, 2007).

Limitations of the study

Although this study contributes to the literature on knowledge sharing, it is important to take into consideration some potential limitations. First, leadership may not be the only predictor of knowledge sharing within the library context. Other factors, such as the organizational culture, reward systems, communication and collaboration, may play an important role in explaining the relationship between leadership and knowledge sharing, and thus should be taken into consideration. Second, the types of leadership, such as the transformational and transactional leadership chosen for this study, may be a limitation. The study only considered the effects of transformational and transactional leadership on knowledge sharing. However, there are several other types of leadership – such as autocratic leadership, democratic leadership, strategic leadership, team leadership, cross-cultural

leadership, facilitative leadership and laissez-faire leadership – that can be found in the literature. Third, the study measured the influence of transformational and transactional leadership on knowledge sharing – that is, it only considered knowledge sharing out of many knowledge management processes that may be of importance to a university library. Fourth, since the study was conducted within the Nigerian context or working environment, the findings may be limited to this environment and not generalizable to other cultures. Fifth, the quantitative approach adopted in this study may be considered a limitation because this approach allows the use of a questionnaire as the main data collection method. A questionnaire is a self-reporting data collection technique and may create a response bias. Finally, the response rate was not large enough, and this might have had an effect on the results of this study.

Despite these limitations, there is room for improvement to increase the reliability and validity of the findings of future research. We recommend that other factors which may have an influence on knowledge sharing should be considered in future research. Furthermore, it would be interesting if other researchers were to use more leadership styles or other dimensions to measure the various constructs and then compare the findings. Researchers are encouraged to replicate this study in other contexts and compare their results. Since it is suggested that more factors be included in future research, an analysis tool such as structural equation modelling is recommended to help simplify the research structure or model that will be developed. In order to deal with the issue of a poor response rate, researchers interested in this area should endeavour to involve or recruit a good number of research assistants to help with the data collection. This approach does not preclude other established methods of data collection. It is hoped that a combination of both methods may reduce the incidents of either delay or no response, or both.

Conclusion and implications of the study

This study contributes to the literature on transformational leadership theory and knowledge sharing within the library context. The findings of this study reveal that knowledge-sharing activities are moderately applied in university libraries in Nigeria, and that these activities are positively and significantly influenced by transformational and transactional leadership styles. The type of institution has a partial influence on the knowledge-sharing activities of these libraries.

The study sheds light on how librarians perceive transformational and transactional leadership styles and knowledge sharing, and the role of the former in influencing knowledge sharing among librarians. The transformational leadership behaviours that involve influencing, motivating, stimulating and encouraging employees are equally significant in enhancing the knowledge-sharing capability of university libraries. Also, the knowledge-sharing efforts of librarians can be enhanced through corrective actions and the exchange of some form of values.

The study has managerial implications. It reveals that, of all the transformational leadership variables, intellectual stimulation has the strongest influence on knowledge sharing. This means that in order to enhance knowledge sharing, transformational leaders or library managers should encourage their staff to think about work-related problems from a new perspective and always reassess their assumptions. The study also reveals that contingent reward, a variable of transactional leadership, influences knowledge sharing more than management by exception. This means that transactional leaders or library managers should reward every attempt by staff members to share knowledge aimed at helping a library to achieve its goals. This can be achieved by clarifying what needs to be rewarded in order to encourage employees to share their knowledge through direction and participation. Furthermore, library managers can make the process of knowledge sharing interesting by creating awareness among their employees that they will be given a special reward for any knowledge shared. The idea here is that transactional leaders' most effective strategy is the reward they can give in return for achieving a specific goal – in this case, knowledge sharing. The results also show that transformational leadership contributes to knowledge sharing more than transactional leadership. This suggests that it is not enough merely to offer a reward to employees to increase their interest in knowledge sharing. Employees share their knowledge when they are motivated, challenged and encouraged, and attention is paid to their needs and personal growth. Further, the study has demonstrated that the type of institution has a partial influence on knowledge sharing. This means that library managers should focus more on acting as role models and building employees' capability to contribute to the development of the library. This can be achieved by setting incentives for knowledge sharing and establishing a network of knowledge employees with the aim of creating a social space for sharing knowledge in university libraries in Nigeria. Library managers should also look beyond the type of institution and focus more on the various organizational

and individual factors that are likely to influence the knowledge-sharing efforts of their staff. In conclusion, this study has empirically demonstrated that leadership is one of the factors influencing knowledge sharing in a library environment.

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Knowledge management and innovation: Two explicit intentions pursued by Spanish university libraries

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Abstract

This article analyses the content of three types of institutional statements (mission, vision and values) published on Spanish university libraries' websites. The aim is to determine whether they express explicit support for knowledge management and innovation in the university. The analysis revealed that 75% of the population ($n = 76$) published at least one such statement. The most widely published of the three types was the mission statement, 37 of which contained the terms 'knowledge' or 'innovation', particularly the former, present in 33. The vision statements of 17 libraries alluded to both, in practically the same proportion. 'Innovation' appeared in 20 of 28 libraries with statements of values, denoting the high esteem in which that conceit is held by university librarians. These statements stand as proof that libraries regard innovation and some stage of knowledge management as primary aims, with the furtherance of knowledge creation/generation the one most frequently cited.

Keywords

Innovation, knowledge, mission statement, Spanish university libraries, values statement, vision statement

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Introduction

Organisational culture, a key to effective knowledge management (Nonaka and Takeuchi, 1995), has been shown to be the factor with the heaviest impact on its creation (Koloniari et al., 2018). It is understood to be the suite of values, customs, habits, beliefs, rites, models, standards and behaviour patterns, shared by most of its members, that distinguishes an organisation from all others. These elements constitute its identity, its DNA, and inform its *modus operandi*. In addition to being observable in members' behaviour, they are set out explicitly in corporate documents. The conceptual framework that defines an organisation's identity is embodied in their mission and vision statements and statements of values. A mission statement is an organisation's *raison d'être*. Its vision statement defines its goals: where it wants to go and how it intends to get there. Its values are the principles on which its culture rests and serve to create behaviour patterns. These three statements should be the outcome of planning that envisages an organisation's

essential components early on, as recommended in any number of management and particularly planning manuals (e.g. Evans and Alire, 2013).

These statements describe an organisation's commitments and beliefs. They should be in line with its members' specific objectives and the latter must be aware of statement content (Kaplan and Norton, 2004), for such awareness or its absence may encourage or discourage knowledge exchange and creation (Alavi and Leidner, 2001). A close correlation has been found, for instance, between the vision statement and innovation in university libraries (Jantz, 2017a). Insofar as values induce behaviour, they can be decisive in knowledge management and innovation, particularly if these concepts are explicitly established as

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such. Innovation is one of the values enshrined by many libraries.

In addition to being clearly defined, statements must be effectively conveyed to ensure integration and interaction across the organisation to generate a shared vision that bonds personal to organisational interests (Moreno-Espinoza, 2009). Today's organisations have a wide range of in-house communication tools that can be used to that end. They also tend to publish their statements on their corporate websites to convey their commitment to their stakeholders and the image the organisation wishes to portray. Mission and vision statements are also often used by companies and other organisations as marketing and public relations tools (Robledo-Ardila and Ríos-Molina, 2013).

This study aims to determine whether Spanish university libraries include innovation and knowledge management in their explicit and shared mission and vision statements and statements of values. The universities' third mission, knowledge transfer to society, contributes to economic and social progress, with such institutions acting as a platform and agent for innovation (Bueno-Campos, 2007) and libraries afford universities essential support. Given those premises, the initial hypothesis is that the university libraries' mission would be expected to include knowledge management and innovation as part of their *raison d'être*, attesting to their commitment to and affinity with the university benefitting from their services.

Knowledge management and innovation. Literature review

Davenport (1996) defined knowledge management as systematically finding, selecting, organising, distilling and presenting information in ways that enhance the understanding of a specific area of interest by an organisation's members. Other definitions relate it directly to competitiveness, regarding it as 'the planned and continuous supervision of processes and activities to enhance knowledge and raise competitiveness through the creation and better use of individual and collective knowledge' (Ríos-Delgado, 2012: 45).

Innovation has been defined as the economic or social change resulting from a deliberate and intentional process that calls for a suitable atmosphere, capital investment and enthusiastic and engaged leadership (Drucke, 1979). Innovation may begin with the development of in-house processes that foster the ongoing generation of ideas, ultimately leading to new knowledge. Such new knowledge translates into

new *modi operandi*, improvements, solutions, greater efficiency, progress, lower costs, new ways to relate to customers or new organisational models. An organisation's capacity to generate new ideas is consistently associated with knowledge and technology (Martín, 2017), although the latter, depending on the organisation's economic and social environment, is not always a key factor (Parra-García, 2013).

Knowledge management and innovation are closely linked, inasmuch as the former aims to ensure organisations' *acquis*, not only as generated through innovation but also by guaranteeing the accessibility of the knowledge stemming from the organisation's members and its availability when and where needed to further the effectiveness of innovation (Nagles-García, 2007). Knowledge management consequently entails generating new knowledge, innovating. Knowledge makes it possible to create and apply innovation. Since the two ideals pursue the same ends, they should have equal standing in the organisation. Therefore, as Nagles-García (2007) notes, in-house innovation cannot be mobilised or dynamically furthered in organisations in the absence of suitable knowledge management. The existence of that close bond has been proven in the literature (e.g. Akram et al., 2011; Páez-Logreira et al., 2016; Zia and Shafiq, 2017). The synthesis and application of knowledge captured is deemed crucial to improving existing services as well as to developing new services in academic libraries (Islam et al., 2015a, 2015b).

In a knowledge society, universities play a decisive role as 'knowledge-intensive organisations', specialising in its creation, organisation and dissemination (Serradell-López and Juan-Pérez, 2003). Building on their mission, universities can help establish such a society by managing knowledge geared to strengthening interaction with their surrounding community. In a scenario characterised by the ongoing evolution of ICTs, libraries are in a position to effectively manage all the knowledge produced in a university as a key to innovation. They are the institutions best suited to manage information and knowledge (Llorens-Largo, 2011), for they have routinely adopted the most sophisticated information technologies. ICTs continue to affect universities' two main purposes: research and knowledge conveyance, systematically supported by academic libraries (Tardón, 1999) which have unvaryingly embraced and furthered the use of technologies in their services. Librarians have consistently lent their support to the creation of new knowledge by securing and managing information and keeping collections up-to-date (Fister, 2015). As such actions may have been perceived more as support for teaching and learning, however, researchers may have

not always felt that libraries attend to their needs (Cox and Pinfield, 2014).

Since the 1980s and 1990s, knowledge and innovation have been acknowledged as factors vital to library success (Koloniari et al., 2018). Musmann (1982) noted that the capacity to innovate might make librarians more aware of and better prepared to respond to the problems facing them in a turbulent environment.

Today, innovation is an aptitude highly valued among librarians. Some deem it to be one of the gaps in their training. Delmás-Ruiz and López-Borrull (2015) showed that the initiative to innovate was one of the weak points in librarians' business culture. Although today's librarians are committed to innovation in their jobs, some encounter limits imposed by the lack of resources or affiliation with a library network. Such shortcomings relate not only to economic investment, but also and especially to facility availability and time to devote to spawning innovative ideas or projects.

Technology is an indispensable support but not a cure-all. One way to broach innovation is by developing a series of in-house processes that further the continuous generation of ideas. An in-house perspective alone does not suffice, however. An organisation genuinely endeavouring to create and capture value through innovation must adopt a broader and more comprehensive view of innovation. A more general focus, which includes stakeholders, must also be established. Users for instance may make helpful contributions to innovation and value co-creation (Islam et al., 2017; Yeh and Walter, 2017), thereby ensuring library success.

The most recent review of innovation in academic libraries, covering papers published up to 2015 and authored by Brundy (2015), concludes that studies on the subject are 'scattered, thin, and, considering the importance of the topic, in need of additional empirical inquiry'. While acknowledging that more articles were published after 2010, the author deems that they do not suffice to determine the direction of innovation in such libraries and are not useful for library management. Brundy notes, however, that innovation is no longer a mere consideration but a need if libraries are to be useful to their communities, given the funding and technological pressures to which they are subject. The role of academic libraries is diminished by digital technologies, rendering service innovation a strategic imperative (Yeh and Ramírez, 2016). Librarians such as Anglada (2014) are categorical in this respect, contending that if the present generation of librarians is unable to introduce radical changes in libraries' role, these institutions' continuity will

be in serious jeopardy. That idea was already in the air in the 1990s, when Bryson (1990) referred to innovation as a survival strategy for university libraries. Other authors such as Lozano (2014) have suggested ways to innovate, even during crises, with ideas such as just-in-time libraries, providing what is needed when it is needed, with demand as the engine that drives the process. Such an approach entails migration from a supply side, just-in-case model to a demand-side, just-in-time model.

The studies published stress that libraries must draw from their specialised resources and services to favour innovation. Librarians deem them essential to support the undertakings of university professors, staff and students, as well as of other interested users associated with enterprising universities. That involves furnishing such support through dynamic and flexible programmes that call upon librarians to provide training, partnering and resources (Howard et al., 2018). Library collaboration with university technological services is another essential factor. Libraries are valuable partners, although their value is not always acknowledged (Bryan et al., 2017). When analysing and presenting university knowledge management models and projects, researchers seldom mention the library, even when recognising that a good support system is vital to suitable knowledge management (Gaviria-Velasquez et al., 2007; Mata-Ordaz and Pesca de Acosta, 2011; Páez-Logreira et al., 2016; Rodríguez-Castellanos et al., 2001). Should libraries not be cited and included in that information system? One exception to that rule can be found in Bueno-Campos (2003), who proposes a university knowledge management model that includes the library as part of the structural capital, an infrastructure necessary for research.

Another study describes librarians' contributions to company chartering, licensing and economic development at the University of Arizona (Elliott et al., 2017), and their recognition by university leadership as critical to its strategic plan. Other proposals for innovation view university libraries as competitive intelligence institutions, applying innovation models designed for small companies (Ming et al., 2018). The idea is to involve libraries in the furtherance of new business models.

The literature also discusses librarians' tasks as 'knowledge managers', about which various opinions have been expressed. Sánchez Pastor (2000) contends that they can help final users manage their personal knowledge. That author attributes to them the design and development of tools, methods, systems and services that enable users to share, convey and disseminate their knowledge, while aiding them in the

assimilation and integration of the information acquired for subsequent knowledge generation. Pérez-Lindo (2017) deems that librarians who regard themselves as ‘knowledge managers’ must also provide training to enable professors, researchers and students to meet their needs more readily.

The most recent papers on university library knowledge management note that interest in the subject has grown among professionals. It has not been systematically applied in libraries (Koloniari and Fasoulis, 2017), however, which nonetheless realise that knowledge management could create closer links with their parent organisations and help them survive in an ever more challenging environment (Sarrafzadeh et al., 2010). Academic libraries strive to capture their users’ as well as explicit in-house knowledge. They fail to adopt social endeavours such as communities of practice, however, which facilitate tacit information and the exchange of experience (Blanco-Rojas and Archila-Córdoba, 2014).

Although the literature conveys different perceptions about the state-of-play of knowledge and university libraries, a consensus has been reached in one respect: libraries are aware that innovation is a key to their continuity in the organisations that use their services and for which they, in conjunction with other campus services or units, manage knowledge. University knowledge management is deemed to be essential to their survival because it affects their success and because, like universities, they must assume innovation as an added value to survive in a competitive world. They must continue to show that they can offer valuable assistance in solving institutional knowledge management-related problems, for that capacity appears to go unnoticed by some actors.

Methodology

The content of 76 libraries’ mission and vision statements and statements of values was analysed. All 76 were members of the Spanish network of university libraries (Spanish initials, REBIUN), 50 affiliated with public and 26 with private universities. This population was chosen because REBIUN is a stable institution with a membership that includes all Spain’s scientific and university libraries. Their affiliation with the network entails acceptance of and involvement the third strategic plan formulated by REBIUN (2014), which among others aims ‘to empower libraries as a driver of innovative university training...’. That objective supports the aims established by universities that pursue the furtherance of open knowledge through institutional repositories or the placement of free course content on online

education platforms (open course ware, OCW). ‘Innovation and the development and implementation of new technological and digital projects to encourage the use of and access to scientific and technical information custodied by libraries’ is another of the plan’s knowledge dissemination objectives. The inclusion of such priorities as explicit aims infers that the largest network of Spanish university libraries supports the commitment by its members to knowledge management and innovation.

The first step was to collect the statements published on these libraries’ websites in November 2018. Only the texts headed by the words ‘mission’, ‘vision’ or ‘values’ were collected. Content labelled by libraries as purpose, objectives or similar to refer to their activity was disregarded if the aforementioned general terms were absent.

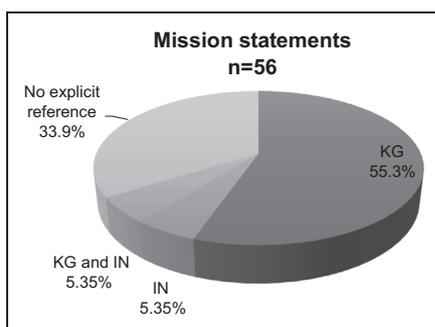
The web pages where these statements were found included those carrying libraries’ strategic plans, citizen charters or sections explicitly designed for such content, including ‘About the library’, ‘About us’ and ‘General information’. Some libraries published the statements in more than one document with similar but not identical versions. In such cases the version used was the one deemed to be most complete or the one found in the citizen charter, as appropriate, given that the charter is a commitment to citizens or library service users. In Spanish law, such charters are the outcome of the pursuit of improved public service quality in keeping with citizens’ needs.

The presence of the words ‘knowledge’ and ‘innovation’ was identified in the statements retrieved, coding those that included the term ‘knowledge’ and ‘innovation’ as 1 and all others as 0, for the two terms are not synonymous but complementary and, as discussed in the review of the literature, the latter is dependent upon the former. The identification and quantification of these terms in all the university libraries provided objective evidence of whether they are explicitly committed through their mission statements to managing the knowledge in place in their respective institutions. The words accompanying ‘knowledge’ were also retrieved to ascertain the knowledge management stages or processes prioritised by libraries.

Inasmuch as the explicit reference to knowledge and innovation in mission statements did not suffice to determine how libraries’ working strategies are implemented, their websites were reviewed in a second stage of the study to determine whether they had a strategic plan. The existence or otherwise of lines of action geared to those objectives could not be established in the seven plans located, however. Although plan implementation was not questioned, the

Table 1. Total number of libraries (T) libraries in public (PU) and private universities (PR) in which mission and vision statements and statements of values contained the words 'knowledge' (KG) or 'innovation' (IN).

	Mission statement (n = 56)			Vision statement (n = 28)			Statement of values (n = 28)		
	PU	PR	T	PU	PR	T	PU	PR	T
KG	25	6	31	4	2	6	1	0	1
IN	1	2	3	6	2	8	19	1	20
KG and IN	3	0	3	3	0	3	0	0	0
Neither KG nor IN	13	6	19	11	0	11	7	0	7

**Figure 1.** Mission statements: Explicit reference to 'knowledge' (KG) and 'innovation' (IN).

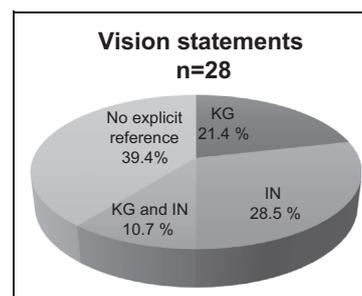
information gathered proved to be insufficient for the aims pursued here. Verification in that regard would have to be sought in reports on plan fulfilment to determine the possible achievement of knowledge management aims. Moreover, even where extant, such reports are not necessarily published on institutional websites. For those reasons, this study will be followed up by an analysis of librarians' replies to a survey on the action undertaken to ensure effective management of their own and their universities' knowledge.

Results

Of the 76 libraries studied, 57 (75%) had published at least one of the statements. In all, 56 mission and 28 vision statements and 28 statements of values were analysed. The number of libraries with statements containing the terms 'knowledge' or 'innovation' is given in Table 1 by type of university and statement.

The mission statements of 31 (25 in public and six in private universities) of the 56 libraries with such statements (55.35%) contained the term 'knowledge', three (5.35%) included the word 'innovation' and three (5.35%) both (Figure 1).

Of the 28 vision statements collected, specific reference to 'knowledge' was found in six (21.4%), to 'innovation' in eight (28.5%) and to both in three (10.7%) (Figure 2).

**Figure 2.** Vision statements: Explicit reference to 'knowledge' (KG) and 'innovation' (IN).**Table 2.** Spanish public university libraries including the terms 'knowledge' (KG) and 'innovation' (IN) in their mission and vision statements and statements of values.

No. Libraries	Mission statement	Vision statement	Statement of values
3	KG	IN	IN
3	KG	KG	IN
2	KG and IN	KG and IN	IN

Of the statements of values published by 28 libraries, only one (3.5%) contained the word 'knowledge' and 20 (71.4%) 'innovation', inferring that the latter is highly regarded by a majority of librarians.

Overall, a total of eight libraries, all affiliated with public universities, included the terms 'knowledge', 'innovation' or both in the three statements (Table 2). The relationship and differences between the two terms was visible in those libraries and especially in two of them, which included both in their mission and vision statements and innovation in their values.

The mission and vision statements of the university libraries with explicit reference to both terms, cited below, constitute examples of good practice.

University of Seville

- Mission: 'the library's mission is to manage an information environment in continuous flux to contribute to learning, research and *innovation*

in the university through strategies of sustainable and socially responsible service excellence that furthers *knowledge generation and transfer*'.

- Vision: 'to establish strategies and quality services focused on the university community and society through: the creation of versatile spaces for study and individual and group work; management, conservation and effective access to stacks and the USE's scientific and academic output; *innovative* services that support students' comprehensive training and professors' and researchers' *knowledge creation*; management excellence by proactive and competent professionals; and alliances to advance and foster social engagement and sustainability'.

Autonomous University of Barcelona

- Mission: 'the library service's mission is to provide information resources and the highest quality services in keeping with the UAB's excellence objectives in education, research, *innovation* and *knowledge transfer*'.
- Vision: 'the information commons must be an information and resource benchmark throughout the university community for learning, teaching and research. It participates in *innovation*, *knowledge transfer* and talent creation and ranks highly on the list of Spanish and international university library systems'.

The pursuit of specific, effective action into which these mission and vision statements might translate in terms of knowledge and innovation management led to an analysis of libraries' strategic plans. Only seven such plans were found to be in effect. The lines of action cited in connection with library staff and university knowledge management are summarised below.

- 'Good practice and knowledge management' seminars are held yearly to pool collective knowledge on resources, processes and services rendered and further knowledge management among library staff. These seminars are open to non-library personnel in the same and other countries to favour the exchange of experience and knowledge around new practices geared to improving management and services.
- Strategies are designed in conjunction with productive and social networks in the surrounding community in particular and society in general to favour the transfer of and open access to

Table 3. Knowledge processes or stages alluded to in libraries' mission and vision statements.

Process or stage of knowledge reflected	No. of mentions in libraries
Creation (or generation)	31
Transformation of information into knowledge	3
Conveyance (or dissemination or transfer)	21
Management	4
To share	2
To develop	1

the scientific knowledge generated by the institution.

- Standing lines of collaboration and communication are created with other university units and services to improve the support for research-generated knowledge transfer and management with documentary management techniques and competencies specific to librarianship.
- Support and training in areas such as open data, open access publications and use of research data repositories are provided for researchers to further the visibility and accessibility of the knowledge generated.
- Co-working space is created for researchers to foster knowledge generation.

These lines of action, which focus systematically on the constructive use of library technologies, are aligned with those identified in some of the experiences summarised in the review of the literature.

Although the plans retrieved contained references to the need to innovate, no specific action to materialise that aim was identified. The University of Zaragoza library was the only institution that mentioned the creation of an innovation plan as one of its aims. If such a plan exists, however, it could not be located on the library's website. Nonetheless, related information showed that it was distinguished by the Council for Library Cooperation for a 2017 initiative to lend vegetable seeds. The aim was to establish a full cycle of seed loans and returns and gather data on sowing and plant growth for subsequent analysis.

Not all the libraries including the word 'knowledge' in their statements alluded to the entire process or the usual phrase 'knowledge management'. The terms found in conjunction with 'knowledge' are listed in Table 3. The most common was 'creation' (or 'generation'), followed by 'conveyance' (or

‘dissemination’ or ‘transfer’) and ‘management’. Some libraries used more than one, combining ‘creation and dissemination’, for instance, or ‘management and conveyance’. Other words appearing in the set were the verbs ‘to share’ and ‘to develop’. Two libraries referred to ‘transforming information into knowledge’, a process associated with knowledge creation or generation. As García-García (2008: 73) noted, that expression appeared in the ALA’s definition of the university library in 1989 and ‘what this definition shows is that libraries’ task is not to provide information, but to collaborate with users to transform that information into knowledge, a much more subtle and significant undertaking’. That idea is still explicit in these libraries’ *raison d’être*.

The 31 libraries that used the expression ‘knowledge creation’ in their mission statements may be assumed to have the most innovative services. That assumption is based on Islam et al.’s (2015a) findings, which endorsed the opinion that the academic libraries best able to create knowledge can offer their users more innovative services. Those authors also contended that the academic libraries with the most highly developed knowledge usage and application practices also offer more new services.

Further to the data in Table 1, the word ‘innovation’ was found primarily in the statements of values. It was associated essentially with technology. In seven cases it appeared in conjunction with other terms: technological innovation (5), teaching innovation (1) and educational innovation (1). It was also associated with creativity, such as in the University of Cadiz, with the following wording: ‘We leverage our intellectual and technological capital by imbuing our products with creativity and innovation’. It was also found as an adjective preceding the word ‘services’.

To determine whether the 34 libraries including ‘knowledge’ in their mission statements were aligned with their respective universities, the term was sought in the statements published by the latter. The findings were as follows:

- 20 (58.8%) university mission statements, like those of their libraries, included the term, an indication that over half of the libraries explicitly seconded and supported their university’s mission;
- 7 (20.5%) university mission statements made no reference to ‘knowledge’, whereas their libraries’ statements did;
- 7 (20.5%) universities published no mission statement, unlike their libraries, which included the term ‘knowledge’ in theirs.

Conclusions

On the whole, the literature on knowledge management is closely related to innovation, for knowledge management is deemed to be indispensable as an innovation enabler. More specifically, the literature on knowledge management by university libraries addresses the subject from two perspectives: experiences and models on how to apply this management technique in libraries as organisations (e.g. Blanco-Rojas and Archila-Córdoba, 2014; Koloniari et al., 2018); and experiences and theoretical models on how libraries should manage the knowledge produced in their universities. Although some authors report that university libraries have successfully managed the institution’s knowledge, others deem that practices that would ensure effective knowledge management have yet to be implemented (Blanco-Rojas and Archila-Córdoba, 2014). Researchers seeking to implement knowledge management models in universities tend to ignore libraries as a necessary element in the information system or at least fail to cite them in their papers. Such scant acknowledgement might be the result of greater visibility of other services also involved in knowledge management activities, such as universities’ knowledge transfer bureaus or centres, which would eclipse libraries’ efforts. The former, institutional channels that support researchers and companies associated with the university, help strengthen the bonds between the university and the surrounding community (companies and institutions).

The status of knowledge management is similar and closely related to that of the management of universities’ research data. Although the situation varies from country to country, libraries are not always lead actors in this regard. Other services such as research offices are more prominent, despite the recognition of university libraries’ RIM (research information management) -related functions (Bryant et al., 2017). Some authors consequently call for a change in attitude that would encourage librarians to act as proactive research agents (González-Solar, 2017).

Inasmuch as 75% of Spanish university libraries include references in their mission or vision statements or statements of values to knowledge management and innovation, they (especially the public institutions) can be said to be committed to those concepts. Most are in step with the respective university’s stated mission. Publication of these statements on their websites denotes their desire to disseminate their essential purpose and organisational strategy, and to contribute to meeting REBUI objectives in support of innovation and knowledge management.

The high rate of occurrence of the term ‘knowledge’ in libraries’ mission statements (33 of 56) is in keeping with universities’ mission, inasmuch as it the third most common conceit found in their statements the world over (Cortés-Sánchez, 2018). In Spain, both ‘knowledge’ and ‘innovation’ appear in public universities’ mission statements (Arias-Coello et al., 2018). Such concordance attests to the explicit alignment between Spanish libraries’ and universities’ missions. Knowledge can be inferred to be a strategic priority for both types of institution, given the presence of the word in their respective mission statements, the basis for establishing their priorities, strategies and action plans.

As discussed in the results, ‘knowledge’ is a term associated essentially with the mission statement (the means), whereas ‘innovation’ is related to the vision statement (the end). That preferential attachment in the population analysed corroborates the relationship between the variables ‘knowledge management’ and ‘innovation’. Innovation (the end - vision) is only possible if knowledge can be managed (the means – mission).

Innovation is a value shared by many librarians, for 20 of the libraries studied here explicitly mention the term in their statements of values, a finding supported by the literature. Nonetheless, the need to surmount the stasis associated with librarianship continues to be stressed, along with the idea that librarians must overcome the conservatism that views past action as inherently right (Budd, 2008). Strong leadership is needed to manage innovation (Jantz, 2017b) and rise to the challenges imposed by a changing environment.

Spanish university libraries identify primarily with the creation or generation stage of knowledge management, although none of the stages (conveyance, transformation, development, sharing, dissemination, etc.) were absent in the population analysed. The strategic plans of some of these libraries contain objectives and actions geared to implementing their statements. Such actions are also related to the generation and dissemination of their universities’ knowledge base.

The presence in their statements of such a variety of terms is an indication that libraries deem they have both the human resources and the infrastructure needed to handle the flow of university-generated knowledge to society, from the creation to the conveyance or dissemination stage. Their resources may help ensure the success of key knowledge-related activities: university-company research partnering, patents and licences, research contracts, technological alliances, company chartering (spin-offs and start-

ups) and within academia, open education via MOOCs and similar.

Limitations and suggestions for future research

One word of caution is in order with respect to the present findings: a library’s failure to publish one of the statements analysed here on its website does not mean it does not exist. It may; the university may simply not deem its online communication to be necessary.

In another vein, as stated in the title of this article, knowledge management and innovation are explicit intentions. Future research should be geared to determining their implementation. In other words, it should address how libraries manage knowledge and innovate in practice. The findings discussed here must be supplemented with interviews and case studies to corroborate compliance with institutions’ corporate commitments.

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National and international trends in library and information science research: A comparative review of the literature

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Abstract

The study is an attempt to understand the trends in LIS research by analyzing published literature on the topic. The study identifies and analyses 39 research papers on LIS research trends in various countries, three papers on LIS research trends in regional countries and 13 papers on LIS research trends with an international perspective. The findings of the study reveal that there is a similarity among various countries as far as the LIS research topics are concerned but with a different focus at different periods. While understanding international research trends in LIS, it was interesting to note that the research trend in China was similar to the worldwide research trend while the pattern in other countries differed.

Keywords

Library and information science, LIS research, research trends, subject trends, topics trends

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Introduction

There seems to be an increased interest in the library and information science (LIS) research community to study the trends of research in LIS as a subject. Analyzing subject trends is not a recent phenomenon, with many scholars like Järvelin and Vakkari (1990), Atkins (1988) and Buttlar (1991) having initiated this more than three decades ago. The factors that can be attributed to the recent upsurge in the popularity of research on subject trend analysis may include (a) evolution of the subject of LIS into an interdisciplinary aggregate subject with Information Sciences, Computer Science, Technology, Management, Statistics, etc. being some of the significant influencers; (b) easy availability of abstracting and indexing databases to study the subject and (c) availability of free and popular science mapping tools.

The evolution of LIS as a subject into an interdisciplinary one has been appealing to the LIS research

community, and Prebor (2010) argues that the role and impact of technologies in the library and library services are the main reasons behind the interdisciplinary nature of LIS as a subject. A study by Milojević et al. (2011) finds that the amalgamation of technology with the subject of LIS has changed the cognitive structure of the LIS discipline. There has also been a clear trend wherein the traditional LIS topics disappeared, and new ones appeared, and most of these emerging topics are interlinked with technology (Lariviere et al., 2012). The incorporation of these technology-related topics has made LIS into an interdisciplinary subject.

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The infusion and merger of other subjects into the core of LIS as a subject make it compelling and interesting to study the evolution and changes in the subject of LIS over the years. There are a good number of research papers that delve into the changes in the LIS research trends at the international level. However, in the context of national LIS trends, there seems to be hardly any comprehensive research paper, with the exception of the one by Rochester and Vakkari (1998). Therefore, the authors thought it appropriate to address this gap and attempted to identify research on the evolution of LIS as a subject. The review of the literature reveals a lack of research that examines country-wise LIS topic trends and international LIS research, together. Therefore, the study objective is to understand the trends in topics on which LIS research has been conducted, across various countries and also internationally. The study also aims to identify the similarities and differences in LIS research across countries.

Methodology

Scopus, Web of Science, EBSCO's LISTA and Google Scholar, were used for conducting the literature review and the search terms used in the study were:

- Research Trends AND ((Library Science) OR (Library and Information Science))
- Subject Trends AND ((Library Science) OR (Library and Information Science))
- Evolution AND ((Library Science) OR (Library and Information Science))

The authors identified papers that were relevant to the study, from these search results and thoroughly reviewed them. The criteria adopted to include papers in the present study were that they had to be peer-reviewed and focus on LIS research trends, specific to a country or international in scope.

The selected papers were divided into three categories based on geographic scope, i.e. country-specific LIS research, regional LIS research and international LIS research. In the country-specific research papers (39) the focus was on LIS research trends specific to a country, while the papers (3) in the regional category focused on a group of countries like the Gulf, Africa and Australasia and the papers (13) classified as international research papers brought in a global perspective. Each paper was examined in detail to list out the popular research topics identified in these papers.

It was interesting to note that studies included in this study, with the objective of identifying trends in LIS research, had adopted various classification

schemes developed by researchers like Feehan et al. (1987), Atkins (1988), Järvelin and Vakkari (1990) – later updated in Järvelin and Vakkari (1993) and Tuomaala et al. (2005) – Cano (1999), Zins (2007), Davarpanah and Aslekia (2008), Prebor (2010), and the JITA classification scheme (<http://eprints.rclis.org/view/subjects/subjects.html>) for the purposes of representing LIS research topics. A few studies had also used the co-word analysis, title word analysis, and co-citation analysis methods, and other simple bibliometric methods like keyword analysis to represent the research topics. In the present study, the researchers have considered topics as provided in the original papers.

Limitation of the study

The review of research studies covered in this study reveals variations in the methods used and does lead to difficulty in comparison. For instance, the very understanding of LIS (in terms of topics covered) may vary across geographies, the sources used in the studies vary from journals (national or international) to theses (Doctoral/Master's), the time period of the reviews are not similar, studies have used different strategies to identify topics like keywords analysis, co-word analysis, and content analysis.

Another limitation of the study is that the literature reviewed by the researchers includes only English language publications. Despite these limitations, the study has value, as the present research does indicate broad trends across geographies and enhances our understanding of the growth of LIS as a subject.

LIS research trends in specific countries

Australia

The early LIS research (1985–1994) in Australia was dominated by topics like LIS service activities, information seeking, and library history (Rochester, 1995). The author adopted the content analysis method developed by Järvelin and Vakkari (1990) to identify the popular research topics during that period by exploring the papers published in two leading LIS journals of Australia.

Middleton and Yates (2014) analyzed scholarly research published between 2005 and 2013. The authors examined the 115 theses and 1604 research publications and found that information behavior, information literacy, management, information resources, and services were the most popular topics of research.

Botswana

Moahi (2008) studied 285 research papers indexed in the Library and Information Science Abstracts (LISA) database and published by LIS researchers from Botswana in the three periods of 1980–1990, 1991–2000, and 2001–2006. In the period 1980–1990, the popular topics included library education, management and planning, publishing, and special libraries; in 1991–2000 the popular topics were library automation/ICT, library education, and library and development and in the period 2001–2006 the popular topics were library automation/ ICT, and library operation. The topics that had been consistently pursued across years included library automation/ICT, library education, library operations, archive and records management, and information seeking.

Canada

Paul-Hus et al. (2016) analyzed 1580 papers published between 2010 and 2015 by 1446 distinct authors drawn from the Association for Library and Information Science Education (ALISE) directory using Google Scholar. The study used Gephi software to find out significant clusters in LIS research in Canada and the analysis shows that technology-orientated topics like information system and technology, information visualization, users and uses of the information system, information retrieval and human-computer interaction were the most popular ones.

China

The earliest study on LIS research in China by Cooper (1987) analyzed the library literature published in Mainland China to understand the subject trends. The results of the study show that the orientation of earlier LIS research was the role of libraries in society and library profession in addition to other important topics like technical services, cataloging, and classification. Another interesting publication on LIS research trends was by Huanwen (1996) who analyzed articles published in three specific years, i.e. 1985 (1930 articles), 1990 (2447 articles) and 1994 (2665 articles). The author devised a classification scheme based on topics that formed the essence of LIS to study the research trends. The findings of the study show that LIS research in China was more or less similar, in the context of research topics over the three time periods. The basic theory of LIS and information services were the major research areas in addition to principles of LIS, classification and indexing, information management and circulation. The study also revealed that LIS research in China was more focused on theory when

compared to international research, which was more on practice-oriented topics.

Ma (2012) studied articles published between 1998 and 2007 and identified 11 subject clusters, which represent the focus of LIS research in China. The results of the study showed that LIS subfield had been changing since 1998 and the topics which had emerged and gained popularity were webometrics, competitive intelligence and ontology. The study also found that there seemed to be a consistent interest on topics like bibliometrics and intellectual property rights, and information retrieval, while topics on the decline included cataloging, knowledge organization and digital library. In the context of sources used in these studies, in addition to journal articles, many researchers had used doctoral dissertations to identify the research trends.

Zong et al. (2013) studied 640 PhD dissertations awarded between 1994 and 2011 to identify the intellectual structure of LIS. The most popular research areas identified were an information resource, information need and services, ontology, semantic web, electronic government, information resource management, knowledge management and digital library.

The more recent study on China was by Hu et al. (2013) that analyzed LIS papers from the Chinese Social Science Citation Index (2008–2012). The paper found that LIS research in China was very varied and could be categorized into 13 topic clusters that included information retrieval, ontology, data mining, information services, information organization, knowledge management, digital library, information literacy, the social network. The findings also revealed that LIS research in China was continuously evolving from traditional topics like classification, cataloging to bibliometrics and information retrieval, to new topics like data mining, ontology, digital library and social networks.

Denmark

The study by Kajberg (1996) found that the popular LIS research topics between 1957 and 1986 in Denmark included individual libraries/national library system, library collection and materials, building and equipment, administration and management, network and resource sharing, librarianship, automation, and library policy. The topics reflected a strong concern for issues relevant in practicing librarianship. The study had adopted a specially developed hierarchical classification scheme based on the work of Feehan et al. (1987). The journals used in the study included: *Bibliotek 70*, *Bibliotekaren*, *Biblioteksarbejde*, *Bogens Verden*, *DF-Revyn*, *Skolebiblioteket*, *Nordisk*

Tidskrift for Bokoch Biblioteksvlisen, Scandinavian Public Library Quarterly, Reol and Tidskrift for Dokumentation.

It is interesting to note that the LIS research in Denmark and other Scandinavian countries was different in the sense that there seemed to be a strong link between professional work in the library and the research conducted reflecting the findings reported by Rochester and Vakkari (1998). The study also found that traditional topics with immediate implications for a working librarian were popular while theoretical development had received scant attention.

India

The studies on LIS research in India reveal that most of them have used doctoral theses as sources of data for research, while very few of them have used journal papers as data sources. One of the oldest publications on trend analysis was by Chatterjee et al. (1995) who studied 212 PhD theses reported in various information sources like *University News*, newsletters of ILA, IASLIC, IATLIS and other bibliographic sources that were published between 1950 to 1993. The author found that popular research areas in LIS were academic libraries, bibliometric/citation studies, cataloging, classification, and indexing.

Similarly, Lahiri (1996) studied 255 doctoral theses from 1950 to 1995 and found that topics like user studies, information needs, bibliographic control, information sources are interesting areas where LIS researcher was working apart from the bibliometrics and academic library. bibliometrics, academic library, information needs and user studies were found to be the most dominant topics in LIS research. These findings were confirmed Manjunath and Shivalingaiah (1998) while analyzing doctoral theses reported in the *University News* and awarded between 1987 and 1999. The analysis of the LIS topics, based on the Dewey Decimal Classification, also revealed the emergence of new topics like information system design and personnel management.

The study of 346 doctoral theses based on the bibliographic data extracted from *University News* and the bibliography of doctoral dissertations by Kannapanavar and Vijayakumar (2000), also revealed that topics like bibliometrics, user studies, planning and management topics were dominant research topics between 1950 and 1992. A similar study by Chandrashekhar and Ramesha (2009) of 802 doctoral theses awarded between 1957 and 2008, drawn from *University News* and Vidyanidhi database, found that topics like bibliometrics/scientometrics /informatics, library management, university libraries, indexing systems,

information-seeking behavior and library information services were the most popular ones in LIS research. Shivalingaiah et al. (2009) analyzed 851 theses (1980 to 2007), the data of which was collected from Shodhganga database (INFLIBNET), Vidyanidhi database, *University News* and through a web-based survey. The study found that IT application in libraries along with library automation and human resource development was significant research areas in addition to bibliometrics and user studies. Madasamy and Alwarammal (2009) studied 171 theses indexed in the *University News* between 2003 and 2008. The results revealed the dominance of LIS topics like library information sources and services, user studies, library and information management, and bibliometrics.

The study by Singh and Babbar (2014) analyzed 1754 theses awarded between 1950 and 2012 collected through *University News*, Shodhganga (INFLIBNET) and LIS journals and newsletters. The findings reflected that in addition to popular topics like bibliometrics, user studies and information-seeking, new emerging topics like electronic resources, network and consortia, library management software, institutional repository, webometrics and knowledge management had appeared in LIS research in India.

A recent study by Maity and Hatua (2015) analyzed 1058 theses awarded between 1950 and 2012 and found that the popular topics of research among the PhD scholars were ICT applications, and studies on specific library and scholarly communication (including bibliometric research).

The few studies that use journal papers to understand LIS research trends in India include one by Mittal (2011), where she studies articles indexed in the LISA database between 1990 and 2010. The researcher used co-word analysis to identify the trend in LIS research and found research on topics like bibliometrics and user studies and then moved on to topics like copyright, digital libraries, institutional repositories, electronic resources, open access and Web 2.0. The other study by Dora and Kumar (2017) reviewed 3713 papers indexed in Indian Citation Index between 2004 and 2015 and the findings revealed that the studies could be categorized into three essential research areas of bibliometrics/scientometrics, information technology/digital libraries and traditional LIS topics (information seeking, user study, collection development). Garg and Sharma (2017) reviewed the articles published in Indian Citation Index and found that the sub-disciplines which were popular among Indian LIS researchers included bibliometrics/scientometrics/webometrics, user

studies, information technology, digital libraries, and academic libraries.

Iran

The only study on LIS research trend in Iran was by Horri (2004), that reviewed 1635 papers published in 11 professional and semi-professional Persian journals, 26 proceedings, 731 defended theses and 124 Persian research reports. The topics were classified by subject using both the LISA subject categories and course titles of the Iranian LIS school. The findings revealed that popular research fields in Iran included bibliographic control, information storage and retrieval, library use and services, and information technology.

Malaysia

Goon and Singh (2007) studied 158 articles published in the *Malaysian Journal of Library Science* between 1996 and 2006 by Malaysian authors. The study used the classification of Järvelin and Vakkari (1993) and the findings revealed that the popular research topics included information storage and retrieval, information seeking and scientific and professional communication (including bibliometrics).

Yazit and Zainab (2007) studied the LIS research productivity of Malaysian authors and institutions by analyzing 1045 papers, published between 1965 and 2000. The study found that LIS research in Malaysia was on the rise and evolving into a developed discipline. The publication trend revealed that popular LIS topics included management of library information centers, information services, collection development and ICT applications in LIS.

New Zealand

The only study on LIS research in New Zealand by Godfrey (2016) between 2004 and 2014 found that collection management, library management, information center, information literacy and social-cultural aspects of information society were the most popular subjects. The researcher had used Zins' classification scheme (2007) for classifying the research topics. The data sources used in the study included *New Zealand Library and Information Management Journal*, *Archifact*, *LIANZA Conference Proceedings* and *ARANZ Conference Proceedings*.

Nigeria

Oyewusi (2012) studied 72 articles published in the *Nigerian School Library Journal* between 1979 and 2010 to find out the subject trends in school

librarianship. The study used Järvelin and Vakkari's (1993) classification scheme to identify the research topics, and the findings revealed that the most popular topics in school library research were information seeking behavior, information literacy, communication and information technology, and evaluation of school library services.

Pakistan

The study by Naseer and Mahmood (2009) was one of the early studies that focused on trends in LIS research in Pakistan. The authors reviewed 236 journal articles that had been published between 1998 and 2007 in *Pakistan Library and Information Science Journal*. Adopting the JITA classification scheme for assigning subject categories, the study found that the most popular research topics included LIS profession and education, collection development and information and library technology. In their second study, Naseer and Mahmood (2014) reviewed a larger dataset of 5195 papers published over 62 years to understand the subject dispersion in LIS research in Pakistan. The study, adopting the same methodology to assign subject categories as their earlier study, revealed that the majority of the Pakistan LIS research focused on very few subject areas like information treatment for information service followed by the library as a physical collection. There seemed to be little interest in topics like library technologies, archives, museum, and management. Ahmed and Bhatti (2011) analyzed 28 LIS dissertations, identified through questionnaire and semi-structured interview and awarded between 1947 and 2010, to find out the primary research interest of researchers. The study found that the most sought-after research areas were academic library, archives, bibliometric study, cataloging, collection development.

South Korea

To understand the knowledge structure of South Korean LIS, Jeong and Kim (2005) reviewed 654 articles published in the *Journal of the Korean Society of Library and Information Science (SLIS)* and *Journal of the Korean Society of information management (SIM)* from 1970 to 1999. Research topics were classified into 22 subfields identified based on earlier researches of Järvelin and Vakkari (1990) and Jeong (1993). In addition to identifying the popular LIS research topics, the study also identified the theory used in the papers and the findings revealed that most productive subfields in LIS were cataloging/classification, LIS education, information system, information services, and oriental materials.

Spain

The earliest publication on Spanish LIS research was by Cano (1999) that covered 17 years of LIS research and included 354 articles from two major Spanish journals, i.e. *Revista Espanola De Documentacion Cientifica (RevDoc)* and *Documentacion de las Ciencias de la Informacion (Documentacion)*. The conceptual and methodological model proposed by Järvelin and Vakkari (1990) was adopted in the study and results of the analysis show that Spanish research concentrated on topics like information retrieval, LIS services, and scientific and professional communication included bibliometrics.

In contrast to the above study, Kawalec (2013) used JITA classification instead of Järvelin and Vakkari's classification scheme and collected research publication data from 12 public universities. The study identified 11 topic groups in LIS research that were popular, and they included information sources, support, and channels followed by information use and sociology of information, information treatment for information services and industry, profession and education. The popular subtopics under information sources support and channel were periodical, newspaper, electronic resources, archive materials, repositories. The popular subtopic under information use and sociology of information topic were information in society and information policy and bibliometric method, information policy, archive, user studies and academic library.

A recent paper on Spanish LIS research trends by Olmeda-Gomez et al. (2017) adopted the co-word analysis method to find out the thematic landscape of LIS literature in Spain. The 2209 publications from the Web of Science database, published between 1985 and 2014 were reviewed to identify nine popular key research terms, and they included digital rights management, citation analysis, translation services, bibliometric analysis, co-authorship, electronic books, webometrics, information systems and World Wide Web. The authors also identified other LIS research topics like H-index, semantic collaboration, bibliometric indicators, ranking, universities and webometrics.

Sri Lanka

The study on LIS subject trends in Sri Lanka by Gunasekera (2008) shows that LIS literature seemed to concentrate mostly in the areas of LIS service activities, information seeking and information storage and retrieval. The paper, categorizing the topics based on Järvelin and Vakkari's (1990) classification, analyzed the 141 articles published in *Journal of University*

Librarian Association (JULA) and the *Sri Lanka Library Review* between 1997 and 2007.

Taiwan

The paper by Lin (2012) investigated the research characteristics and trends in LIS research in Taiwan by examining 2494 research papers from 11 key library science journals, 983 Master's and Doctoral theses downloaded from NDLTD, 191 research project reports from the National Science Council of Taiwan between 2001 and 2010. The classification scheme developed by Lin (2004) was adopted to analyze the topics, and the study revealed that the most popular topics were LIS and technology, book, documentation and archives, user services and LIS theory and foundation.

The journals used in this study included *Archives Quarterly*, *Bulletin of the Taipei Public Library Quarterly*, *Instructional Technology and Media*, *Interdisciplinary Journal of Taiwan Library Administration*, *Journal of Educational Media and Library Science*, *Journal of Librarianship and Information Studies*, *Journal of Library and Information Science*, *Journal of Library and Information Science Research*, *Journal of Library and Information Studies*, *National Central Library Bulletin* and *University Library Journal*.

Turkey

The only study on Turkey's LIS research was by Yontar and Yalvac (2000) that reviewed the literature published in the journal *Türk Kutuphaneciligi* between 1952 and 1994 and divided the study into four different periods 1952–1964, 1965–1974, 1975–1984 and 1985–1994. The content analysis of the journal articles (644 in number) revealed that the most popular topics of research from 1952 to 1994 were LIS service activities and information storage and retrieval. Table 1 shows the popular topics across the four periods of the study. The paper used Järvelin and Vakkari's (1990) classification scheme to identify the topics and also found that the LIS research trend in Turkey had not changed much in the last 40 years.

United Kingdom

The paper by Ward (1997) includes the review of research literature published between 1965 and 1995 to examine the trends in UK LIS research. The researcher analyzed nine LIS journals and used the Järvelin and Vakkari (1990) classification scheme for representing research topics. The research was recorded in four categories that pertained to the decades of 1965, 1975, 1985, and the year 1995. The

Table 1. LIS topics trends in Turkey across four decades.

Study period	Popular topics
1952–1964	Library and Information Services Activities, Library History, Information Storage and Retrieval
1965–1974	Library and Information Services Activities, Information Storage and Retrieval, Library History, Publishing
1975–1984	Library and Information Services Activities, Library History, Information Storage and Retrieval, Publishing, Profession
1985–1994	Library and Information Services Activities, Information Storage and Retrieval, Information Seeking, Library History, Methodology

most popular LIS topics in the first category were information retrieval, use of information channel, and information and reference services. Similarly, for the decade of 1975, it was information and reference services, bibliographic databases, information retrieval, for the 1985 decade, the popular topics were admin and planning, automation and information retrieval. For the year 1995, the popular topics were admin and planning, information retrieval, and automation.

USA

Buttlar (1999) conducted a citation study of 61 titles listed in Dissertation Abstracts International under the section of LIS from 17 different ALA-accredited LIS programs. The study revealed that popular subject areas identified were related to public services in addition to other interesting areas like administration, automation/systems, collection management, bibliographic information and technical services.

Regional LIS research trends

Africa

The paper by Alemna (1996) is one of the earliest studies that researched into the papers published in the *African Journal of Library, Archives and Information Science*, a prominent journal indexed in the Web of Science and Scopus databases. The papers included in the study were between 1990 and 1995, and 60% of them were descriptive research, while 40% were empirical. The most popular research topics included information technology, rural libraries, and status of the image of the librarians. Very few papers focused on topics like bibliometrics and technical services. An extended study of the same journal by Alemna (2001) between 1996 and 2000

revealed that information technology remained the most popular topic for the African LIS research community, in addition to the emergence of new topics like publishing, record management, bibliometrics and academic libraries.

The Gulf and the Arab region

To understand the status of LIS research in the Gulf Cooperation Council (GCC) countries (Bahrain, Kuwait, Oman, Saudi Arabia and the United Arab Emirates), Al-Ansari (2008) reviewed the LIS papers published by these countries. The study included 282 papers published between 1975 and 2005 and indexed in LISA and Library Literature databases. The analysis of the papers revealed that research on topics like IT applications in libraries, electronic information resources, LIS education, academic libraries, and information-seeking was the most popular.

Zakaria (2015) reviewed LIS papers published between 1981 and 2010 in eight reputed Arabian (18 countries) LIS journals. The study found that the most popular research topic was librarianship, followed by information technology and technical services. The other major topics included information resources and library information services.

Australasia

Dorner (2001) reviewed papers published in 11 LIS journals published from the Australasian region (Brunei, Cambodia, East Timor, Hong Kong, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam, Australia, Fiji, Kiribati, Micronesia, Nauru, New Caledonia, New Zealand, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Western Samoa, Vanuatu) between 1991 and 2000. The study results showed that LIS researchers in this region were more inclined towards professional topics relevant for practicing librarianship as compared to theoretical topics. The dominant research topics included LIS services, information seeking, and the library profession in that period.

International LIS research trends

One of the earliest studies which analyzed international research trends in LIS was by Atkins (1988) who analyzed the papers published in *College & Research Libraries*, *Information Technology and Libraries*, *Journal of Academic Librarianship*, *Library Quarterly*, *Library Resources & Technical Services*, *American Libraries*, *Library Journal*, *ASIS Journal* and *Library Trends*. Each of the 2705 papers, published between 1975 and 1984, was rigorously

examined and categorized into 58 subject topics. The most popular topics identified in the study included library management, information retrieval, databases, cataloging, public library, library automation, librarianship, and technology.

A similar study by Buttlar (1991), identified LIS research topics from 1725 papers published between 1987 and 1989 in *College & Research Libraries*, *Information Technology and Libraries*, *Journal of Academic Librarianship*, *Journal of Education for Library and Information Science*, *Journal of Library Administration*, *Journal of the American Society for Information Science*, *Libraries and Culture*, *Library & Information Science Research*, *Library Quarterly*, *Library Resources & Technical Services*, *Library Trends*, *Public Library Quarterly*, *RQ*, *School Library Media Quarterly*, *Serial Librarian* and *Special Libraries*. The study found that the most popular subjects were cataloging, automation, library management, LIS education, collection management, reference service, networking, and OPAC.

Kumpulainen (1991) used the classification scheme devised by Järvelin and Vakkari (1990) to find out the most prominent LIS topics in the year 1975. The paper reviewed 632 articles published in 30 journals and found that the two most common subject groups in LIS research were library and information science services (circulation, collection management, administration) and information storage and retrieval (classification, indexing, information retrieval). The study by Järvelin and Vakkari (1993) included the review of articles published over 20 years (1965–1985) to understand the topic distribution of LIS. The study sample consisted of 142, 359 and 449 research articles published in 1965, 1975 and 1985 respectively, by 40 LIS journals. The results revealed that although there were few interesting changes, the main focus of LIS research had not significantly changed from 1965 to 1985. The principal topics that dominated the trend were the same, i.e. information storage and retrieval followed by library and information science service activities. The most remarkable change identified in the study from 1965 to 1985 was that there seemed to be a loss of interest in methodology over time and topics like Information storage, and retrieval includes classification and indexing were gaining popularity.

Another critical study on topic trends was by Astrom (2002) who analyzed keywords and citations of 1135 articles published between 1998 and 2000 in five highest-ranked LIS journals (*College & Research Libraries*, *Information Technology and Libraries*, *Library Quarterly*, *Library Trends* and *Journal of Academic Librarianship*) and four highest-ranked

Information Science journals (*Journal of Documentation*, *Journal of the American Society for Information Science*, *Information Processing and Management* and *Journal of Information Science*). The study found that the LIS research centered around the three clusters of library science (including academic library, electronic library, library services, collection, etc.), information retrieval (information retrieval, online search, Internet, information system, World Wide Web, information seeking etc.), and bibliometrics (scholarly journal, information science, electronic publishing, citation analysis).

Later on, Astrom (2007) extended the study by 15 years (1990–2004) and reviewed papers from 21 LIS journals. The researcher used Web of Science database to extract the records and Bibexcel software for bibliometric analysis and found that popular topics included information retrieval, information seeking, bibliometrics, webometrics, World Wide Web and information search. The analysis of articles in three distinct periods of showed that information seeking and information retrieval dominated the period 1990–1994, information seeking and information retrieval and informetrics research was popular in 1995–1999 while in the period 2000–2004, webometrics and information seeking and information retrieval became dominant.

The topics like librarianship and Internet also had a significant impact on LIS research in 1994–2004, as seen in the study by Blessinger and Frasier (2007). The study analysed 2220 papers published in *Journal of Documentation*, *College & Research Libraries*, *Library Resource & Technical Services*, *Library and Information Science*, *Library & Information Science Research*, *Library Trends*, *Journal of Librarianship and Information Science*, *Information Technology and Libraries*, *Knowledge Organization*, *Canadian Journal of Information and Library Science* (these 10 LIS journals were selected from a random sample of 28 LIS journals). The subjects or topics of each record were determined from subjects listed in the index of Library Literature and SSCI. The other favorite topics of LIS research included cataloging, user studies, Internet, serials, librarianship, reference/information services, information retrieval. It was interesting to note that information retrieval and user studies had been consistent as popular topics in other studies too.

There have been many longitudinal studies on topic trends in LIS research, and one of such paper was Milojević et al. (2011) who conducted a 20-year study (1988–2007) of papers from 16 LIS journals recommended by American Library Association Deans and Directors. The study showed that the papers

concentrated around three main branches of LIS, the library-related, information-related and equally distinct bibliometrics/scientometrics. The library-related topics included academic librarianship, collection building, information literacy, knowledge management and digital library; information-related topics included information retrieval, web search, catalogs and databases, and the bibliometrics/scientometrics included author productivity, citation studies, and bibliometric indicators. The study also reported the development of information seeking as a branch in itself.

Aharony (2012) in a study of 417 papers (selected by systematic sampling from 1250 papers) published in *Journal of the American Society for Information Science and Technology*, *Scientometrics*, *Journal of Information Processing and Management*, *Journal of Computer-Mediated Communication*, *Journal of Information Science*, *Journal of Documentation*, *Information Research*, *College & Research Libraries*, *Library & Information Science Research* and *Journal of Global Information Management* during the period 2007–2008. The study identified 856 keywords using Zins' (2007) classification and found that the identified topics focused on four major research areas in LIS, i.e. information technology, bibliometrics/scientometrics/webometrics, social information science classification (information need) and information retrieval.

The paper by Larivière et al. (2012) included a study of 96,000 articles published in 160 journals (drawn from Web of Science) between 1900 and 2010 and found that the title words that had a positive growth trend were information, technology, citation analysis, bibliometric*, impact, journal, scholarly, access, user, use, search, management, knowledge, theory, model, research, data, behaviour, information seeking, health, clinical, literacy, network, social network* and academic libraries. The study also identified prominent words that were on the decline and they included library*, librarian, book, university, public, children, archive*, catalog*, subject head*, index*, classification and retrieval.

The other longitudinal study in this domain was by Tuomaala et al. (2014) that included the analysis of LIS research articles published in 29 core LIS journals in 2005, 22 journals in 1985 and 10 journals in 1965. Järvelin and Vakkari's (1990) classification that was updated in Järvelin and Vakkari (2005) with new subclasses was adopted in the study. The results revealed that information retrieval had been the most popular area of research and papers on library science and activities decreased from 1985, while research on information seeking and scientific communication

grew during the study period. The other interesting finding of the study was the change of focus from the LIS organization to end-user and system development along with increased attention to evaluation and experimentation.

Liu et al. (2015) reviewed the 10,648 bibliographic records published in 16 leading LIS journals between 2001 and 2013. The paper used the formal concept analysis method to identify the intellectual structure of LIS. By examining the papers, the author identified nine main themes in LIS, and they included bibliometrics, scientometrics and infometrics, citation analysis, information retrieval, information behavior, libraries, user studies, social network analysis, information visualization and webometrics.

Onyancha (2018) investigates the evolution of LIS research by tracking the author-supplied keywords in the papers published in between 1971 and 2015 and extracted from SSCI, SCI and AHCI under the label of information science/library science. The data were categorized into two 10-year and one 5-year (1971–1980, 1991–2000 and 2011–2015) periods. The study found that focus of LIS research shifted from topics like information system design and management in the 1970s to information systems, information technology, information retrieval, expert systems in 1990s and then to scientific communication, information storage, and retrieval, knowledge management and user education in 2015.

Conclusion and further research

Table 2 depicts the decade-wise view of LIS research trends in various countries in addition to international research. It is interesting to note from Table 2 that the earliest literature covered in the studies related to LIS research trends, is from the 1950s and the pioneers were India and Turkey. India has been consistent and continuing the research until the current decade of the 2010s, while Turkey does not have studies for literature published after the 1980s. Denmark has research on LIS literature from the 1960s till the 1980s and none after that. One can say that studies on LIS research picked up in the 1960s from Malaysia, Denmark, Pakistan, and the United Kingdom in addition to international studies. United Kingdom, USA, South Korea, Africa, and Australasia do not have studies on LIS research after the 1990s. In fact, USA and Taiwan have studied for only one decade of LIS research, i.e. 1990 and 2000 respectively. In addition to India, international research has been consistent, and there exist studies that cover the literature for each decade since the 1960s to the 2010s. China and Australia were the only other countries that had studies of the

Table 2. Most popular topics across country and study period.

Study	1950	1960	1970	1980	1990	2000	2010
International	Classification and Indexing, Automation, Library Collection, LIS Profession (Jarvelin and Vakkari, 1993)	Classification and Indexing, IR, LIS Edu, LIS Services, Library Management, IR, Automation (Jarvelin and Vakkari, 1993; Kumpulainen, 1991; Atkins, 1988)	IR, Collection, LIS Profession, Library Automation, Databases, Cataloging, LIS Education (Jarvelin and Vakkari, 1993; Atkins, 1988; Buttlar, 1991)	IR, Information Seeking, Academic Libraries, Bibliometric, Cataloging, User Studies (Astrom, 2002; Blessinger and Frasier, 2007)	IR, LIS Service Activities, Information Seeking, Scientific Professional Communication (Bibliometric), IT, Librarianship, Webometrics, (Tuomaala et al., 2014; Aharony, 2012; Blessinger and Frasier, 2007)	IR, Bibliometric, Knowledge Management, Social Media, Academic Libraries, Citation Analysis, Innovation (Onyancha, 2018)	
Gulf and Arab Region			Automation, IT Application, Librarianship, Electronic Resources, LIS Education, Technical services, IS (Al-Ansari, 2008; Zakaria, 2015)				
Africa Region				IT, Academic and Rural Libraries, Librarianship, Publishing, Record Management, Bibliometric (Alemna, 1996, 2001)			
Australasia				LIS Services, IS and Library Profession (Dorner, 2001)			
Australia			LIS Service Activities, IS and Library History (Rochester, 1995)	LIS Education, Library Automation, ICT, Management and Planning, Publishing, Special Libraries (Moahi, 2008)	Information Behaviour, IL, Resources and Services (Middleton and Yates, 2014)		
Botswana				LIS Education, Library and Development (Moahi, 2008)	Library Automation, ICT, Education, Library Operation, Archive and Record Management, IS (Moahi, 2008)		
Canada							Information System and Technology, Information Visualization, IR, User and Use of the Information System (Paul-Hus, 2016)
China			Libraries and Society, LIS Profession, Management and Administration, Cataloguing, Classification (Copper, 1987)	Principle of LIS, Classification and Indexing, IR, Information Collection and Storage (Huanwen, 1996)	Basic Theory of Library Science, Information Science, Digital Information Resources and Use (DL), Information Organization and Retrieval (Ma, 2012)	IR, Ontology, Data Mining, Information Services, Information Organization, KM, DL, IL (Hu et al., 2013, Zong et al., 2013)	

(continued)

Table 2. (continued)

Study	1950	1960	1970	1980	1990	2000	2010
Denmark		Specific Region and Countries, Building and Equipment, Cooperation, Network and Resource Sharing (Kajberg, 1996)	Specific Region and Countries, Materials/ collection, Building, and Equipment (Kajberg, 1996)	Materials/collection, Specific Region and Countries, Multimedia, Library Policy (Kajberg, 1996)			
India	Library Movement/Legislation, Classification, User Studies (Chatterjee et al., 1995)	User/Use Studies, Academic Libraries, Bibliographic Control (Indexing, Classification, thesaurus (Lahiri, 1996)		Classification, Library Services, Reference Services, User Studies, Academic Libraries (Chatterjee et al., 1995; Lahiri, 1996)	Library Services, User Studies, University Libraries, Academic Libraries, IR, LIS Education, Bibliometric (Mittal, 2011; Manjunatha and Shivalingiah, 1998)	Bibliometric, DL, E-Journals, Automation, Library Services, User Studies, Academic Libraries (Dora and Kumar, 2017; Madasamy and Alwarammal, 2009; Garg and Sharma, 2017)	Bibliometric, E-Resources, E-Journals, Library Services, User Studies, IT, DL, Academic Libraries (Dora and Kumar, 2017; Garg and Sharma, 2017)
Iran							
Malaysia		Management of Library Information Centre, Library Collection and Management, ICT Application in LIS (Yazit and Zainab, 2007)				ISR, IS and Scientific and Professional Communication includes Bibliometric (Goon and Singh, 2007)	
New Zealand						Collection Management, Library Management, Information Centre, IL, Socio Cultural Aspect of Information Society (Godfrey, 2016)	
Nigeria					ISB, IL, ICT, Evaluation of School Library Services (Oyewusi, 2012)		
Pakistan		Cataloging, Indexing, Academic and Special Libraries, Librarianship, LIS Education (Nasser and Mahmood, 2014)				Library Profession, LIS Education, Collection, IT (Nasser and Mahmood, 2009)	
South Korea		Cataloging/ Classification, LIS History, Education (Jeong and Kim, 2005)	Cataloging/ Classification, LIS Education, ISandR (Jeong and Kim, 2005)	Cataloging/Classification, ISandR, Serials, LIS Education, Bibliometric (Jeong and Kim, 2005)			
Sri Lanka					LIS Service Activities, Information Seeking (Gunasekera, 2008)		
Spain		LandIS Services, IR, Scientific Professional Communication include Bibliometric (Cano, 1999)				Cataloging, Indexing, Content Analysis, Bibliometric, Information Policy, Education, Use Study (Kawalec, 2013)	
Taiwan						LIS and Technology, User Services, Books, Documentation, Archives (Lin, 2012)	

(continued)

Table 2. (continued)

Study	1950	1960	1970	1980	1990	2000	2010
Turkey	LIS Service Activities, Library History, ISandR (Yontar and Yalvac, 2000)	LIS Service Activities, ISandR, Library History, Publishing (Yontar and Yalvac, 2000)	LIS Service Activities, Library History, ISandR, Publishing, Profession (Yontar and Yalvac, 2000)	LIS Service Activities, ISandR, IS, Library History, Methodology (Yontar and Yalvac, 2000)			
United Kingdom		IR, Use of Information Channel, Information and Reference Services (Ward, 1997)	Information and Reference Services, Bibliographic Databases, IR (Ward, 1997)	Admin and Planning, Automation, IR (Ward, 1997)	Admin and Planning, IR, Automation (Ward, 1997)		
USA					Administration, Automation/Systems, Collection Management, Bibliographic Information and Technical Services (Buttlar, 1999)		

ISandR: Information Storage and Retrieval, IR: Information Retrieval, DL: Digital Library, IL: Information Literacy, IS: Information Seeking, KM: Knowledge Management, ISB: Information Seeking Behaviour, IT: Information Technology, ICT: Information Communication Technology.

recent decade of 2010, and both these countries have studies on LIS research since the 1980s. One can say that in addition to international studies, research from India, China, and Australia cover LIS research continuously.

When we compare the LIS research topics in the 1950s, the popular ones in India were classification, user studies, and academic libraries while in Turkey the common topics were LIS service activity, library history, information storage, and retrieval.

For example, the decade 1960 and 1970 was the decade of classification and indexing research internationally, but for countries like Denmark, it was building equipment and materials/collection. Similarly, for India and South Korea, during the same decades, the research interest was on library legislation, user studies, library history, and education apart from the popular topic of classification and indexing.

The emphasis of international research was on topics like library automation, information retrieval, cataloging, and the LIS profession in the 1980s. At the same time, the focus of Australian research was on LIS services and library history, and for Spain, it was library services, bibliometrics, and information retrieval. The trend in the African sub-continent was to research on LIS education and information seeking, while in India, China, and Korea, the bias was towards cataloging, classification, and library services.

The decade of the 1990s did reveal many changes in international research with the dominance of information retrieval, information seeking and user studies, and this decade also marked the appearance of bibliometrics as a research topic. In the African countries, it was automation, ICT, and information-seeking behavior research while it was LIS services that were an important research area for Australia, New Zealand, India, and Sri Lanka, including other topics like user studies and information retrieval, classification, indexing, and cataloging. In China and South Korea, classification and information storage and retrieval were still the primary topics of research.

The bibliometrics and webometrics research topics were dominating the international LIS research along with topics like information retrieval and LIS services in 2000. Similarly, at the country-specific level, topics of research included bibliometrics and webometrics that were dominant in countries China and India. ICT and digital library were other areas on which research focus was evident both at the international and country-specific level.

Interestingly, in African countries, research attention seemed to be on topics like automation, information seeking and ICT. In Australia and New Zealand, the popular research topics in LIS comprised of

collection management, databases, and information behavior and in Taiwan, it was LIS and technology, user services, and archives. In Pakistan, the LIS research topics included library profession, education, and collection while the Malaysian researcher was interested in topics like information storage and retrieval and information seeking.

Bibliometrics was the most researched topic in the decade of 2010, apart from topics like knowledge management, social media, citation analysis, information retrieval, and innovations. This decade also witnessed a significant shift in Chinese research, where the topics that dominated the LIS research were from the information science domain, e.g. IR, ontology, data mining, information system, and information organization. LIS research in India was dominated by topics like bibliometrics, electronic resources/journals, and library services during this period.

The review of the studies shows that each country had its focus on research. For instance, in Australia, New Zealand and Turkey, LIS service activities dominated the research, while in Denmark, it was buildings, and collection research. LIS research in African countries was on topics like information seeking, education, IT, and automation-related research. In Arabian countries, LIS research was dominated by topics like automation, librarianship, electronic resources, education and technical services. The Chinese LIS research witnessed a shift from classification and indexing to pure information science topics like bibliometrics. Similarly, Indian research shifted from classification and user studies to bibliometrics and electronic resources and services.

The difference in the topics of LIS research may depend on several factors that include education, culture, social structure, for example in the case of research in Australian and Scandinavian countries, Rochester and Vakkari (1998) argue that social institutionalization did affect the LIS research in those countries. The other important factor that may be relevant in understanding the reasons or factors that drive research interests in LIS could be technology adoption in the libraries of that region. It may be true that issues in practical librarianship could be a catalyst for LIS researcher to select research problems. It is obvious that topics that are technology-intensive like data mining or social media may not be popular in regions where libraries may not be actively engaged in such technologies. The comparison of international LIS research with research in each country shows that there is a remarkably different research focus, despite a few similarities across countries. Further, research can be done to understand the critical factors that shape the characteristics of LIS research

in a country and how the shift in focus of LIS research takes place across various countries. The author also states here that the results were depicted as original from the study.

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Taxonomy design methodologies: Emergent research for knowledge management domains

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Abstract

A knowledge management research study was integrated into a consulting internship for three students in an MLIS programme, working under the direction of a faculty member. The project scope was to organise knowledge across all academic disciplines, as represented in university structures, in support of the consulting client's software analytics tools for scholarly journal publishers. The study team's original research contribution was a four-phase design and validation approach to taxonomy creation, using extant research methods in concert. The students learned to bridge their coursework knowledge into a knowledge management environment in industry and to apply data collection and analysis methods to a novel research project.

Keywords

Consulting internships, knowledge management, knowledge management methodology, MLIS internships, research consulting, taxonomy design, taxonomy validation

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Background

In the domains of knowledge organisation and knowledge management (KM), opportunities abound to apply concepts grounded in information science and established tenets of librarianship to a vast array of work environments (Lambe, 2015; Todd and Southon, 2001). However, students preparing for careers in KM face challenges in connecting their course learning to application in such environments. Internships supervised by faculty versed in KM research and practice can help bridge this gap by scaffolding the knowledge building. Such consulting internships—called “consulternships” (Neumann and Banghart, 2001)—are common for students earning degrees in business, yet are relatively unusual in Library and Information Science programmes. In rare occasions, students even extend their learning to create original research findings that contribute to the domain, with implications for praxes and for the culture of the student community (Hall, 2016).

This paper reports on such a contribution, a study in which a team of three student-interns in a Master in

Library and Information Science (MLIS) degree programme worked under the direction of a professor on a consulting assignment. The consulting project was for a Silicon Valley company that provides usage analytics for scholarly journal publishers. The scope was to organise knowledge across all academic disciplines, as represented in university faculty and departmental structures, in support of the client's software analytics tools (PRWeb, 2015). The team's primary deliverable was a taxonomy, accompanied by governance recommendations, and the consultantship led to a second KM project several months later. During the 15-month timeline of the taxonomy design work, the study team submitted the anticipated deliverables and, in addition, developed processes that integrated extant methods in original ways to inform

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a novel research project. The primary research contribution was a four-phase design approach to taxonomy creation and validation. A secondary benefit from the research was a rigorous approach to assessing technological tools for taxonomy management.

In a previous article (Tucker et al., 2018), the study team reported on the learning experiences of the student-interns and how they initially learned about practices and methodologies for KM work. Its focus was on how the students were able to bridge their course learning of KM concepts into a consulting project that involved designing an extensive taxonomy and on their reflections on their learning experiences. The paper briefly introduced how the interns, as part of the consulting team, not only learned about methods for design and management of knowledge assets, but were also able to discern gaps in knowledge related to taxonomy validation methods and then to contribute new research to this area, as a result of the consulting internships. This article reports on those research contributions, on how they were developed through a combination of quantitative and qualitative methods, and on their transferability to other information-intensive environments.

Two themes are woven throughout the findings discussed here, representing the praxes of KM and the research education necessary to prepare for the development of expertise within that practice. For the latter, this encompasses a forward-thinking approach to curriculum design that is built around research methods and combined with a commitment to ongoing learning, given the fast-changing technologies in KM and the cross-currents that can benefit knowledge managers working in diverse settings. The definition of “knowledge management” framing this study has been taken from Townley (2001: 45): “Knowledge management may be defined as the set of processes that create and share knowledge across an organisation to optimise the use of judgement in the attainment of mission and goals”. (There is no shortage of definitions of KM, as persuasively argued by Koenig (2016) and Semertzaki (2017). Indeed, the naysayers regarding the term “knowledge management” itself seem to have quieted in recent years as well (Wilson 2002, 2005).) Noteworthy in Townley’s definition for the purposes of this study was the emphasis on the “set of processes,” and that the creation and sharing of knowledge occurs “across an organisation”; for the study, the methodologies the team developed enabled them to fine-tune the KM processes and to make them into a fully integrated set. In addition, documenting and managing the cross-organisational patterns in the creation—and in the re-creation—of knowledge represented in the taxonomy were essential to the success

of the taxonomy delivered and the governance plan prepared for the client.

This study was situated in an industry setting, and it demonstrated how competencies acquired in an MLIS programme, and as put forth in the literature (Hazeri and Martin, 2009a, 2009b; Nazim and Mukherjee, 2013, 2016) and by professional societies (ALA, 2006; SLA, 2016), are in demand in the marketplace. As further background for exploring the research methods and the abilities revealed in these projects, relevant professional competencies as currently put forth are discussed for context. This background considers information-rich environments such as libraries, as well as industry sectors that demand KM skillsets combined with the abilities of design thinking and collaboration. Extending these competencies into KM venues where highly creative approaches are crucial, such as in this study, creates fertile ground for original contributions to both practice and research.

Competencies for the information professions and KM settings

Perspectives on competencies for the information professions have evolved dramatically, even within the last decade. Fewer than 10 years ago, the nascent environment of Web 2.0 created new ways of thinking about the roles of librarians and other information professionals, as well as about the KM skills required of them (Partridge et al., 2010). Vassilakaki and Moniarou-Papaconstantinou (2015), in a review of the literature from 2000 to 2014 on emerging roles for information professionals, concluded that:

The job market offers knowledge managers posts but information professionals are not yet fully equipped, especially in terms of degree level, to be appointed to such posts. LIS schools ought to increase their offerings of relevant courses at different degree levels and librarians need to enhance their efforts of promoting their presence and role as knowledge managers in business sector. (p. 53)

They emphasised that information professionals must “intensify their promotional efforts” (p. 55) and be able to articulate the varied contexts for KM skills acquired from an MLIS or similar degree.

Looking back to perspectives yet a decade prior, a major conversation within education was emerging around whether to focus on preparing students to perform in given jobs—that is, to train students—or to prepare them with critical thinking skills, the “ability to take a series of known facts and develop abstractions from them” (Holcomb 1994: 37). This was at the

root of impetus toward competency schema that encompassed both “hard” and “soft” skills (Hirsh, 2019). For example, the Special Libraries Association competency set (SLA, 2016) lists the abilities to organise and manage data, information, and knowledge assets, and to understand knowledge flows, knowledge systems and technologies, as well what it labels “enabling competencies,” such as critical thinking, initiative, flexibility, oral and written communication skills, and relationship building. Hirsh (2019) sums up these enabling competencies as “soft” skills and including “communication, critical thinking, [and] collaboration” (2019: 1), contrasting them with data skills, such as “data management, research methodologies, data visualization” (p. 1).

The mission statement of the Knowledge Management Special Interest Group of the Association for Information Science and Technology (ASIST-SIGKM, 2015) states that the activity of KM, “encompasses techniques, technology, and organizational change” (2015: Mission), demonstrating the combination of abilities present among practicing knowledge managers. In studying requirements specific to careers in KM, Todd and Southon (2001) elicited input from highly experienced knowledge managers, then outlined five categories of necessary skillsets and understandings: knowledge about knowledge (e.g. how people acquire knowledge), people (e.g. needs analysis), organisation (e.g. organisational culture and cost benefits of KM), information management, and technology. They concluded that opportunities in KM are significant and that, “Institutions which are preparing people for roles in it will need to be very flexible in the way that they act to best match the needs of the students with the opportunities of the marketplace” (Todd and Southon, 2001: 325). Offering consulting internships, such as described here, is a highly beneficial way to provide realistic and flexible education in workplace settings, and to engender competencies covering both hard and soft skills.

Contributing to research as a knowledge manager

The achievement of established competencies for a given degree programme within the information professions typically includes an understanding of research methods (ALA, 2009: Section 6. Research), and yet it is unusual for a student to contribute to new research methodologies during the period of study. To achieve this kind of contribution, a student may pursue a further advanced degree or choose a career path that calls for deeper understanding of research. Design thinking is essential to this potential next stage in a student’s learning in order to develop a

researcher’s mindset that enables new ways of thinking about approaches in research (Bower, 2017; Kolko, 2015; Lambe, 2015; Weedman, 2009). As an illustration, when this study began, the team was highly aware of the acknowledged value of taxonomies in industry; however, the literature’s primary focus was on enhancing search (White, 2016), whereas the project objectives were on supporting technologies for business analytics. This created an opportunity for the team members to think critically and creatively about the methods to be used for the taxonomy.

Research methodologies

The taxonomy project commenced by drawing upon established methods from both quantitative and qualitative realms of applied research. In the early investigative stages, the research team conducted data gathering through environmental scans and card sorting (Conrad and Tucker, 2019; Spencer, 2004, 2009), described below in the section ‘Evaluating extant knowledge structures’. The requirements of the project were delineated in finer detail during meetings with the client, and the necessity for customised methodologies to produce and refine the design, and later to conduct validation of the taxonomy, was more fully understood as this fine-tuning took place.

The primary gap in existing methods to assure the robustness of the taxonomy was in approaches to validation. For grounding this effort, the study team became versed in the conceptual frameworks for tacit vs. explicit knowledge (Semertzaki, 2017; Serrat, 2017), which provided insights and guidance, particularly when viewed through the lens of inter-organisational systems. As the team was investigating multi-dimensional schemas of academic disciplinary structures that had evolved over decades or even centuries, and which had multiple actors or “agents of knowledge” (Serrat 2017: 293) at differing levels of authority over those structures, the components of the taxonomy were fundamentally complex. Its multiple dimensions were further dependent upon multiple factors, such as the agent’s position—as individual, as member of a group, and/or the intra- and inter-organisational domain—and lesser known factors, such as seniority, motivations, etc.

Other dependencies included the nature of the academic discipline itself, for example, the rate at which terminology within the domain changed (e.g. humanities vs. medicine), and the ambient forces affecting those changes (technologies, politics, etc.); there was considerable variation among disciplines. Because we were organising explicit knowledge as manifested in

the academic departmental structures, we framed this similarly to how Serrat (2017: 293) categorises an organisational chart: as the intersection of explicit knowledge with the intra-organisational domain. However, tacit knowledge—that 80% under the surface in most models of tacit vs. explicit—may emerge into the domain’s structure, independent of the academic discipline. Our study team saw evidence of this migration most often in the humanities, noting that the “tracking of terminologies and structures is far more circuitous than the tracking of the people involved, who may in fact remain with unchanged responsibilities and in their very same offices” (Tucker et al. 2018: 406).

The team was also working with timelines for the deliverables and very much tied to the real-world experience of creating a product to meet requirements for the software tools set to be launched (Anderson, 2017; RedLink, 2018). The taxonomy thus needed to be “the conceptual, semantic structure underlying the organizing system” (Abbas, 2010: 19), and it also had to be delivered on time. With this heightened awareness of the complexities and the variable nature of the knowledge to be documented in the taxonomy, atop the deadline demands of the marketplace, the study team set about the first stages of data collection and determining the initial methods to be applied.

Early planning of research design

The initial project scope was to revise and extend an existing taxonomy in the public domain, yet as the project requirements were further refined, it was apparent that this taxonomy would not suffice nor ultimately support the future analytics software products the client envisioned. The public domain taxonomy did not reflect academic disciplines in sufficient depth, and it was lacking alignment with faculty departmental structures in many subject areas. Its terminologies were also more reflective of industry lexicon and not of university structures, the basis of the journal author associative dataset. As a result, during this early planning stage, the focus shifted toward a wider scan of extant taxonomies and evaluating their strengths and weaknesses for analysis.

Evaluating extant knowledge structures

The study team addressed the initial work positioned as a research question: What could be learned from knowledge structures already existing in comparable environments? The scans focused on academic environments as evidenced in university departmental structures and names, and in research journal ontologies and other relevant taxonomies (e.g. the

Classification of Instructional Programs from the US Department of Education (NCES, 2010)). We sought knowledge structures that were extensive in the total number of subject terms, and to evaluate schemas that were thoroughly multi-disciplinary in scope. This included Digital Commons, Ringgold, JSTOR, Wikipedia, and HighWire Press. These ontologies were widely varied in scope; for example, Wikipedia is constantly changing as it is open source and user editable so it was necessary to take a slice in time for purposes of analysis. JSTOR’s taxonomy is a small collection of fewer than 100 terms and lacks a hierarchical structure, such that there is no relational context or subject granularity. Although the purpose of JSTOR is to support retrieval and browsing, its subject term hierarchy is secondary to natural language for search purposes. HighWire’s subject terms were developed for its own publications.

The eight universities in the initial sample scanned were ones with a far-reaching range of disciplines, and the final sample was Harvard University, Stanford University, and the University of California at Berkeley. This sample gave the project a US leaning; however, the universities were selected for breadth of disciplines as well as the professional schools present (medicine, law, business, etc.). Additionally, department names and structures were fully accessible on the university websites, supporting both the objectives of the environmental scans and the project timeline.

Card sorting was the subsequent step during the initial work to analyse the results of the university environmental scans and prepare for the pre-construction stage of the taxonomy design. Card sorting made it possible to see the commonalities and the differences among the three schemas and their labels, with particular attention to the two highest structural levels (Soranzo and Cooksey, 2015). This evolved into a modelling scenario that was then the basis of the hierarchy.

Assessing technologies and tools

In order to manage the construction of the taxonomy and in planning for its updating and larger governance issues, the study team needed to select taxonomy management software and recommend it to the client (Padmavathi and Krishnamurthy, 2017). To make a persuasive case, we evaluated three tools: WebProtégé, MultiTes, and Synaptica Express. Synaptica was selected and adopted for four primary reasons:

1. Accessibility of the taxonomic data. Access included the ability to view all relationships for a given term. Because the taxonomy

included terms occurring in multiple places and under different parents within the hierarchy, the ability to view the different relationships at once was essential. With the growth anticipated, as well as the modifications, this access to term relationship context was also important for maintenance.

2. Speed and efficiency. The sub-structures in the tool are based on separate records of each term, stored along with its scope note and unique identifier, and all parts of this record are searchable. Second, the tool uses drag and drop for relocating a term in the hierarchy or changing its relationship to a parent or child term, and likewise for the merging/unmerging of terms. This visual interface vastly sped up the processing of terms.
3. Minimising human error during edits to the taxonomy. The tool supports editing a term in one occurrence with the option to universally apply the change elsewhere, if relevant. The team also developed workflow recommendations to support editing practices.
4. Report generation, including templates for task-specific purposes, as well as customising reference lists to aid in spotting similar terms that may be candidates for merges and/or editing.

Phases in the taxonomy construction and validation

There were four phases in the construction and validation of the taxonomy. Research on validating a taxonomy, or any form of controlled vocabulary, is limited, and thus this is the primary area where the study team was able to contribute new research to the field of knowledge management. As stated in the ANSI/NISO standard on controlled vocabularies:

There is surprisingly little research or literature dealing specifically with the testing and evaluation of controlled vocabularies, which could be due in part to the difficulty of isolating the quality of a vocabulary from the performance of other elements of an information system such as content, technology, search engine, and interface. (ANSI/NISO, 2010: Section 11.2.1, p. 95)

The methods for constructing the taxonomy included environmental scans, card sorting (considered a form of “affinity modelling” in the ANSI/NISO standard (2010)), and detailed analysis of term meanings; it was conducted in four phases.

Phase 1: Environmental scans. As mentioned above in brief, the environmental scans phase had two parts.

First, we compared and contrasted academic discipline ontologies, most notably Digital Commons, Wikipedia, Ringgold, and HighWire Press. Second, we compared and contrasted eight major university academic departmental structures, eventually focusing on Berkeley, Stanford, and Harvard, contrasting and comparing these three through in-depth analysis. In the later stages, we added departmental library data in order to reflect how these divisions can mirror their larger academic departmental contexts as they typically have parallel financial allocations. The analysis of data from the environmental scans achieved two purposes. First, it was a productive term-gathering method, generating a significant body of terms, and second, it enabled us to map disciplinary terms and relationship patterns, supporting our efforts to assign terms to appropriate tiers as the scans demonstrated disciplines that were consistently acknowledged to be sub-disciplines of others. Not surprisingly, analysing the scans also revealed discrepancies in some parts of the different university departmental structures that had to be taken into account. Another challenge was semantic ambiguity: terms like *design*, *environmental*, and *cultural* that are intrinsically vague, and which adopt meanings dictated by the terms surrounding them and their disciplinary contexts. Yet another challenge were fields and studies that escape direct taxonomic relationships, rendering them resistant to clean fits into a hierarchical structure. A typical situation was “pure” and “applied” departments that focus on a similar subject matter; for example, Economics and Business, or Ministry Studies and Religious Studies. Others were difficult to fit into a hierarchy due to being a nexus of subject areas. These, like Classics, Environmental Studies, and Global Studies, are highly interdisciplinary and may fit at once everywhere and nowhere in a taxonomy. In such instances, the approach was to create terms in multiple areas of the taxonomy to represent the elements in the nexus. The team was particularly discerning in determining term candidacy for this treatment.

Phase 2: Taxonomy construction: Tiers and terms. Constructing the tier structures and terms of the taxonomy took place next. The team focused on term analysis throughout, accounting for the inherent challenges that plague natural language knowledge management, most particularly the need to discern meaning and context before finalising and situating a term in the hierarchy. After creating the two top tiers in the hierarchy based on the environmental scans of the three universities, adding terms began. Term construction involved three stages:

1. Select a term within the area of focus and gain an understanding of its meaning through searching its usages in three places:
 - a. taxonomies used in the environmental scans;
 - b. academic disciplines, examining department/faculty labels and research tracks (in instances where congruency was elusive among the three universities, such as for highly esoteric terms, refer to other universities in the initial sample of eight); and
 - c. journals, by examining journal titles, descriptions, and subject areas covered in their scope statements.
2. Use the information found to conduct term analysis. This second stage included two primary considerations; first, the term's meaning (both its definition and its common academic/scholastic usage); second, the scope of that meaning, which could range from broad and interdisciplinary (e.g. Development Studies) to narrow and limited to a single discipline (e.g. Colonial American History).
3. Assign the term a best-fit academic departmental classification, then confer with a team member, and decide if the term should be either (a) conclusively assigned or (b) classified as a candidate for that taxonomic section. Some terms were assigned to multiple classifications because they appeared in different academic departments, for example, "computational biology" was present in Mathematics, Computer Science, and Biology departments, depending on the university's structure.

Phase 3: First-stage validation: Tagging and journal sampling. The third phase in constructing the taxonomy was to begin validating. To accomplish this, the team tagged a sample of scholarly journals in each of the top- and second-level tiers of the emerging hierarchy. The goal was to tag 25 journals in each of the 48 top- and second-levels; however, some areas were lacking sufficient journal titles available to meet this goal (e.g. medieval history had three titles, and performing arts had 14). The results were that 36 of the tiers (75%) could be fully sampled and tagged, with the others tagged using smaller samples. This led to small refinements in the second-tier labelling, but no changes to the hierarchical structure were needed.

Phase 4: Second-stage validation: Cross checks, term merging, and content mapping. A second stage of

validation was conducted in order to ensure breadth of coverage of the taxonomy. Crosschecking was done against three of the non-university ontologies from initial environmental scans. Through this process, we were able to identify gaps in subject knowledge areas that were not reflected in the university departmental labels and to add terms as needed; however, only a few additions were necessary. Another form of crosschecks during this later phase of validation was merging similar terms present throughout the academic ecosystem. This unified the vocabulary of the taxonomy and improved the authority of the terms.

An additional decision criterion that was noteworthy during the latter stages of validation was the nature of the academic structures and substructures that defined a taxonomic area. University department names were definitive of disciplines, yet less obvious academic structures were also taken into account; this included degree programmes, research tracks, fellowships, and graduate certificates. The team identified academic structures of this nature, but did not drill down further, such as to the subject or course level, in creating terms.

Discussion

The main contributions from the study are two-fold: to KM research and to education for careers in the KM field. First, the blending of complementary methodologies to construct and validate a comprehensive taxonomy representing academic disciplines was an original research approach, and this contribution has implications for other information-intensive areas. Organising the knowledge scoped in this study resulted in the most extensive taxonomy for academic disciplines, with the breadth necessary for tools to support scholarly publishing. When the project was completed, the taxonomy consisted of 1861 terms, as compared to Digital Commons' 1194 terms, Ringgold's 656, and JSTOR's 74. The team also explored the social media research platform ResearchGate; however, this proved impractical because its taxonomy is not viewable. Based on testing, the subject headings appeared to be a rotated term list generated by user tagging; however, it was not possible to fully discern term generation, based on anomalies discovered (for example, 'music information retrieval' was a term, but 'information retrieval' was not), nor the size of the taxonomy at a given point of time. (Requests for information about the term list went unanswered.)

Second were the learning experiences of the consulting interns who developed the skillsets and understandings necessary to KM careers in an industry

setting, and which are transferable to other information-rich environments. This second outcome was reported on previously (Tucker et al., 2018), thus the focus of this discussion is on the first outcome. However, the two are interdependent from the perspectives of the learners and of educator-researchers who are committed to preparing students for careers as knowledge managers and to developing in them the potential to develop expertise in KM over the course of those careers. Having the potential to develop expertise means more than being trained to do the job at hand (Holcomb, 1994); it encompasses competencies such as design thinking, applied research skills, and collaborative abilities (Clarke, 2018; Tucker, 2017; Weedman, 2009). In addition, much in the way that Hall (2016: 223) describes building a “culture of research” among academic library staff, the inclusion of internships that combine practical knowledge with research tactics can bring about a culture of research among students that reinforces programme learning objectives.

For this study, the team of consulting interns broadened their coursework learning far beyond the initial tasks presented to them at the start of the internships. The structure of a consulting internship created an extended team situation in which they collaborated with the client directly (its key stakeholders), the supervising professor, and each other. Part of the initial work was scoping the project details and delineating the tasks to be completed. This included evaluating available technologies and tools that would be needed, presenting a comparison to the client, and recommending the technology of choice. With new understandings, the team successfully deployed the processes developed: for taxonomy design, construction, validation, and management.

The transferability, or applicability, of the methods from the study may be considered for other KM environments. Taxonomies are present in a variety of business settings, prominently in the management of product inventories, and more widely in the search support systems for site navigation and browsing functionalities. The methods developed in the study for representing a domain as complex and shifting as academic structures, and for updating the taxonomy, are highly applicable and relevant in these environments. Additionally, the project team included recommendations for supplementing the taxonomic terms created by the analysts with functionality for user-generated tags—not an original idea certainly, yet the details for how to do parameter weighting of these supplemental tags and how they could migrate into the controlled vocabulary was.

A further outcome of the project was confirmation of ways in which the challenges of governance and managing content have commonalities, as made clear in recent studies and perspectives (Bultrini et al., 2016). The project completion and the team’s governance recommendations at hand-off to the client were a reminder of the necessity of flexibility in taxonomy design (Hedden, 2016), and that, “An effective taxonomy sits between Chaos and Order and mediates the two; it does not, as it’s so often assumed, represent the domain of Order unequivocally” (Lambe, 2007: 259).

Roles and opportunities for graduates of MLIS programmes to work in KM environments are increasing and are evidenced in increasingly diverse settings, based on studies using thematic coding of job advertisements (Harper, 2013), publication content analysis (Van Rooi and Snyman, 2006), and Delphi method (Abukhader, 2019). My own experiences, crossing over in industry and academic environments, intersect through consulting, such as described in this study, and also through chairing the programme advisory committee on KM at the university. Committee members are technical services leaders at academic libraries, search engine designers, and consulting information architects. Members provide input on the curriculum for students preparing for careers in KM, and routinely emphasise the importance of internships as key in students’ experiences during the MLIS programme.

Conclusion

The outcomes of the study demonstrated that students in an MLIS programme can contribute inventive and robust research approaches to the field of KM when working in a consulting internship under the direction of a faculty member. The experiences of the interns were strong evidence of developing a researcher’s mindset, of achieving competencies relevant to KM, and of the bridging of their coursework concepts into application in the workplace. Consulting internships are a highly beneficial framework for strengthening information professional education for KM workplace settings, and to support the learning of both hard and soft skills. The calibre of the research developed through the consulting internships furthers the argument for adoption of consulting internships to support existing curriculum.

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The effect of information literacy instruction on lifelong learning readiness

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Abstract

The purpose of the present study is to examine the effect of information literacy skills instruction on the lifelong learning readiness of users in Iranian public libraries. To this end, 30 active users of two libraries were randomly placed in control and experimental groups. Information literacy skills were taught to the experimental group over one and a half months. The results revealed that information literacy instruction led to a significant increase in readiness for self-directed learning and readiness to overcome deterrents to participation. According to the findings, information literacy skills instruction made a significant difference to the information literacy of users in Iranian public libraries. The results of this study encourage public libraries to plan for the implementation of information literacy instruction in order to make public libraries lifelong learning centres.

Keywords

Information literacy instruction, lifelong learning readiness, users, public libraries, Iran

Introduction

Information literacy is widely considered to be an essential survival skill for life in the information age, a vital underpinning to lifelong learning and critical for a thriving democracy (Harding, 2008). One of a librarian's responsibilities is to encourage library users to achieve information literacy so that they may become lifelong learners (Agee, 2005). In order to achieve this, Kingori et al. (2016) and Perry (2014) have identified the need for information literacy instruction in public libraries to foster the lifelong learning of their communities.

As a formal construct, information literacy has received significantly greater attention in the professional literature of academic libraries than that of public libraries, and thus the definitions, standards and frameworks most associated with information come from that body of scholarship. The Association for College and Research Libraries' (2015)

'Framework for information literacy for higher education' and the Society of College, National and University Libraries' (2011) 'Seven pillars of information literacy: Core model for higher education' are two examples of the development of information literacy as a formal construct in academic libraries. In contrast, the public-library professional literature lacks such formal treatment of information literacy.

This standard could be used in public libraries as part of more formalized information literacy education, and it would supply a set of valuable tools for assessing information literacy on an individual basis, if needed, in the more formalized teaching of information literacy (Society of College, National and

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University Libraries, 2011). On the other hand, perhaps the most influential theoretician in the field of information literacy instruction at the school level is Carole Kuhlthau. Kuhlthau's contribution to practice is reflected in what has been called a paradigm shift in the field of user education – from the standard source-based library instruction towards an embedding of skills and source instruction in the learning processes of school or university assignments (Hart, 2006; Kuhlthau, 1988).

Public libraries, as a vital part of the community that supports their users, have a crucial role to play in offering guidance and training in how to search, use and rate the quality of information resources. From community information centres, they can also become learning centres, empowering individuals throughout life, which means that in addition to their popular traditional services provision, public libraries can create new technology-based, value-added services to fulfil information users' needs (Balapanidou, 2015; Garmer, 2014; Nygren, 2014). Therefore, public libraries have an important role to play in supporting the learning process because there is a recognized need for the inclusion of informal elements in learning, flexible learning opportunities and a shift towards self-directed learning (Nielsen and Borlund, 2014).

Royce (1999, p.145) explains lifelong learning as a combination of skills and attitudes that embrace change: 'lifelong learning aims to give students the skills to go on learning throughout life and also positive attitudes toward learning which accept and even welcome change and new learning'. Lifelong learning readiness elements include readiness for self-directed learning, readiness to overcome deterrents to participation and readiness to respond to triggers for learning (Kungu, 2010). Self-directed learning refers to a process where the learner assumes responsibility for planning, implementing and evaluating a learning experience (Brockett, 1985). According to Isarawatana (1995), when learners are searching for the ideas from the beginning with or without seeking help from others to analyse their learning needs they are able to recognize and realize learning resources to select appropriate learning methods and then evaluate the results of such learning. The readiness to overcome deterrents to participation refers to the reasons contributing to a learner's decision not to engage in learning activities (Scanlan, 1986).

According to Valentine and Darkenwald (1990), helping individuals to overcome the forces that prevent them from participating in learning is the most difficult task confronting programme planners. Cross (1981) classified the barriers to participation in learning activities under three headings: situational,

institutional and dispositional. Situational barriers are those reasons that arise from one's situation in life at a given time, such as lack of time, lack of money or lack of transportation. Institutional barriers refer to practices and procedures that discourage individuals from participating in educational activities. Dispositional barriers refer to the attitudes and self-perceptions of learners which may inhibit participation in educational activities or educational attainment. A poor educational background or low grades in the past may engender a lack of interest in learning or low confidence in the ability to learn.

The readiness to respond to triggers for learning refers to an event related to a past, present or anticipated change in the life of an individual where new knowledge or skills are required to deal with it. It is a change in an important area of an individual's life that creates a need to learn. Individuals' engagement in learning is instrumental in nature and characterized by a necessity to learn (Kungu, 2010). It is usually in response to some trigger to learn. Knox and Videbeck (1963) discussed critical changes in life circumstances, such as starting a new job, getting married, moving into a new community and retirement, as being useful in explaining participation in learning. Tough (1979) asserts that learners set out to learn when confronted with decisions of intense personal importance. Examples of such decisions include choosing a career, deciding which university to enter, considering whether or who to marry, selecting a place to live, or planning for retirement. They move people towards learning.

The public library is one type of library in a continuum of libraries concerned with information literacy and lifelong learning. It has a major part to play, not only providing ready-made answers and access to resources, but also taking on an educational role by being actively involved in the knowledge-construction processes of its target community groups in collaboration with other stakeholders (Goldstein, 2020). As Harding (2008) also states, public libraries are regarded as a leading and powerful force, ideally suited to promoting the development of information literacy and encouraging lifelong learning in their communities. Lau (2006) considers information literacy as the first step to achieve educational objectives, and takes it as the main factor in lifelong learning, finding a job and the interpersonal communication of citizens in their daily affairs. Public libraries could be a centre for lifelong learning through the implementation of information literacy (Ganji, 2013).

Public libraries in Iran have a history of nearly 80 years and, over the past two decades, the number of

public libraries has increased. The Iran Public Libraries Foundation is legally responsible for governing the public libraries of Iran based on the Act of Establishment and Administration of Public Libraries, which was approved in 2003. The library area in Iran is 300 square metres per 25,000 people. There are approximately 40,000,000 books and 2.5% of the Iranian population who have access to libraries are members of public libraries. There are 7000 personnel (about 4000 librarians) working in the Iran Public Libraries Foundation. The financial resources of the Iran Public Libraries Foundation are supplied through a special parliamentary budget and 0.5% of the revenues of the municipalities. Currently, there are approximately 3500 public libraries in Iran (Seifi and Soltanabadi, 2019). According to the Iranian public libraries' 2025 vision plan, public libraries are considered to be the local gateway to knowledge, to provide an essential condition for lifelong learning, and to aid the independent decision-making and cultural development of individuals and social groups (Iran Public Libraries Foundation, 2012). Although, according to the vision plan, public libraries in Iran have been acknowledged as valuable providers of lifelong learning development, the lack of infrastructure, information technology skills and human resources is a challenge to information literacy instruction in Iranian public libraries (Tafreshi and Angooraj Taghvai, 2009).

The studies on information literacy skills are divided into several categories. Some have focused on the role of information literacy in academic libraries (e.g. Bidokht and Assareh, 2011; Jardine et al., 2018; Julien et al., 2018; Saunders, 2018; Trembach and Deng, 2018) and some have examined the level of information literacy in Iranian public libraries (e.g. Abdollahi and Jowkar, 2015; Jamali Mahmuei and Alizadeh, 2013; Mahdizadeh, 2010; Mansorian, 2012; Tajdaran et al., 2012). The results of these studies indicate that the information literacy of public library users in Iran is at a low level. On the other hand, there have been some challenges to training in information literacy, such as the lack of an information technology infrastructure, the poor information literacy skills of the librarians in some libraries, the lack of computer literacy and English-language barriers for some users of public libraries. Some of the international studies have investigated information literacy in public libraries (e.g. Harding, 2008; Ireland, 2017; Jacobsen, 2017; Julien and Hoffman, 2008; Kingori et al., 2016; Matteson and Gersch, 2019; Nielsen and Borlund, 2011; Widdowson and Smart, 2013). The results of these studies revealed that some public libraries offered information literacy

instruction and the users of these libraries participated in the programmes offered for their information needs. The professional literature is less well developed, and less is known about how public librarians understand, value and carry out information literacy instruction in their library settings. Some of the studies also pointed to challenges such as a limited budget and the need for the attention of policymakers to be directed at the development of information literacy programmes in public libraries (Lau, 2006; Harding, 2008).

Yet there is a notable lack of literature related to the information literacy training of public library users for lifelong learning readiness, especially in Iran – it might have been assumed that Iranian public libraries are not actively engaged in information literacy efforts. Despite the fact that information literacy instruction is already implemented in some international public libraries, it seems that it has been ignored in Iranian public libraries, and people use Iranian public libraries mostly for reading purposes (Razavi, 2015).

Therefore, attention needs to be directed towards the development and implementation of information literacy programmes in Iranian public libraries, which could be achieved by increasing the awareness of the users, librarians, stakeholders and policymakers of Iranian public libraries. The existing literature primarily focuses on the level of information literacy of users and librarians. There is still a lack of relevant studies on information literacy instruction in public libraries, especially with regard to an examination of the readiness for lifelong learning of users of Iranian public libraries.

Since the role of Iranian public libraries, as one of the infrastructures of the information community, is more in focus, and these libraries are responsible for providing services and information to the whole society (Mirhosseini and Shabani, 2014), it seems that training in information literacy is necessary for the readiness for lifelong learning of the users of Iranian public libraries. The present study therefore seeks to answer the question of whether information literacy skills instruction has any effect on the lifelong learning readiness of Iranian public libraries users.

Methods

The research method was experimental, using a pre-test–post-test design with a control group. Prior to the intervention, both the control group and the experimental group were assessed for information literacy and readiness for lifelong learning. The training programme was conducted with the experimental group

for seven weeks, while the control group did not receive any training. Both groups were then reassessed using the same tests as in the pretest. In addition, the researchers observed the performance of the participants while conducting the instruction and conducted informal interviews with them to measure their levels of information literacy and readiness for lifelong learning.

The study sample included active users of public libraries in South Khorasan Province, from which two accessible libraries were selected based on the approved grade of the Iran Public Libraries Foundation. The participants were active library users, based on Iran's public library rules, who had a membership card for the public library and used the library at least twice per week. A sample of 30 library users was selected from among active users who were secondary high school students and they were placed randomly in the experimental and control groups. The experimental and control groups were homogenized in terms of age groups and educational level. For the purpose of this study, three instruments were used.

Information literacy instruction

For the purpose of instructing the students, the researchers developed and adapted a protocol training model based on the information literacy skills outlined by the Society of College, National and University Libraries and Kuhlthau's (2004) information search process model. The reasons for adapting the Society of College, National and University Libraries' standard were because this has primarily been developed as a tool to support information literacy instruction and measurement, and can be used in public libraries as part of more formalized information literacy education, since it is focused on skills (Bruce, 1997; Webber and Johnston, 2000). Moreover, it measures a range of skills, from basic to advanced. On the other hand, Kuhlthau is perhaps the most influential theoretician in the field of information literacy instruction at the school level (Hart, 2006; Fidel et al., 1999). Therefore, since the study was measuring the information literacy skills (from basic to advanced) of secondary high school students, the researchers adapted and developed an instruction protocol which was suitable for the Iranian public library context. In order to establish the content validity of the protocol, the information literacy skills programme was confirmed by six information literacy experts.

After granting permission of general director of South Khorasan public libraries, seven workshop sessions were conducted. The workshop topics included: basic library skills; recognition of a need for

information skills; information sources skills; skills of Internet searching and knowledge of resources; skills of databases and library searches; search skills of evaluating information and sources; and referencing and ethical skills (Table 1). The content was delivered by the researchers to the experimental group over seven weekly sessions for about one and a half months at Mohammad Ali Karim Pour Library.

Lifelong learning readiness scale

In order to measure lifelong learning readiness, Kungu's (2010) scale was modified and localized based on the Iranian public libraries context. There are various scales which measure lifelong learning, such as those of Knapper and Cropley (2000) and Candy (1991), which measure the attributes of the lifelong learner; Kirby et al. (2010) and Uzunboylu and Hursen (2011), which measure lifelong learning competencies; and Hojat et al. (2006), which measures physicians' orientation towards lifelong learning. Since the present study was measuring lifelong learning readiness, the Kungu (2010) scale was a comprehensive instrument for this purpose. The scale includes three components of readiness: readiness for self-directed learning; readiness to respond to triggers for learning; and readiness to overcome deterrents to participation. Thirty-two items were related to readiness for self-directed learning; 28 to readiness to respond to triggers for learning; and 15 to readiness to overcome deterrents to participation. In order to measure the reliability and validity of the scale, it was administered to a statistical sample of 200 secondary school students (100 females and 100 males). Confirmatory factor analysis was applied for the validity of the questionnaire. The reliability was achieved through a Cronbach's alpha for readiness for self-directed learning of 90%; readiness to respond to triggers for learning of 87%; and readiness to overcome deterrents to participation of 70%. The total reliability was 82%.

Information literacy skills scale

In order to measure the information literacy skills of users in public libraries, Jamali Mahmuei and Alizadeh's (2013) used a scale with a reliability of 0.93%, and its content validity was confirmed through a study of a sample of 255. A reliability of 0.87% was achieved through Cronbach's alpha in the present study. Since Mahmuei and Alizadeh's scale was developed based on the cultural and infrastructural context of Iranian public libraries, and it measured the skills of information literacy from basic to advanced, it fit with this study's purpose and was

Table 1. Protocol of information literacy skills instruction.

Session	Session title	Content to teach	Activities
1	How to start research	Knowledge of information literacy skills Basic library skills	Information literacy skills with practical examples presented by the instructor Basic library skills such as using call numbers, online catalog and etc. taught by the instructor
2	Recognition of a need for information	Knowledge of the topic Knowledge of the information need Applying the skills of information needs	Users identified key concepts and terms of their information need Users asked to define what the topic is about Users asked to describe their topic and formulate discussion group for their topic Users asked to determine the type of information they need
3	Information sources skills	Knowledge of the categories of sources of information Knowledge of the location and access tools Knowledge of the structure of information sources	Demonstration to the users how to identify or choose their information source Demonstration to the users how to identify or describe search tools Introducing to the users how knowledge is generated and organized
4	Skills of Internet search and knowledge of resources	Knowledge of search engines Knowledge of search strategies Knowledge of the Google search engine	Explanation of the concept of search engines and databases Explanation of search strategies Explanation of Google search engine Users asked to find information by google search engine
5	Skills of databases and library search	Knowledge of searching with databases Knowledge of searching the library software	Introduction to SID database (Persian Database) Introduction to Elmnet database (Persian Database) Users asked find book and the related resources from library software called Saman (In-house software) Users given some examples to find their information from databases
6	Search skills of evaluating information and sources	Knowledge of evaluation criteria of information Applying evaluation skills	Explanation and demonstrating to users various evaluation criteria of information sources (reliability, validity, accuracy, authority, timeliness and etc). Explanation to the users why they should know criteria for evaluating information and sources
7	Referencing and ethical skills	Knowledge of ethical and legal issues of using information Bibliographic citation	Explanation of the ethical and legal issues of using information Discussing with the users different laws, regulations and public libraries policies related to the access and use of information Training to users various systems of bibliographic citations Users asked to practice APA citation method

selected for measuring information literacy skills. The pilot for 20 students of library users also had been done.

Findings

There are very few studies that have used an experimental method to measure the effect of information

literacy skills instruction on the readiness for lifelong learning in Iranian public libraries. This study used a pretest–post-test experimental method with a control group. When a researcher intends to intervene and measure the effect of an intervention, this is an appropriate approach. In this study, the experimental group received the intervention (information literacy instruction) and the control group did not receive any

Table 2. Mean of lifelong learning readiness components in pretest and post-test.

Variable	Group	Pretest		Post-test	
		Mean	SD	Mean	SD
Self-directed learning	Experimental	2.26	0.37	3.10	0.30
	Control	2.42	0.35	2.34	0.30
Overcome deterrents to participation	Experimental	2.03	0.45	2.76	0.29
	Control	2.22	0.45	2.26	0.40
Respond to triggers for learning	Experimental	2.25	0.26	2.93	0.33
	Control	2.31	0.36	2.19	0.37
Lifelong learning	Experimental	2.56	0.42	2.60	0.36
	Control	2.34	0.32	2.27	0.28

intervention. Before the intervention, a pretest was taken by both groups, and both groups were then tested after the intervention. The pretests and post-tests were designed to measure the amount of information literacy and lifelong learning of users acquired in the training workshops. To do this, the information literacy skills and lifelong learning readiness of the users were measured using two questionnaires. The mean scores of the users were calculated from their answers to the questionnaires and analysed by the statistical method of analysis of covariance (ANCOVA). ANCOVA is a strong analysis method to measure the level of change in a variable due to an intervention. In this case, it was used to measure the effect of the independent variable (information literacy training) on the dependent variable (readiness for lifelong learning) in order to determine whether the information literacy training was statistically significant or not.

The training workshops were conducted for the experimental group in seven sessions over one and a half months. The results of the study indicated that information literacy instruction had a positive effect on two components of readiness for lifelong learning. The findings of the study are described in this section and then the results will be presented. Table 2 shows the descriptive statistics (mean and standard deviation) of the lifelong learning readiness components of the variables in the pretest and post-test.

Based on Table 2, it can be said that for almost all components of lifelong learning readiness in the post-test, the mean of the experimental group is higher than that of the control group and, secondly, that the mean of the post-test is higher than the pretest. In other words, as the data shows, the experimental group had an increase in the post-test in all components of lifelong learning. This increase was, from highest to lowest, in the components of 'self-directed learning' (0.84), 'overcome deterrents to participation' (0.73) and 'respond to triggers for learning' (0.68).

However, the control group did not increase in two skills and had a slight increase in one skill ('overcome deterrents to participation').

Table 3 indicates that for almost all components of information literacy skills in the post-test, the mean of the experimental group is higher than that of the control group. In other words, the data shows that the experimental group increased from the pretest to the post-test in all information literacy skills.

This increase was, from highest to lowest, in 'production and dissemination of information' (1.84), 'information search' (1.8), 'recognition of information need' (1.77), 'basic user skills' (1.52), 'finding types of information resources' (1.46) and 'ability and guidance of librarians' (0.88). While the control group did not increase in one skill ('recognition of information need'), in the other skills the increase was negligible.

First hypothesis: information literacy skills instruction has a positive effect on readiness for self-directed learning

The ANCOVA results show that there was a significant difference in the mean scores of readiness ($F = 36.92$, $p = 0.000$) between the two groups. In other words, at a reliability level of 95%, information literacy skills instruction is influential on the readiness for self-directed learning.

The modified mean scores (Table 4) also show that readiness for self-directed learning had increased after training. The partial eta-squared value indicates the effect size and should be compared with Cohen's guidelines (0.2 = small effect, 0.5 = moderate effect, 0.8 = large effect). It can be seen that for the experimental group, the effect size is large (0.99). This means that the intervention programme (information literacy training) had been able to increase self-directed learning.

Table 3. Mean of information literacy skills in pretest and post-test.

Variable	Group	Pretest		Post-test	
		Mean	SD	Mean	SD
Recognition of information need	Experimental	2.03	0.75	3.80	0.42
	Control	1.98	0.59	1.77	0.59
Finding types of information resources	Experimental	2.07	0.57	3.53	0.63
	Control	1.73	0.36	1.93	0.47
Information search	Experimental	1.92	0.45	3.72	0.51
	Control	1.42	0.36	1.69	0.58
Production and dissemination of information	Experimental	1.99	0.47	3.83	0.28
	Control	1.36	0.38	1.76	0.51
Basic user skills	Experimental	1.83	0.65	3.35	0.42
	Control	1.65	0.41	1.68	0.58
Ability and guidance of librarians	Experimental	2.62	0.61	3.50	0.56
	Control	2.55	0.61	2.62	0.58

Table 4. Modified mean scores of readiness for self-directed learning of users.

Group	Mean	SD
Experimental	3.05	0.08
Control	2.32	0.08

Second hypothesis: information literacy skills instruction has a positive effect on readiness to overcome deterrents to the participation of users

Based on the ANCOVA outcomes, there was a significant difference in the mean scores of readiness ($F = 9.90$, $p = 0.004$) between the two groups. In other words, at a reliability level of 95%, teaching information literacy skills is influential on the readiness to overcome deterrents to the participation of users.

The modified mean scores (Table 5) also show that readiness to overcome deterrents to the participation of users had increased after training. It is seen that for the group variable, the effect size is large (0.8). This means that the intervention programme (information literacy training) had been effective in improving the readiness to overcome deterrents to participation.

Third hypothesis: information literacy skills instruction has a positive effect on readiness to respond to triggers for learning in users

The ANCOVA was employed and, based on the results, at a reliability level of 95%, teaching information literacy skills is not influential ($F = 0.66$, $p = 0.42$) on readiness to respond to triggers for learning in users. In other words, by training in information literacy skills there was no positive effect on readiness to respond to triggers for learning in users. This means

Table 5. Modified mean scores of readiness to overcome deterrents to participation of users.

Group	Mean	SD
Experimental	2.37	0.09
Control	1.93	0.09

that the information literacy training had not been effective in increasing readiness to respond to triggers for learning in users.

Fourth hypothesis: information literacy skills instruction has a positive effect on the lifelong learning readiness of users

The results showed that, at a reliability level of 95%, training in information literacy skills is not influential ($F = 2.32$, $p = 0.13$) on the lifelong learning readiness of users. This means that the information literacy training had not been able to improve overall lifelong learning readiness. Although two components of readiness for lifelong learning had a positive effect on users' readiness, training in information literacy skills did not increase users' lifelong readiness overall. It can be argued that continuous workshops over a long period of time could be a great help in transforming public libraries into lifelong learning centres.

Fifth hypothesis: information literacy skills instruction has a positive effect on the information literacy of users

The results of the ANCOVA showed that, at a significance level of 0.05, teaching information literacy skills is influential ($p < 0.0001$) on the information literacy components, and the modified mean scores

Table 6. Modified mean scores of information literacy skills of users.

Component	Group	Mean	SD
Recognition of information need	Pretest	1.9	0.15
	Post-test	3.7	0.15
Finding types of information resources	Pretest	1.9	0.18
	Post-test	3.6	0.18
Information search	Pretest	1.61	0.18
	Post-test	3.8	0.18
Production and dissemination of information	Pretest	1.7	0.13
	Post-test	3.8	0.13
Basic user skills	Pretest	1.9	0.16
	Post-test	3.3	0.16
Ability and guidance of librarians	Pretest	2.7	0.18
	Post-test	3.43	0.18

(Table 6) show that the components of information literacy skills increased after training.

In other words, information literacy skills instruction had a positive effect on the information literacy of the users of the public libraries before and after the workshop with the experimental group. It is also observed that the users found the workshops to be helpful and informative for their school activities.

Discussion

The purpose of this study was to investigate the effect of information literacy skills instruction on the life-long learning readiness of users of Iranian public libraries. Based on the objective of the study, information literacy skills instruction was given to an experimental group of secondary school users of Iranian public libraries. The results of the study revealed significant differences before and after the workshops. It should be noted that, for an accurate measurement of the information literacy of the users, while conducting the workshops, informal interviews and observations were also conducted with them, which are presented in the following.

It is observed that the secondary school users of Iranian public libraries found the information literacy instruction useful for their school activities and assignments. For example, one of them said: 'Before the training programme, I did not know librarians could help me in finding information'. It is also observed that, before the instruction programme, the students assumed that a public library was only a place for reading, while after attending the workshops they found public libraries to be very informative places in terms of providing assistance with their school assignments. One user mentioned: 'I had this idea that public libraries are only for reading, but now

I know that for improving my information literacy skills I can always consult the librarians'. Some of the users also mentioned that, before the workshops, they did not even know how to search for a book on a library shelf by themselves.

The literature demonstrates the low level of information literacy among users of Iranian public libraries (Farkhari, 2016; Jamali Mahmoui and Alizadeh, 2013; Mahdizadeh, 2010; Mansorian, 2012). The literature also reveals that, although one of the roles of Iranian public libraries in the 2025 Vision plan is the implementation of information literacy, it is yet to be implemented in some Iranian public libraries.

It can be argued that there is a strong match between the literature and the results of the first hypothesis, which confirmed that information literacy skills instruction had a positive effect on the readiness for self-directed learning of the users. According to Zaersabet et al. (2014), conducting information literacy workshops could be useful for the promotion of readiness for self-directed learning in students. The results of Mozafari Remechahi's (2013) study also indicated that there is a correlation between information literacy skills instruction and self-directed learning on the part of students. As mentioned earlier, the users found that the information literacy skills instruction was useful for their learning activities. For example, one student commented: 'At school we have not received any classes about information literacy skills, whereas by participating in these workshops we were trained in how to search, how to cite and find reliable sources'. It can be concluded that information literacy skills instruction could significantly increase users' readiness for self-directed learning.

The results of this study also revealed that information literacy skills instruction had a positive effect on readiness to overcome deterrents to the participation of users. It can be argued that information literacy skills could create the ability to overcome learning barriers. It is observed that, by conducting information literacy instruction, the users were able to overcome barriers such as a lack of time by learning information literacy skills. Therefore, they were able to complete their school activities in less time. With the benefits of Internet search skills, they could overcome the barrier of distance learning. For example, one of them said: 'My brother left school because of financial problems. After this workshop, I suggested to him to do distance education'. It should be mentioned that, in Iran, some school students have to leave school because of economic problems. By learning web-searching skills, they can participate in distance learning if they have to leave school. It is also observed from the users' experiences during the

workshops that, by improving their information literacy skills, they had a sense of satisfaction. The users also stated that they were happy with the training during the workshops and felt more confident compared with those who had not attended these workshops.

The observations of this study might be related to the results of Lai's (2011) study, which indicated that the public library is a place that supports community education and lifelong learning, and has the capability of providing free access to users and improvement in the information literacy skills of individuals. The results of Nielsen and Borlund's (2011) work also showed that students consider public libraries as an important place for learning, and view librarians as assistants to overcome barriers with regard to homework and assignments.

According to the results of this study, information literacy skills instruction had no effect on readiness to respond to triggers to participation in learning. Based on the definition of readiness to respond to triggers, it refers to an event related to past, present or anticipated changes in the life of an individual where new knowledge or skills are required to deal with it. One of the possible reasons for this result may be to do with the education system in Iran. The teaching method in Iranian schools is memorization method instead of creative thinking. In fact, the education system is only concerned about textbooks and memorizing by students. However, just transferring information is not enough to think critically (Shabani, 1992). Probably, students cannot achieve critical thinking skills in the education system and they may require a considerable amount of time to learn advanced information literacy skills such as critical thinking.

Most of Iran's schools are run by the government, and librarian positions have been removed due to financial problems and teacher shortages. Of course, library schools exist, but the quality of library services is poor and sometimes libraries are even run by students who do not have any library skills. This could be another reason why the students were not able to receive any training in information literacy skills in the past or at present, and the workshops could not affect their readiness to respond to triggers immediately.

Another possibility that may be raised about this finding is that of cultural differences. Readiness to respond to triggers for learning can somehow be rooted in the culture of communities. In some communities, individuals learn to prepare for entry into specific situations, such as a new job, marriage or having a baby, while in other cultures this approach may take different forms (Kungu, 2010). It is likely

that information literacy skills instruction in some cultural contexts may not be able to immediately increase the level of readiness to respond to triggers for learning.

Information literacy skills instruction had no effect on the readiness for lifelong learning of the users in Iranian public libraries. On the other hand, the findings of the study indicated that information literacy skills instruction had a significant effect on two components of lifelong learning readiness. This finding may be influenced by two factors. One possibility is that despite information literacy skills instruction having a significant influence on the two components of readiness for lifelong learning, the degree of significance was not high enough to influence readiness for lifelong learning overall. The other likely reason is the lack of infrastructure of public libraries for conducting continuous information literacy instruction – the lack of Internet access and lack of Internet literacy and computer literacy of library users. It is observed that Karimpour library, where the workshops were conducted, did not have an information centre equipped with computers. The English language was also a barrier which users faced while searching for information from international databases.

It is also observed that, after the training, the users had achieved good skills and an ability to identify their information needs, use information resources, select appropriate keywords for searches, and search and evaluate their search findings. They were able to formulate research questions and search in databases. They were also performing advanced searches in databases. This result also confirmed that information literacy instruction made a significant difference to the information literacy of the users. Therefore, conducting continuous information literacy skills instruction can provide the requirements and conditions to transform Iranian public libraries into lifelong learning centres. The results of Singh and Begum's (2012) study also confirm the benefits of implementing continuous information literacy skills instruction, and Solmaz's (2017) study indicated that with the increasing information literacy skills of students, their lifelong learning readiness is also increasing, although more time may be required to practise and learn.

Limitations

The limitations of this study include the small sample size and population – in the population of the study, a large number of diverse active library users were unavailable, so the researchers only studied secondary high school students. Another limitation of the study

might be the short amount of time that was allowed for conducting the workshops. The measurements of information literacy and readiness for lifelong learning were a further limitation of the study. A qualitative study design would be an accurate measurement, using an experimental study method.

Conclusion

Based on the 2025 vision plan of the Iran Public Libraries Foundation, it is clear that it has embraced the concept of information literacy by incorporating lifelong learning as one of the pillars of the plan. However, information literacy skills are yet to be implemented in Iranian public libraries.

It is important to note that the positive effect of information literacy instruction on two components of lifelong learning readiness is an indication that training can be effective and that there is the need for libraries to provide and implement information literacy instruction. Therefore, public libraries could enhance information literacy levels by increasing the effectiveness of training and sustainable training, or even by using other information literacy instruction models to increase the level of readiness for lifelong learning. We also need to acknowledge that information literacy efforts require time and practise to create the necessary conditions in Iranian public libraries. Achieving an information literacy society requires the attention of policymakers and stakeholders in the implementation and planning of information literacy, and the cooperation of all organizations in this field.

Recommendations

Based on the results of this study, we suggest the following recommendations for the improvement of information literacy instruction for lifelong learning readiness in Iranian public libraries: special attention should be paid to the information technology infrastructure, facilities, equipment, manpower and budget; additional training programmes should be conducted, such as courses in English, computer literacy skills and Internet literacy skills; workshops should be held, offering training in abstracting, indexing skills, and research and writing methods; information literacy instruction should be conducted for public librarians; and similar research should be carried out with a qualitative approach to measure information literacy and lifelong learning readiness.

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Semantic modeling for education of library and information sciences in Iran, based on Soft Systems Methodology

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Abstract

Reviewing the recently published texts in the field of library and information science education indicates some fundamental problems in this pedagogic process. According to different factors dealing with the process, confronting the challenges is considered as complex issues. Therefore, in this research Soft Systems Methodology, an action research method, was chosen to propose a comprehensive model to solve the mentioned problems. Based on the Checkland seven proposed stages, the problem situation was identified, and then it was expressed in the form of a rich picture. Driving root definitions and the CATWOE model were cleared to accomplish the conceptual model. Comparison of the conceptual model to the real world, also proposing feasible and desired changes are the fifth and sixth stages of the research. Finally, taking action to improve the current situation in the field of LIS education finished the procedure. Utilizing the steps of Soft Systems Methodology, this research draws the rich picture illustrating the process of LIS education and its issues dealing with the related ecosystem. Accordingly, the final model consisting of three ontologies was attained. To validate the semantic model, Cohen's kappa coefficient was calculated. The model, approved by high level of expert agreement, not only can be an appropriate solution for the problems involved in library and information science education in Iran, but also can be considered as a pattern for future researches in designation and implementation of a semantic model of education in other disciplines.

Keywords

Adaptive model, educational model based on ontology, library and information science, semantic model of education, semantic pattern of education, Semantic Web technologies, Soft Systems methodologies, Web3 technologies

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Introduction

In the world today, the educational system, particularly higher education, has a direct relationship with the comprehensive development of communities. In

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other words, there is an intimate dependence between the growth and progress of communities on one hand and the growth and advancement of their higher education system on the other hand (Brennan and Shah, 2011).

Therefore, investment in universities and centers of higher education is considered as one of the most important types of long-term investment in different countries. In this regard, the investment for the training of experienced manpower is reckoned in different arenas such as social, cultural, economic, industrial sectors all over the world (Horri, 2006).

Academic education aims to train people who can live wisely in the increasingly changing world. Achieving this goal, universities should focus on teaching-learning strategies (Adali and Silman, 2009).

The available evidence indicates that higher education in Iran has met some problems in designing and executing curriculums. Obviously, to accomplish a learning community and breed lifelong learners, the institution should review its own syllabus and also identify obstacles in order to overcome them now more than ever (Karimi and et al., 2014).

Library and information science (LIS), a domain of higher education in Iran, has faced abundant fluctuations since the beginning of its official foundation in the 1970s until now. Accordingly, its curriculums have been dramatically changed based on necessities or personal interests. Whereas educational programming has several disadvantages and advantages in this field (Horri, 2006: 207), recognizing the weaknesses and finding appropriate solutions will cause the majority to progress.

Problem statement

Information science as a subsystem depends on a more general system, Iran's educational system. Therefore, social, economic, cultural, and political issues of the educational system on a macro-level determine the conditions of subsystems in the micro-level such as information science. The Iranian educational system, even at the higher levels, is still steeped in old-fashioned models and paradigms (Heidari, 2011). The absence of organic relationships among different educational levels and elements and the lack of cohesive programming and dynamic educational systems are noted as other deficiencies of LIS education by Heidari (Heidari, 2011: 17; Radfar, 2011). In addition, the existence of old learning references and resources used by an Information Science department, along with neglecting the (public) services available in the syllabus, is warned against by other experts (Eltemasi and Fahimnia, 2014).

Although the Committee of Library and Information Science – which belongs to the Supreme Council of the Ministry of Science, Research and Technology – made some influential attempts to improve the information science educational system (such as a comprehensive review of the syllabus in 2009 and then 2014), the lack of attention to the design of a systematic framework based on a special philosophy is still considered the main challenge in this domain (Geraei and Heidari, 2016). This study aims to systematically review the relevant resources in information science education and provide a rich picture of the current status in this area. On the other hand, the authentic and updated texts pertaining to educational works were studied to provide an effective model in overcoming the mentioned issues. In this regard, emphasizing the usage of new educational technologies (Amir and Jelas, 2010) and recommending the powerful tool of knowledge organization (Zeng, 2008) – which enables the analysis of knowledge, formulating terms and their relations, reconstructing knowledge, and disseminating and sharing the general understanding of a knowledge structure amongst individuals (Kafashan and Fattahi, 2011) – put forward the terms ontology and Semantic Web. This proposed educational model, benefiting from semantic capabilities, can indicate the key elements of an educational system in an integrated way (Levison et al., 2012). Also, based on metadata, semantic and ontological relations and the power of efficient organization, it can impressively improve the learning process (Jashapara, 2009). Therefore, this research can offer an effective solution to the problems mentioned and improve the process of teaching-learning in LIS on one hand, and introduce a new chapter of educational models based on ontologies in various disciplines of Iran's higher education.

Citing the original texts, the properties of a semantic model of education are considered as the solution to the problems mentioned in Table 1.

Literature review

Literature review of LIS education in Iran

Educational topics and issues related to information sciences have been noticed by researchers since the official establishment of this field in Iranian universities. Most of the researchers have confirmed the necessity of deep changes and reforms in the structure and curriculum of information science education.

The studies conducted by Ganjian (1974) and Ebrami (1975) can be regarded as the first works in this field (Fattahi, 2005). Many researchers (Eltemasi and Fahimnia, 2014; Fattahi, 2000; Hayati, 1999;

Table 1. Problem statement.

Row	Mentioned problem	The problem citation	Property of semantic model to solve the problem	The property citation
1	Absence of organic relationship among different educational elements	When the absence of an organic relationship among different educational elements is considered as a big obstacle for educational efficiency (Heidari, 2011).	Providing adaptive educational systems (i.e. domain, user and context) and representation of various types of knowledge driving the process of adaptive learning, and their interaction when generating the concrete instances of adaptive learning design dynamically (Kravcik and Gasevic, 2010).	Semantic web technologies can improve reusability and interoperability of each model of an adaptive educational system, focusing on pedagogical (instruction or activity) and adaptation models (i.e. procedural knowledge), and other models of adaptive educational systems (i.e. domain, user, and context). Also, Semantic Web provides solution of the current reusability and adaptivity issues, the representation of various types of knowledge driving the process of adaptive learning, and their interaction when generating the concrete instances of adaptive learning design dynamically (Kravcik and Gasevic, 2010).
2	Traditional and old-fashioned models and paradigm.	Educational system of LIS in Iran, even in high levels, is based on traditional and old-fashioned models and paradigms (Heidari, 2011).	Semantic Web and ontologies, are noted pivotal in new paradigm of interoperability and reusability in human-machine accessible systems.	Using human-machine accessible systems which represent educational components and their relations, especially Semantic Web and ontologies, are noted pivotal in a new paradigm of interoperability and reusability of educational resources (Boot et al., 2008).
3	Necessity of deep changes and reforms in the structure and curriculum of Information Science education	Most of the researchers have confirmed the necessity of deep changes and reforms in the structure and curriculum of Information Science education in Iran (Geraei and Heidari, 2016).	Representation of formal knowledge by Semantic Web technologies to facilitate the teaching-learning process in recent educational systems.	Today, many educational theories insist on representation of formal knowledge by Semantic Web technologies to facilitate the teaching-learning process in educational systems (Sicilia et al., 2011).

(continued)

Table 1. (continued)

Row	Mentioned problem	The problem citation	Property of semantic model to solve the problem	The property citation
4	Lack of attention to designing a systematic framework based on a special philosophy are considered as the main challenge in this domain (Geraei and Heidari, 2016)	The lack of attention to designing a systematic framework based on a special philosophy are considered as the main challenge in this domain (Geraei and Heidari, 2016).	A structured framework of educational capabilities including learning scenarios, human elements and pedagogic processes.	An important part of adaptive curriculum in the 21st century is based on Semantic Web technologies specially which provides a structured framework of educational capabilities including learning scenarios, human elements and pedagogic processes (Johnson, 2016).
5	Loss of a comprehensive and clear picture reflecting topics and sub-topics in LIS field	Loss of a comprehensive and clear picture reflecting topics and sub-topics in this field and a presence of general ambiguity in the internal atmosphere of LIS society (Fadaei et al., 2014).	Subject ontologies represent concepts, major and minor topics in scientific disciplines and make relations among them in a structured framework.	Subject ontologies represent concepts, major and minor topics in scientific disciplines and make relations among them in a structured framework by providing knowledge structure (Miranda et al., 2016).
6	Presence of a general ambiguity in the internal atmosphere of LIS society (Fadaei et al., 2014).	There is general ambiguity in the internal atmosphere of Library and Information Science's society (Fadaei et al., 2014)	Presenting educational goals, attitudes, skills, knowledge, experiences and learning activities (Miranda et al., 2016).	One of the major capabilities of ontologies in different systems presenting educational goals, attitudes, skills, knowledge, experiences and learning activities (Miranda et al., 2016).

Heidari, 2011; Kowkabi, 1997; Mokhtari, 2005; Tahavori, 2006) have expressed the emergence of a fundamental alteration in the educational system of information sciences in different languages.

Kowkabi in research titled "A glance at syllabus of Organization of Materials" studied the content of that syllabus for Associate and Bachelor's degrees in LIS. The findings indicated the absence of an updated syllabus, absence of a logical relationship among headlines and inattention to organization of electronic resources (Kowkabi, 1997). Reviewing different periods of information science education in Iran, Hayati (1999) considered an unusual focus on practical aspects, inattention to theoretical principles and lack of research-based attitude as the main problems involved with the field. According to the changing environment and society, Tahavori, in her research, considered a fundamental amendment of educational resources inevitable to train experts compatible with

the alterations. Information technology, Electronic references, Organization of electronic materials, Research methodology in Information Sciences and Principles of Information literacy were proposed as the new syllabi in this field (Tahavori, 2006).

Lack of cohesive programming and a dynamic educational system in the professional society of LIS, neglecting the role of research in the learning-educating process, unnecessary emphasis on memorizing and sovereignty of an old-fashioned paradigm were listed as the key problems of LIS education in Iran (Heidari, 2011).

Geraei and Heidari (2016) proposed the theory of Core Competencies as an ideal model for educational programming in LIS to overcome some serious obstacles, such as: insufficient skills, capabilities and competencies of graduate students; the absence of dynamic programming; and the loss of a comprehensive pattern referring general and specific competencies necessary

for the increasingly changing society of information sciences. In another study, Geraei and his colleagues reviewed resources, surveyed and analyzed a matrix of direct influences to foresee the future of LIS education. They considered the attention on revising the structure of research and education in humanities and social sciences, status of the discipline in public opinion, specialism in educational programming, knowledge-based new job opportunities, and educational improvement of faculty members to be the most influential factors in the future of LIS education (Geraei et al., 2017).

Literature review of semantic technologies (ontologies) in educational, learning systems

A new concept of ontology (beyond philosophy) has emerged since the 1990s in scientific works by Sowa (1992) and Gruber (1993) dealing with various fields including Computer Sciences, Information Sciences, Artificial Intelligence, Linguistics, Knowledge Engineering, NLP, etc. (Hosseini Beheshti, 2014). The study by Stojanovic et al. (2001), titled “eLearning based on the Semantic Web” is considered as the first published work linking the topics related to procedures, elements and systems of education, and learning and teaching to semantic technologies. The results indicated that semantic architecture enhances educational content with formal semantics, which enables better possibilities for navigating through cyberspace and accessing its contents. It is primarily centered on ontology-based descriptions of content and the context and structure of learning materials, and thus provides flexible and personalized access to these learning materials. After issuing the first documents, the appearance of Semantic Web and ontologies in educational domains has increased by the presentation of various articles in national and international conferences, books, theses, and periodicals. According to a large number of works published in this area, this study points to some authentic and recently issued journal articles indexed in key databases (Elsevier, Science Direct, Eric, IEEE). To identify the learning style of learners, propose compatible educational content with them, and design the related curriculum, Vesin et al. (2012) implemented Protus ontology. This entailed the use of ontology and adaptation rules for knowledge representation and inference engines for reasoning to share, reuse, and create knowledge in the process of education. Icoz et al. (2015) introduced student-made ontologies as an influential tool to represent knowledge conceptualizations. Defining key concepts and their relations between each other establishes the backbone of the learning system. The

system guides an individual student through his/her course by evaluating their progress and suggesting instructional material to review based upon their answers. Three main tasks are performed within this framework: building ontologies for the course, measuring a student’s understanding level for the concepts, and making personal suggestions to create an individualized learning environment. The Icoz et al. (2015) paper presents: the integration of ontologies, assisted with student data, together with an intelligent Recommendation Module for the development of an E-learning system; the comparison and correction adaptation of ontology from students’ mind maps; and the assessment of students’ actual weaknesses in comparison to what the Recommendation Module suggests. Romero et al. (2015) concluded that the use of ontologies as tools to guide the generation and the organization and personalization of e-learning content, including e-assessment, has drawn the attention of researchers because ontologies can represent the knowledge of a given domain, and researchers use the ontology to reason about it. This paper presented progress in the development of an ontology network, called AONet, that conceptualizes the e-assessment domain with the aim of supporting the semi-automatic generation of assessment, taking into account not only technical aspects but also pedagogical ones. Miranda et al. (2016) emphasized subject ontologies as a crucial aspect in engineering knowledge-based educational environments to enable the semantic organization and search of resources to support personalization and adaptation features for learning and teaching experiences. The paper focuses on SKOS for storing and accessing in order to support the knowledge sharing, knowledge reusing, planning, assessment and customization processes related to learning scenarios.

Insisting on designing and utilizing learning systems based on the learner’s personality traits, Labib et al. (2017) introduced the learning environment suitable for as many learner models as possible. The researchers concluded that a Learner’s Characteristics Ontology helps instructors to improve and personalize the learning content, can recommend learning materials to learners according to their learning characteristics and content, can provide both instructors and learners with extensive knowledge about how they improve their teaching and learning abilities and can improve communications and interactions between humans and computers by specifying the semantics of the learning style models’ characteristics. While a large number of published research studies about Semantic Web and ontologies in learning and pedagogic systems are found in English works, a

comprehensive search in Persian citation indexes including Irandoc, SID, Ensani and Noormags resulted in fewer relevant studies. Therefore, the lack of exhaustive research in the Persian language in the mentioned field shows the necessity for an influential educational model based on semantic technologies and ontologies.

Methodology

The present study was conducted by means of the Soft Systems Methodology (SSM), which is considered one of the operations research techniques that are classified into two types: hard and soft. The soft operational research, unlike the hard one that is only interested in solving problems, structures them. The soft operational research often uses qualitative, rational, objective, and structured methods to more deeply interpret, define, and explore various perspectives in an institution and its own problems (Mehregan and Hosseinzadeh, 2009). This method has resulted in more negotiation, learning, and understanding of phenomena. The obtained perceptions are used for improving the situations and resolving the complex problems. Given that the issues in LIS education are complex with many involved actors and beneficiaries, it seems that soft methodology could achieve better results. Therefore, by employing SSM, a process is presented that can solve some parts of the problems affecting the educational ecosystem of this field. SSM was, for the first time, provided by Peter Checkland et al. from the University of Lancaster. SSM is a method that leads to learning through research on the problem conditions (Connell, 2001). There are various methods that can be used to perform SSM; however, the basis for using them is always the same. Checkland and Poulter (2006) suggest seven steps for the purpose that form the basis of our study. These steps are:

1. Enter the situation considered problematic;
2. Expressing the problem situation through a rich picture;
3. Formulate root definitions of relevant systems;
4. Deriving conceptual models;
5. Compare models with the real world;
6. Defining changes that are both desirable and feasible;
7. Taking action.

The method for performing SSM

In order to explain the problematic situations, the literature on the education of LIS from the beginning

Table 2. Keywords searched in specialized databases.

Keywords	Databases
Library Science(s), Library and Information Science (s), LIS	Online Database for National Library of Islamic Republic of Iran (for books)
Education, Learning, Pedagogy, Instruction, Teaching	Iran Doc (for theses)
Teaching-learning, Instructional and training process	Magiran, Noormags, Ensani, SID (for article journals)
Information Science(s), Information Studies	

of 1991 to the end of 2018 was reviewed. Obtaining relevant documents, the authors searched in specialized databases the keywords shown in Table 2.

The search results include 31 articles, 5 theses and 11 books. Then, core and recently updated documents were selected as the main sources (6 articles, 1 thesis and 3 books) to indicate the real scene of LIS education by covering the other resources' main topics. The problematic situations obtained from the core documents were affirmed as the fundamental problems in the field of Iranian LIS education by LIS professionals including seven professors and three PhD students from Tehran, Tarbiat Modares, and Shahed University.

In the second step, by using the general model of education (Gage and Berliner, 1998), an illustration of the educational ecosystem was drawn to present the status quo.

The third step was dedicated to extract root definitions in the literature and recognize the CATWOE components for beneficiaries of the educational system. In the fourth step, a conceptual model was prepared as a corrective model, then five experts in LIS judged it, and the validity of the obtained model was evaluated by the kappa test of agreement. In the fifth step, the conceptual model was compared with real-world situations, and favorable changes were recognized (the sixth step), and in the last step, some necessary recommendations were presented for implementation of the proposed model.

Findings

Step 1. Enter the situation considered problematic

The main objective of this research is to introduce and design a new educational model in the field of LIS in order to overcome major issues affecting education for the science in Iran. The major issues were taken

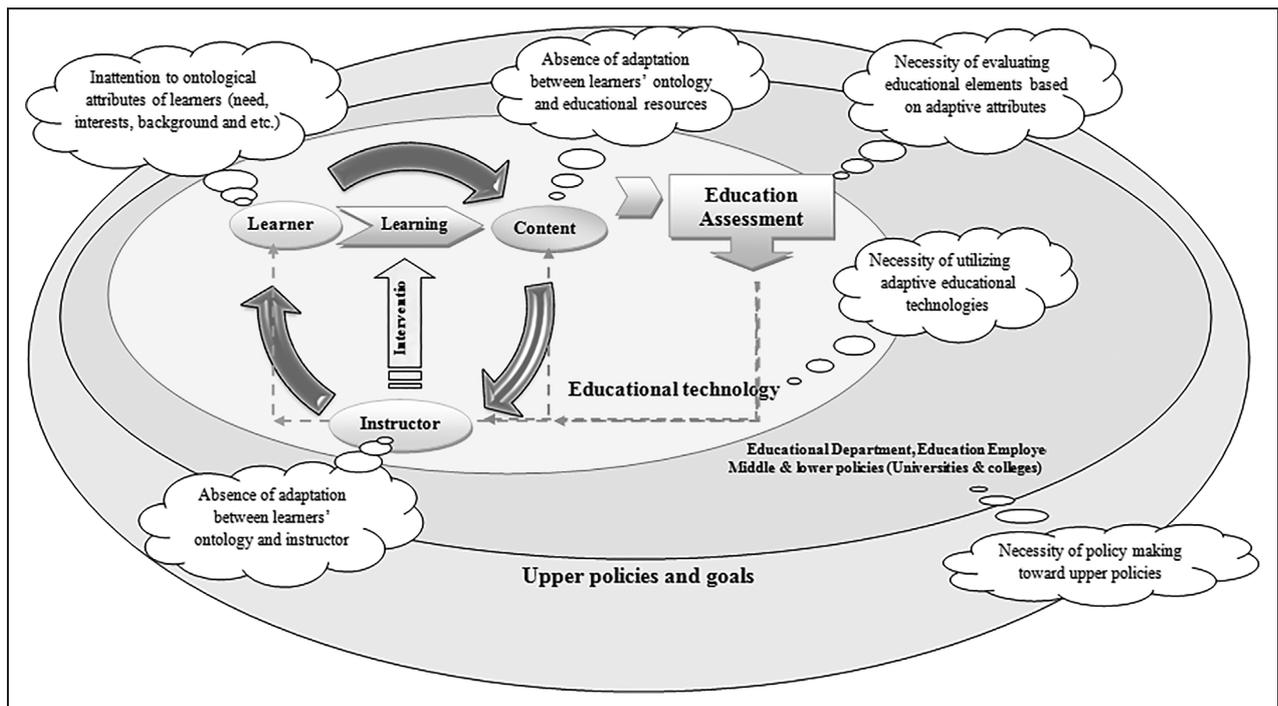


Figure 1. The rich picture illustrating the current situation.

from the specialized and recent literature of the discipline, including:

- the absence of an organic relationship among different educational elements, sovereignty of old-fashioned models and paradigms, lack of cohesive programming and a dynamic educational system (Heidari, 2011);
- the loss of comprehensive and clear picture reflecting topics and sub-topics in this field and a presence of general ambiguity in the internal atmosphere of LIS society (Fadaei et al., 2014);
- the existence of old learning references and resources used by the Information Science departments along with neglecting the (public) services available in the syllabus (Eltemasi and Fahimnia, 2014);
- the lack of attention to designing a systematic framework based on a special philosophy are considered as the main challenge in this domain (Geraei and Heidari, 2016).

Step 2. Expressing the problem situation through a rich picture

In order to present an illustration of the situations and problems existing in LIS education, some credible databases in Persian, including Magiran ‘SID ‘Noormags and Ensani.ir, were explored. We refined

the results of the performed searches based on their relevance to the research problem, and chose the credible literature (scientific-research articles) as the base. Using the general educational model of Gage and Berlinger (1998), the obtained picture was prepared, then judged by five national experts in the LIS field. The result was obtained as an illustration of the status quo, as shown in Figure 1.

Step 3. Formulate root definitions of relevant systems

To help ensure that a draft root definition is acceptable, Checkland developed the CATWOE model where:

C: The Customer. The individual(s) who receive the output from the transformation (The output of the transformation may be negative for some customers and positive for others).

Students (Learners): All students studying LIS (BA, MA or PhD level) in different Iranian universities.

Professors (Instructors): All instructors teaching various syllabuses of LIS in different Iranian universities.

Educational departments: All LIS departments which play a specialized role in the common academic system of Iran.

Colleges: All colleges containing different departments like LIS playing a role at a lower level in the common academic system of Iran.

Universities: All universities containing the above-mentioned colleges acting as a middle level in the common academic system of Iran.

Custodian of education: The parent organization of higher education in Iran which acts as the upper level in the common academic system of Iran.

A: The Actors. Those individuals who would do the activities of the transformation if the system were made real.

Students (Learners), Professors (Instructors), Educational departments, Colleges, Universities and Custodian of education.

T: Transformation. The purposeful activity expressed as a transformation of input to output.

The learners enter into the learning cycle and stream by interacting with the educational ecosystem, and acquire the expected capabilities.

W: Weltanschauung. A German word that literally means “world view”. It is the belief that makes sense of the root definition.

The enhancement of the educational ecosystem, in a way that the beneficiaries adequately express their satisfaction with the ecosystem, and the quality of the education could be improved.

O: Owner. The wider system decision maker who is concerned with the performance of the system.

Professors (Instructors), Educational departments, Colleges, Universities and Custodian of education.

E: Environmental Constraints. The key constraints outside the system boundary which are significant to the system.

As shown in Table 3, key constraints pertaining to every beneficiary of the system are especially considered. The CATWOE components for beneficiaries are shown in Table 3.

Given the CATWOE components, the root definitions were derived as follows:

Education. It is the process of acquiring or improving knowledge, academic skills (psychology), and attitudes needed for performing an action or a task, through which learners can perform their tasks with a higher performance and effectiveness now and in the future.

Educational technology. It includes a variety of means and tools than are used to improve the quality of learning and the educational process. It is often considered as the communication channel between the three pillars of education, which are learners, educators and the content.

Educational content. It refers to the set of curriculum and related educational resources developed,

proposed by the planning committee of the Ministry of Science, Research, and Technology, and it is considered as the basis for the curriculum in educational centers.

Ultimate training objectives. The macro- objectives that indicate the intents and purposes of the educational system of a society. They include objectives related to beliefs, ethics, science, education, culture, art, society, politics, military, economics, biology, etc.

Educational objectives. The educational objectives that are defined according to ultimate objectives of an educational system can be classified into three levels:

1. Major objectives: Objectives that indicate the scope of the considered educational content.
2. Minor objectives: Objectives that are explicit and clear, and which can achieve to a major objective by achieving all of its related minor objectives (they are usually developed in the cognitive scope).
3. Behavioral objectives: Objectives that develop the “behavior” or action, which is expected from learners into a visible or measurable action.

Educational hierarchy

A. Higher education custodian. The institution in charge of policy setting, ultimate objective setting, and explaining the major policy of the higher education area, which is responsible for guiding and supervising the pillars and institutions of this area.

B. Universities and higher education institutions. The intermediate link between the major policy-setting institution in the higher education system and specialized colleges, which is the executor of major objectives, on one level, and the intermediate target setter for its subordinate colleges, on the other level.

C. Colleges. They are centers that execute the education in several scientific-academic fields, and they are responsible for planning, setting minor objectives, and education operation in line with ultimate and intermediate objectives and policies.

D. Educational departments. They are the specialized planner, policy-setter and goal-setter and also the main executor of education in scientific-academic fields, and they play roles within major, intermediate, and minor objectives and policies.

Educators. They are faculty members as well as visiting and contractual educators, who are selected, at the

Table 3. CATWOE components of the educational system.

CATWOE	Component title			
	Educator	Learner	Educational Department	College
A	Learner, educational content, educational department, college, university, Custodian of education	Educator, educational content, educational department, college, university, Custodian of education	College, university, Custodian of education	University, Custodian of education
T	He/She teaches some of the topics determined by the department and changes them based on its preferences. Moreover, performs the educational assessment of learners.	He/She receives the curriculum from the department, and enrolls in it in order to participate in the provided educational opportunity. Also, performs the sectional assessment of educators.	It is responsible for planning, policy setting, and explaining specialized objectives in line with the educational hierarchy and based on the preferences of educators, time schedules, and topics specified by the planning committee of the Ministry of Science, Research and Technology.	It is responsible for planning, policy setting, and explaining minor educational objectives in line with the educational hierarchy and based on the preferences of the educational group, time schedules, and limitations of the educational space.
W	The educational content and also learners should have the most coordination with preferences and teaching styles of educators, in order to realize the maximum educational quality.	The educational content should have the most consistency with the needs, interests, and learning styles of learners, and should be performed in the shortest period with the highest quality.	Planning, policy setting and explaining the specialized objectives should be fully in line with the educational hierarchy (ultimate objectives) and should lead to the satisfaction of learners, educators and educational groups with them, with the least objections, and provide the highest quality.	Planning, policy setting and explaining the minor objectives should be fully in line with the educational hierarchy (ultimate objectives) and should lead to the satisfaction of educators, learners and superior objectives and finally educational elements
O	Educational Department, College	Educational Department, College	Department	University
E	Despite some spatial limitations, the existing educational facilities and technologies organize their teaching processes. - Sometimes, it is confronted with students with different learning styles, educational needs and preferences. - No comprehensive system of ontological characteristics (the educator ontology) has been envisaged and developed for them.	No comprehensive system has been envisaged and developed for them to assess educational talents, needs, and interests (the learner ontology). The limitations of space and educational technologies can interfere in the learning process of learners. Some topics are provided only by specific educators.	There are some possible resistances to some educational innovations in superior and lower levels. The paradigm governing the field, creates some hurdles for specialized planning. There are some limitations in the compliance of educators' expertise with certain educational topics.	The coordination of budget, educational facilities and space, on one hand, and educational groups, on the other hand, is a complex and difficult process. The probable inconsistency of time horizons in the policy setting hierarchy and in explaining objectives can interfere in the process.

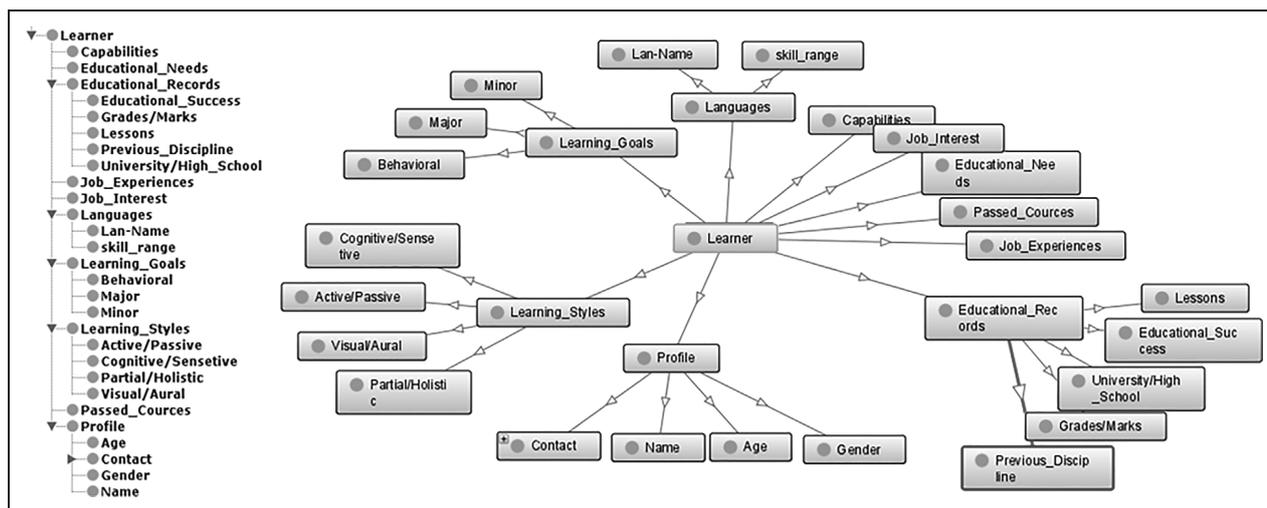


Figure 2. The learner ontology.

discretion of the head of the department, to provide one or more educational topics in different educational levels. Each educator has his/her own ontological characteristics, and the enhancement of the educational quality is expected based on their accordance with the characteristics of learners.

Learners. Students who are studying (whether in the beginning or close to the end) and are considered as the target and key elements in the educational process. Thus, identifying the identities and ontological characteristics of learners as the target of the educational cycle, for every micro or macro educational system, is of particular importance, and their ontology is considered as the most central element in planning.

Ontological components. They are indicators based on features, interests, and fundamental needs of educators and learners that form their professional identity in the learning-educating process, and are displayed in the form of concepts, features, and relationships.

Ontology. It is a set of represented elements that model a knowledge field or an academic field, and utilizes concepts, features, and relationships in order to integrate heterogeneous systems, the interactivity among separate systems, and the semantic representation (Liu and Ozsu, 2008).

Step 4. Deriving conceptual models

At this point, the root definitions are presented in the form of conceptual models, where the focus is on the process of converting inputs into outputs. This model includes actions that ultimately need to be logically linked together (Checkland and Poulter, 2006). Therefore, at first, three conceptual models are presented

and the fourth model is presented as the result and the aggregation of the four previous models. Reviewing the recently implemented ontological models, the authors chose the most adaptive ones with the root definitions of Iranian LIS education to be used as the pattern for a proposed alternative model called the conceptual model. Accordingly, in this step, the beneficial ontological models implemented by experts in the real environment were distinguished as the best choice to improve the current conditions of LIS education in Iran.

A. The conceptual model based on the learner ontology.

This model is designed and suggested based on the learner (or student) ontology, adapted from the smart learning environment model of Oufa et al. (2017). The researcher has implemented the learner ontology using the software Protégé 4.3 and the language OWL 2.0 based on the mentioned model (Figure 2).

The systematic searches made by the researcher in articles indexed in databases of (Elsevier, Science Direct, Eric, IEEE), showed that the model of Oufa et al. (2017) is considered as one of the most comprehensive models proposed for the learner ontology system. Thus, the implemented ontology was used as the basis for introducing the first conceptual model (Figure 3).

B. The conceptual model based on the educator ontology.

This model is designed and suggested based on the educator (or teacher) ontology, adapted from the semantic framework of Miranda et al. (2016). The software Protégé 4.3 and the language OWL 2.0 was used as the basis for implementing the mentioned model (Figure 4).

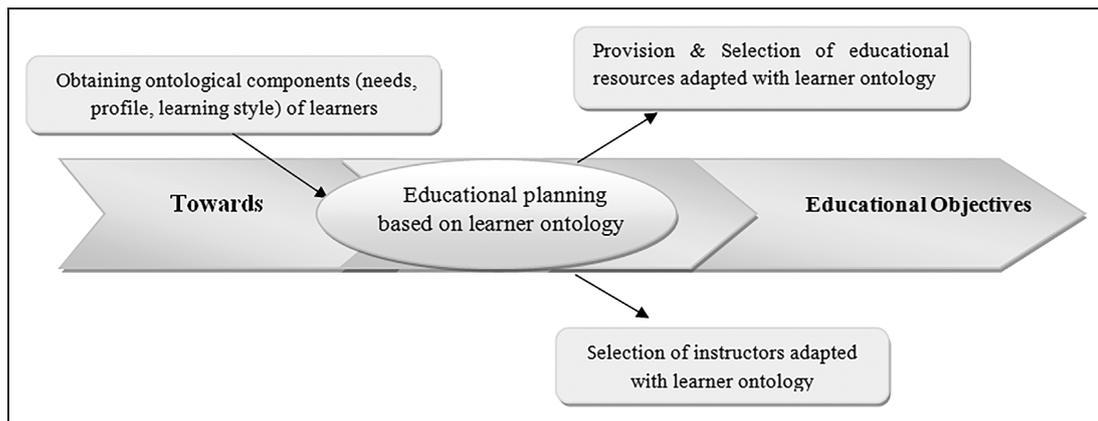


Figure 3. The conceptual model based on the learner ontology.

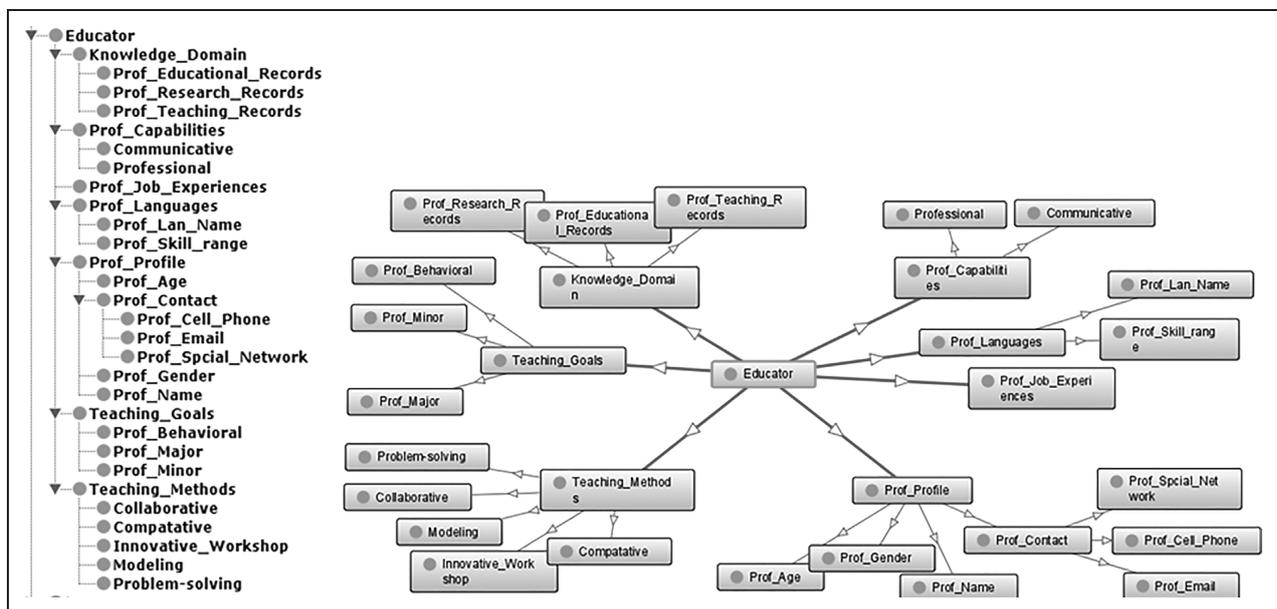


Figure 4. The educator (professor) ontology.

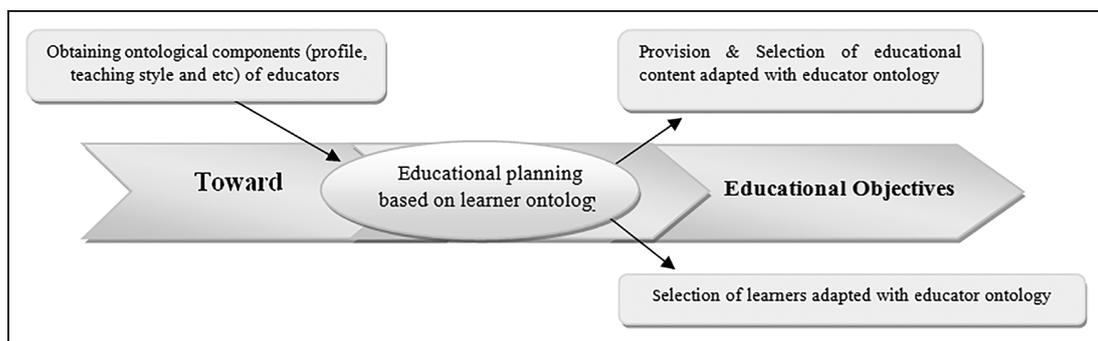


Figure 5. The conceptual model based on the educator ontology.

The systematic searches made by the researcher in articles indexed in databases of (Elsevier, Science Direct, Eric, IEEE), showed that the model of Miranda et al. (2016) is considered as one of the most

comprehensive models proposed for the educator ontology system. Thus, the implemented ontology was used as the basis for introducing the second conceptual model (Figure 5).

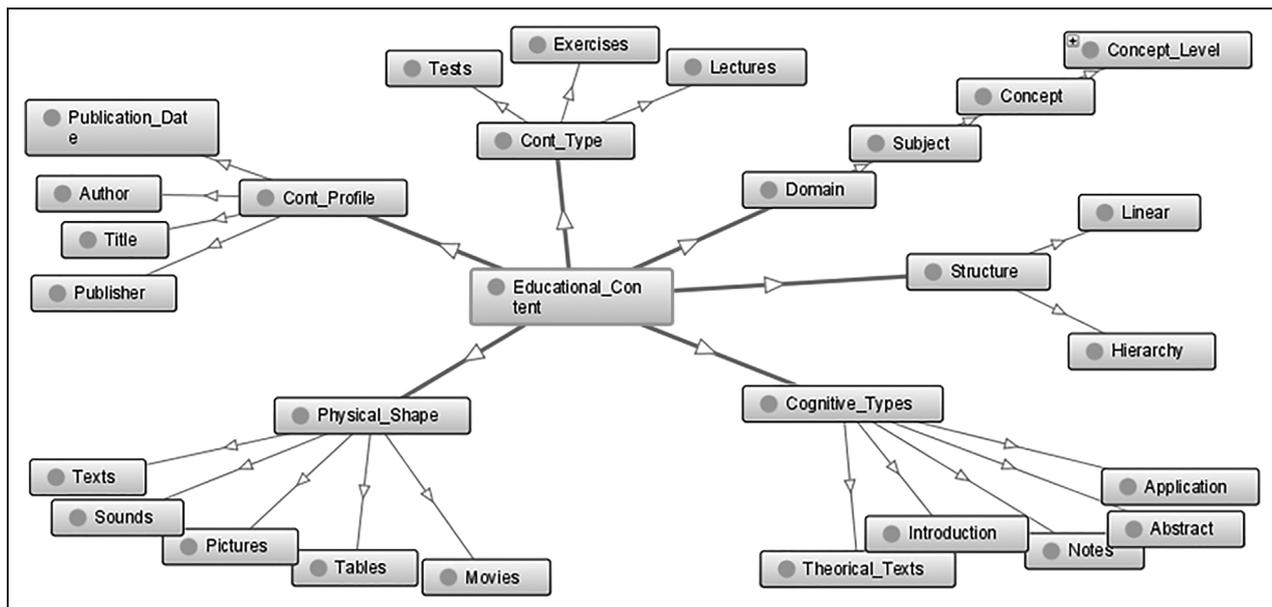


Figure 6. The educational content ontology.

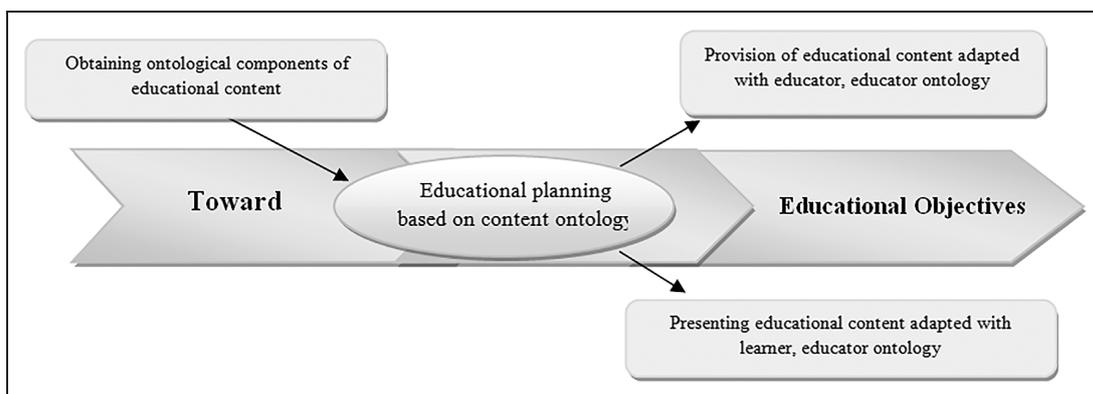


Figure 7. The conceptual model based on the content ontology.

C. The conceptual model based on the content ontology. This model is designed and suggested based on the content ontology, adapted from the ontological model of educational content done by Poulakakis et al. (2017). The mentioned model was implemented by using the software Protégé 4.3 and the language OWL 2.0 (Figure 6).

The systematic searches made by the researcher in original articles indexed in databases (Elsevier, Science Direct, Eric, IEEE), showed that the semantic framework of Poulakakis et al. (2017) is considered as one of the most comprehensive models proposed for the content ontology system. Thus, the implemented ontology was used as the basis for introducing the second conceptual model (Figure 7).

D. The conceptual model based on the meta-ontology of education. This model was explained based on the meta-ontology of education, obtained by mapping the

domain ontologies (learner, educator and content) in the framework proposed by Luna et al. (2015) (Figure 8).

Similar to the previous steps, the software Protégé 4.3 and the language OWL 2.0 was used as the basis of the meta-ontology of education (Figure 9).

Thus, the implemented ontology was used as the basis for introducing the accumulative conceptual model (Figure 10).

Obviously, the obtained model has a relative validity, because it is based on the previous studies and is accurate in examining the content of the references. However, in order to ensure the accuracy of the components of the obtained model, and bring it close to the scientific and fundamental perspective, we concluded that we should validate it separately. In the present study, in order to validate the model, a survey from five experts in the field of LIS education in Iran was conducted using the kappa method. In the

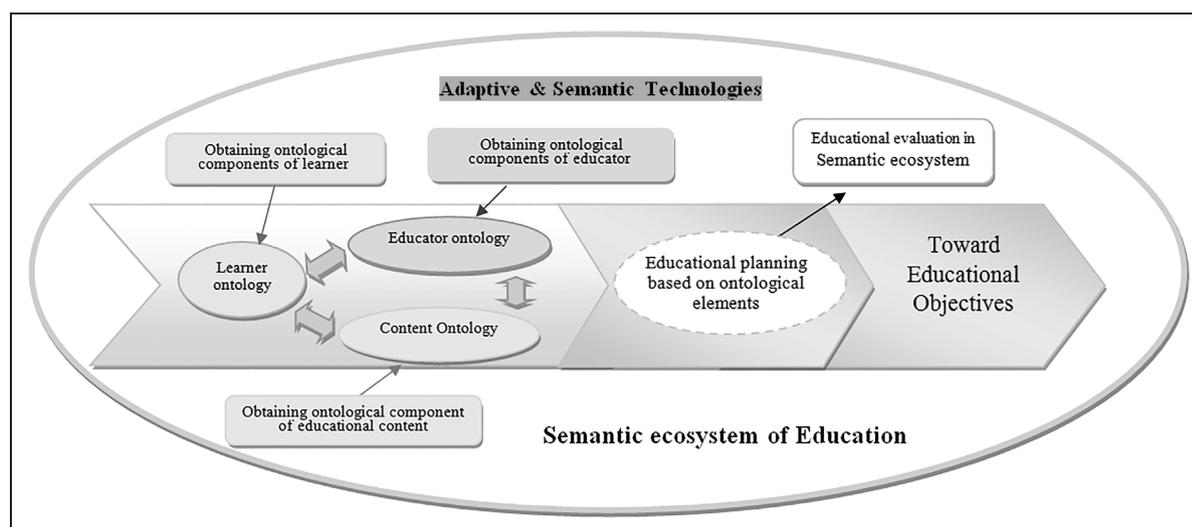


Figure 10. The accumulative conceptual model (The final model).

Table 4. Results of the kappa probabilistic test.

Items				The calculated alignment		
Valid		Missing		Measurement of agreement	standard error	Sig
Count	Percent	Count	Percent			
78	100	0	0	0.926	0.035	000

(the conceptual model) with the process that is currently happening in the education field, in this stage workflow diagrams were used. See Table 5.

Step 6. Defining changes that are both desirable and feasible

This step includes the systematic determination of the appropriate changes, which are also possible culturally. Both the desirability and the feasibility were taken into account in adjusting the changes, which are as follows:

1. Acquiring the motivation and the idea of changes, and optimizing the educational system of the field;
2. Establishing coordination among the stakeholders in the field of education;
3. Providing forms, questionnaires and tests to learners in the early stages of entrance into the educational cycle (determination of ontological features of learners);
4. Determination of the ontological features of educators with questionnaires, interviews and surveys;
5. Monitoring the ontological features of the educational content;

6. Providing Semantic Web technologies;
7. Designing the semantic model of education in the zero phase;
8. Implementing and executing the semantic educational model;
9. Evaluation and receiving the feedbacks.

Step 7. Taking action

Based on the nine mentioned steps, the changes needed to improve the educational system for LIS were explained. However, according to the fundamental nature of the reforms, the usage of, and benefits from, its results will be visible and measurable in the long term. In this regard, the final model was suggested to the Educational Department of Library and Information Science in the University of Tehran as the optimal model, and it received a warm welcome. Since the SSM is considered as a soft operations research method, the principles and assumptions governing it are also true in this regard. The uniqueness of the designed model is a feature of this method. Therefore, the results of the model are somewhat limited to the institution under study, and generalization of it to similar organizations requires local situations and the agreement of the organizational beneficiaries.

Table 5. Comparison of the conceptual model with the real-world situation.

The educational cycle	The current situation	The proposed model
The manner in which the learners enter into the field	Learners enter into fields based on their levels and ranks in the national entrance examination.	Based on the nature of the field, the group and the department, the primary criteria for the entrance of learners are announced to the National Organization for Educational Testing.
The beginning of the entrance of learners in the educational process	The educational certificates and the identity documents of learners are received, and they understand the criteria and programs.	In addition to the initial acceptance, the educational needs, interests, experiences, learning styles, etc. of learners are developed in the form of tests or specialized interviews and the learner ontology
Development of the curriculum for each discipline	The planning committee of the Ministry of Science, Research and Technology, consisting of the outstanding educators of each field, is responsible for developing the curriculum every 5 years.	By preparing the map of the learner, educator and content ontologies, we can help the committee in adopting best educational topics.
Determination of educators of topic	Based on the timing blocks of educators, the determined curriculum and the class limitation, the educators of each course are determined.	Research preferences, teaching experiences, teaching styles, etc. of educators are determined, the curriculum is adapted with the educator ontology and potential educators are determined.
Selection of the educational content	Mainly, the educators of each topic choose the educational content based on their preferences and the references proposed by the planning committee of the Ministry of Science, Research and Technology.	The ontological features of the existing educational content are determined, and the selection is performed based on the learner ontology and the educator ontology, and the hierarchy of educational objectives.
Choosing the provided courses and their respective educators by the learner	Usually, it is done without an adequate understanding of the educators.	Learners, by knowing the educator ontology, will be able to consciously select educators and the corresponding courses.
Education technologies	It is done based on the common and adaptive methods.	It is done using the Semantic Web technologies (ontologies) that are adaptive between educational elements.
Educational assessment of learner	Generally, it is done based on the preferences of educators.	By obtaining the learner and content ontologies along with adaptive educational technologies, the quality assessment would be possible.
Assessment of the educational system	Often, it is not done in a systematic way, and the systematic monitoring of deviations of the educational process from the objectives is not possible.	Semantic Web technologies would enable the educational system to realize the systematic monitoring of itself in an updated manner.

Discussion and conclusions

Undoubtedly, the issues of the field of education are multi-faceted, complex and interdisciplinary. Therefore, providing a model that can be a comprehensive solution for the existing challenges and difficulties seems significantly simplistic. Taking into account the point and applying the SSM method, the present study attempts to explain the issues governing LIS education based on the specialized literature of this

field, and it seeks to resolve some of the mentioned hurdles by presenting a corrective model derived from updated educational experiences and by validating it using experts' opinions. The kind of issues affecting the education of this field in recent literature (including Eltemasi and Fahimnia, 2014; Fadaei et al., 2014; Geraei and Heidari, 2016; Heidari, 2011) which have been authored from a pathologic viewpoint, implies the necessity of a fundamental change in the approach

to the field. Thus, the integration of issues of organization, representation and knowledge management with new issues of education and training, the transition from the current model to a model based on a new paradigm that affects various aspects of the educational process, from educational technologies to learners and educators, and realizes the adaptability of the elements involved in the educational system, made the education accessible in a semantic model.

The literature showed that attention to the importance of the semantic model in different generations of the educational system has not only decreased after one decade of its prevalence, but we see an increase in original studies and also the more extensive interest of researchers in this field. Ontologies and semantic technologies will play the key role in the future of learning environments by realizing the adaptive system of education and creating semantic relationships (Torre, 2009). The fact that there is only one work on this model in LIS (Fernandez-Breis et al., 2009) and the necessity of more attention to the semantic models of education on the part of the experts of this field, makes this research one of the first research works to model this generation in the educational system of Iran, at the macro level, and in LIS, at the micro level. In this regard, in order to overcome the issues of the field of education in LIS in Iran, which have been mentioned in recent literature, we carefully studied the usage of the semantic model of education, which is designed based on the Semantic Web and ontologies, based on the studies conducted on efficient educational models in other educational systems. As Trilling and Fadel (2009) see certain and inevitable the need to change the approach, from the previous model of learning to the new paradigm of learning based on learner participation and benefiting from new information and communication technologies, especially the Semantic Web, in order to achieve life-long learning, this paradigm shift can be an effective response to the issue that the educational system of Iran, even at the highest levels of education, is based on traditional and old paradigms of education (Heidari, 2011). Although Heidari considers the lack of an organic connection between different levels of education and the lack of a coherent planning and a dynamic educational system as other characteristics of the current educational system in information science in Iran (p. 17), Kravcik and Gasevic (2010) consider the coordination and the establishment of an organic connection between various aspects and elements of the educational system as advantages of the ontology-based system. In addition, Miranda et al. (2016) consider the representation of the main concepts and issues and sub-issues related to the

educational content and the delivering of educational objectives, attitudes, skills, knowledge, experiences and learning activities as the key roles of the semantic educational system. Therefore, the semantic system can beneficially solve the lack of a clear picture of scientific activities, issues and sub-issues of the field, and the ambiguity in the internal space of the community of library and information science mentioned by Fadaei et al. (2014) as the fundamental problems.

And in response to the pathology of Geraei and Heidari (2016), which considers the lack of sufficient attention to the design and development of a systematic framework based on a specific philosophy for the education of this field in Iran as the other shortcomings, the findings of Johnson (2016) regarding the function of the ontological system, suggesting the providing of a systematic framework from educational system capacities and the emphasis of many educational theories on representation of the formal knowledge of this field using Semantic Web technologies (Sicilia et al., 2011), more than before confirms the strategy of the semantic system of education to resolve the existing hurdles in the field of LIS. It should be explained that the entrance of the semantic system of education into the field of LIS has additional advantages that will benefit the existing academic system of education beyond resolving the existing problems. For example, benefiting from the ontology enables the establishment of a semantic connection between various components of the learning ecosystem, including the characteristics and the learning styles of learners, the teaching methods and techniques, and the educational content and resources, and through them, facilitates the effective learning and improves the quality of learning (Oufa et al., 2017). Moreover, providing multilevel learning, coordinating various aspects of the adaptive educational system, increasing the interoperability of different and inhomogeneous systems, automatic processing of knowledge, establishing a relationship between various personalized knowledge, realizing adaptable learning processes, extracting semantic knowledge from unstructured texts, and creating Semantic Web standards are among other features of semantic models in academic education (Warren, 2006). The systematic control of elements in the proposed model means that the adaptation of main concepts with each other through the corresponding components and sub-components is measured in both intelligent and semi-intelligent manners (Kravcik and Gasevic, 2010), and by changing each sector, the necessary changes are taking place in other sectors. Thus, the automatic and semi-automatic updating is another advantage of this model, and the inadaptive and

non-updated element is identified as disruptive to the system and is corrected. Therefore, the curriculum and educational content that are inconsistent with educational objectives, the learners' needs and the professional environment (Eltemasi and Fahimnia, 2014) are replaced with the most appropriate content and resources, and at the same time, the existing gaps in the educational content are identified.

Regarding the mentioned points, the obtained model is not only capable of being used in a specific field of knowledge and educational system but is also capable of being used and localized in various organizations, institutions, and fields that are related to learning and education. This is why Wang et al. (2014) argue that future generations of educational systems and sub-systems will be the same as educational frameworks based on the Semantic Web and smart frameworks. Given the importance of the issue of the semantic system and Semantic Web technologies in education, we can consider the present study as a pioneering work (at least in Persian) and use its results in the related fields. As the research findings indicate, the applied studies to normalize and standardize the mentioned model and also to create an effective tool for analyzing the educational process can be a future research subject for researchers in this field. Given the high efficiency of SSM in dealing with real-world complex problems, compared to hard operations research methodologies, the method used in this research is suggested for the education of other groups and departments of the University of Tehran.

Declaration of Conflicting Interests

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Abstracts

قتطفات

Designing a mentoring program for faculty librarians

تصميم برنامج إرشادي لأمناء مكتبات الجامعة
إبرلا بي هاينز ، جوديث نيكسون

مجلة الإفلا ، 3-46

الملخص: تصف هذه المقالة برنامج الإرشاد الإلزامي المشترك لمكتبات جامعة بوردو. وقد أجريت دراسات استقصائية شملت جميع أمناء المكتبات الجامعية في الجامعة، كما أجريت مقابلات متابعة منتقاة. ويقدم البرنامج الدعم لجميع أمناء المكتبات في الجامعات، ويتميز البرنامج عن غيره من برامج الإرشاد في أنه يستند إلى روح الفريق، بما في ذلك المشرف، كما يقدم المشورة بشأن الترقبات. وتأخذ لجان المراجعة بالكلية في الحسبان استعراضات الأداء التي يقدمها البرنامج عند التقدم لنيل الترقية، ويضطلع البرنامج بمسؤولية إعداد الاستعراضات والتقييمات السنوية كتابية، وأيضاً تمثيل المرشح في استعراض التعيين والترقية. وقد أثبت البرنامج فعالية كبيرة في مكتبات جامعة بوردو، وأصبح نموذجاً فريداً. كما تجري مقارنته بأربعة برامج أخرى للإرشاد المشترك في رابطة المكتبات البحثية (ARL) التي تستخدم دراسات استقصائية ومقابلات متابعة.

Transformational and transactional leadership and knowledge sharing in Nigerian University libraries

القيادة التحويلية والقيادة التفاعلية وتبادل المعارف في مكتبات الجامعة النيجيرية

سيبريان إيفيني أوغو، أوميو بوسيري، مادلين سي فومباد

مجلة الإفلا ، 3-46

الملخص: تهدف هذه الدراسة إلى تقصي أثر أساليب القيادة التحويلية والقيادة التفاعلية على ممارسات أمناء المكتبات المتعلقة بتبادل المعارف. واستخدمت الدراسة النهج الكمي والاستبيانات كأداة رئيسية لجمع البيانات. تم جمع البيانات من 216 أمين مكتبة في مختلف مكتبات الجامعات الخاصة والعامة والاتحادية في نيجيريا وتحليلها باستخدام تقنيات الانحدار المتعدد، واختبار Turkey للدلالة الصادقة (HSD). وأظهرت النتائج أن للقيادة التحويلية أثر أكبر على تبادل المعارف بالمقارنة مع أساليب القيادة التفاعلية. وبهذا، تبرهن

هذه الدراسة عملياً على أن أسلوب القيادة يُعد أحد العوامل التي تؤثر على تبادل المعارف في بيئة المكتبات.

Knowledge management and innovation: Two explicit intentions pursued by Spanish university libraries

إدارة المعرفة والابتكار: توجهان واضحان لمكتبات الجامعات الإسبانية

آنا ريبس باسيوس

مجلة الإفلا ، 3-46

الملخص: يحلل هذا المقال محتوى ثلاثة أنواع من بيانات المؤسسات (الرسالة والرؤية والقيم) المنشورة على مواقع مكتبات الجامعات الإسبانية. والهدف من ذلك هو تحديد ما إذا كانت هذه البيانات تعبر عن دعمها الصريح لإدارة المعرفة والابتكار في الجامعة. وأظهر التحليل أن 75 في المائة من المؤسسات (76 مؤسسة) نشرت بياناً واحداً على الأقل من هذا القبيل. وكان أكثرها انتشاراً هو بيان المهمة، حيث ورد مصطلح "المعرفة" أو "الابتكار" في 37 بيان مهمة، لا سيما المصطلح الأول الذي ظهر في 33 بياناً منها. وأشار سبعة عشر بياناً لرؤية للمكتبات إلى كليهما، بنفس النسبة تقريباً. وظهر مصطلح "الابتكار" في جميع بيانات القيم، للمكتبات الثمانية والعشرين مما يدل على المنزلة الرفيعة التي يتمتع به أمناء المكتبات الجامعية. تمثل هذه البيانات دليلاً على أن المكتبات تعتبر الابتكار وبعض مراحل إدارة المعرفة أهدافاً أولية مع تعزيز تكوين / إحداث المعرفة أكثر ما يتم الاستشهاد به.

National and international trends in library and information science research: A comparative review of the literature

اتجاهات بحوث علوم المكتبات والمعلومات على الصعيدين الوطني والدولي: استعراض مقارن للمؤلفات

ماليكارجون دورا، ه. أنيل كومار

مجلة الإفلا ، 3-46

الملخص: تهدف هذه الدراسة إلى محاولة فهم اتجاهات بحوث علوم المكتبات والمعلومات، من خلال تحليل المؤلفات المنشورة حول هذا الموضوع. تناولت الدراسة بالرصد والتحليل تسعة وثلاثين ورقة

بحثية عن اتجاهات البحوث في مختلف البلدان، فضلا عن ثلاث ورقات عن اتجاهات بحوث الدراسة في بلدان المنطقة، وثلاث عشرة ورقة بحثية عن اتجاهات بحوث الدراسة من منظور دولي. وأظهرت نتائج الدراسة تشابه البلدان المختلفة فيما يتعلق بمواضيع بحوث علوم المكتبات والمعلومات، وتباينها في درجة التركيز والفترة الزمنية. ومع أن الهدف هو فهم اتجاهات البحوث الدولية في نظام المعلومات والمكتبات، فإنه من المثير للاهتمام ملاحظة أن الاتجاه البحثي في الصين يسير في نفس اتجاه البحوث العالمية، بينما يتباين الاتجاه في البلدان أخرى.

Taxonomy design methodologies: Emergent research for knowledge management domains

منهجيات تصميم التصنيف: البحوث الناشئة في مجالات إدارة المعارف

فيرجينيا م. تاكر

مجلة الإفلا، 3-46

الملخص: أدرجت دراسة بحثية عن إدارة المعرفة في برنامج للتدريب على الاستشارات لثلاثة من طلاب ماجستير علوم المكتبات والمعلومات، تحت إشراف أحد أعضاء هيئة التدريس. ويشمل نطاق المشروع تنظيم المعرفة في جميع التخصصات الأكاديمية، على النحو المبين في هياكل الجامعة، وذلك لدعم أدوات تحليل البرامج الاستشارية للعملاء لفائدة ناشري المجالات العلمية. وتتمثل المساهمة البحثية الأصلية لفريق الدراسة في تصميم من أربع مراحل، ونهج للتحقق لإنشاء التصنيف باستخدام أساليب البحث القائمة بصورة منسقة. وقد تعلم الطلاب الربط بين معارفهم في مجال الدراسة وبين إدارة المعارف في مجال الصناعة، وتطبيق أساليب جمع البيانات وتحليلها على مشروعات بحثية جديدة.

The Effect of Information Literacy Instruction on Lifelong Learning Readiness

أثر محو الأمية المعلوماتية على الاستعداد للتعليم مدى الحياة

ليلي سيفي ، مريم حبيبي ، محسن عياطي

مجلة الإفلا ، 3-46

الملخص: الغرض من هذه الدراسة هو دراسة تأثير تعليم مهارات محو الأمية المعلوماتية على استعداد مستخدمي المكتبات العامة في

إيران للتعليم مدى الحياة. ولهذه الغاية، تم بشكل عشوائي توزيع 30 مستخدماً نشطاً لمكتبتين في مجموعات الضبط والتجربة. وعلى مدى شهر ونصف تم تدريس تعليم مهارات محو الأمية المعلوماتية للمجموعة التجريبية. وكشفت النتائج أن تعليم محو الأمية المعلوماتية شهد زيادة كبيرة في الاستعداد للتعليم الموجه ذاتياً والاستعداد للتغلب على عوائق المشاركة. ووفقاً للنتائج، أحدث تعليم مهارات محو الأمية المعلوماتية فرقا كبيرا في محو الأمية المعلوماتية للمستخدمين في المكتبات العامة الإيرانية. وتشجع نتائج هذه الدراسة المكتبات العامة على التخطيط لتطبيق توجيهات محو الأمية المعلوماتية لجعل المكتبات العامة مراكز تعليمية مدى الحياة.

Semantic modeling for education of library and information sciences in Iran, based on Soft Systems Methodology

النموذج الدلالية لتعليم علوم المكتبات والمعلومات في إيران، باستخدام منهجية النظم اللينة

أمير ردفار، فاطمة فهمينيا، محمد رضا اسماعيلي، ملوك السادات بهشتي

مجلة الإفلا ، 3-46

الملخص: كشفت مراجعة النصوص الأصلية والمنشورة حديثاً في مجال تدريس علوم المكتبات والمعلومات عن وجود بعض المشكلات الأساسية في هذه العملية التربوية. وفقاً لعوامل مختلفة تتعامل مع العملية مثل الأساتذة والمتعلمين والأقسام التعليمية ومصادر التعلم، تعتبر مواجهة التحديات من القضايا المعقدة. لذلك، اختيرت منهجية النظم اللينة (SSM) في هذا البحث لاقتراح نموذج شامل لحل المشاكل المذكورة. ويرسم هذا البحث، من خلال الخطوات السبع لمنهجية النظم اللينة، صورة غنية توضح عملية تعليم علوم المكتبات والمعلومات، وقضاياها التي تتعامل مع النظام البيئي ذي الصلة. وبناءً على ذلك، تم إنشاء النموذج النهائي الذي يتكون من ثلاثة أنطولوجيات (المتعلمين والأساتذة والمحتوى التعليمي). وللتحقق من صحة النموذج الدلالي، تم حساب معامل كوهين كابا. وفيما يتعلق بارتفاع معدل معامل الاتفاق 92٪، فقد تمت الموافقة على النموذج المفاهيمي الذي تم التوصل إليه. وللاستفادة من النموذج الشامل، تم التنفيذ باستخدام برنامج Protégé4.3 ولغة OWL2

摘要

Designing a mentoring program for faculty librarians

针对教学图书馆员设计辅导计划

Erla P. Heyns, Judith Nixon

IFLA Journal, 46-3, 197-206

摘要: 本文介绍了普渡大学图书馆的义务联合辅导计划，对普渡大学图书馆的所有馆员进行了调查，并有针对性地进行后续采访。该计划为所有教学图书馆员提供支持，它与其他辅导计划的区别在于以团队为基础、辅导员参与其中，并提供有关晋升的建议。这些教学审查委员会将绩效审核与晋升进展相结合，负责撰写书面年度审核与

评估, 并代表候选人参加晋升审核。该计划在普渡大学图书馆的效果显著, 且模式独特。本文还通过调查和后续访谈将该计划与美国研究图书馆协会的其他四个辅导计划进行了对比。

Transformational and transactional leadership and knowledge sharing in Nigerian University libraries

尼日利亚大学图书馆的变革型与交易型领导力和知识共享

Cyprian Ifeanyi Ugwu, Omwoyo Bosire, Madlene C. Fombad

IFLA Journal, 46—3, 207—223

摘要: 本研究旨在探索变革型与交易型领导风格对图书馆员知识共享实践的影响。本研究采用定量方法, 以问卷为收集数据的主要工具。本文作者使用多元回归技术和杜克的真实显著性差异(HSD)事后检验, 分析了从尼日利亚不同私立、州和联邦大学图书馆的216名图书馆员中收集的数据。研究结果表明, 变革型领导对知识共享的影响大于交易型领导。因此, 本研究从经验上证明了领导力是影响图书馆环境中知识共享的一大因素。

Knowledge management and innovation: Two explicit intentions pursued by Spanish university libraries

知识管理与创新: 西班牙大学图书馆的两个明确目标

Ana Reyes Pacios

阿娜·雷耶斯·帕西奥斯

IFLA Journal, 46—3, 224—233

摘要: 本文分析了西班牙各大学图书馆网站上发布的声明(使命、愿景和价值观)的内容, 旨在确定它们是否明确表达对大学知识管理和创新工作的支持。分析显示, 75%的图书馆(n = 76)发表过至少一份此类声明。在这三种类型中, 发表最多的是使命声明, 其中有37份包含“知识”或“创新”字样, 尤其是“知识”一词出现在33份宣言中。17家图书馆的愿景声明中间接提到这两个概

念, 比例相近。”创新”一词出现在了28家图书馆发表的价值观宣言中, 表明大学图书馆员对这一概念的高度重视。这些声明表明, 图书馆将创新和某个阶段的知识管理作为主要目标, 其中“知识创造”是最常见的说法。

National and international trends in library and information science research: A comparative review of the literature

图书馆情报学研究的国内外趋势: 文献对比

Mallikarjun Dora, H. Anil Kumar

IFLA Journal, 46—3, 234—249

摘要: 本研究的目的在于通过分析已出版的关于图书馆学、情报学(LIS)的文献来探究该领域的研究趋势。本文分析了有关各国LIS研究趋势的39篇论文、有关区域国家LIS研究趋势的3篇论文和有关国际LIS研究趋势的13篇论文。研究结果表明, 就LIS这一领域而言, 各国之间存在相似之处, 但不同时期的关注点有所不同。在了解国际LIS研究趋势时, 我们发现, 中国的研究趋势与国际趋势相似, 而其他国家的模式则有所不同。

Taxonomy design methodologies: Emergent research for knowledge management domains

分类设计法: 知识管理领域的新兴研究

Virginia M. Tucker

IFLA Journal, 46—3, 250—258

摘要: 图书馆情报学三名硕士研究生在咨询岗位实习期间, 在导师的指导下开展了知识管理研究。该项目整合了大学组织结构中包含的所有学科的知识, 为客户针对学术期刊出版商开发的软件分析工具提供支持。研究小组的初步成果是在现有的研究方法基础上, 采用四阶段设计和验证来创建分类法。几名学生将课程知识关联到行业知识管理环境中, 并将数据收集和分析方法应用于一个新颖的研究项目。

The Effect of Information Literacy Instruction on Lifelong Learning Readiness

信息素养指导对终身学习意愿的影响

Leili Seifi, Maryam Habibi, Mohsen Ayati

IFLA Journal, 46-3, 259-270

摘要：本文研究了信息素养技能指导对伊朗公共图书馆用户的终身学习意愿的影响。为此，研究人员将两家图书馆的30名活跃用户随机分为对照组和实验组，用一个半月的时间向实验组人员提供信息素养技能指导。结果显示，信息素养指导显著提升了自主学习和克服障碍的意愿。调查结果表明，信息素养技能指导对伊朗公共图书馆用户的信息素养产生了重大影响。这项研究的结果鼓励公共图书馆计划和开展信息素养指导工作，使公共图书馆成为终身学习中心。

Semantic modeling for education of library and information sciences in Iran, based on Soft Systems Methodology

伊朗图情教育领域基于软系统方法论的语义建模

Amir Radfar, Fatima Fahimnia, Mohammad Reza Esmaeili, Moluk al-Sadat Beheshti

IFLA Journal, 46-3, 271-289

摘要：本文研究了图情教育领域的最新出版文献，发现了该领域教学过程中的一些基本问题。该过程中存在多种不同的因素(包括教授、学习人员、教育部门和 Learning Resources)，使应对挑战变得尤为复杂。因此，本文采用软系统方法论建立了一个综合模型来解决上述问题。本文利用软系统方法论的七个步骤绘制了一张内容丰富的图片，阐明了图书馆学、情报学的教育过程及其与相关生态系统有关的问题。最终的模型由三种本体(学习人员、教授和教学内容)组成。本文通过计算科恩的 Kappa 系数来验证语义模型，最终的一致系数高达 92%，使概念模型获得通过。综合模型可通过 Protégé 4.3 软件和 OWL2 语言进行应用。

Sommaires**Designing a mentoring program for faculty librarians****Concevoir un programme de tutorat pour les bibliothécaires des facultés**

Erla P Heyns, Judith Nixon

IFLA Journal, 46-3, 197-206

Résumé : Cet article décrit le programme de co-tutorat obligatoire mis en place dans les bibliothèques de l'université Purdue. Des enquêtes ont été menées auprès de tous les bibliothécaires des facultés de l'université Purdue, suivies d'entretiens sélectifs. Ce programme offre un soutien à tous les bibliothécaires des facultés et diffère des autres programmes de tutorat dans la mesure où il est basé sur des équipes, implique le superviseur et donne des conseils en matière de promotion. Ces comités d'évaluation des facultés examinent les performances ainsi que les progrès en vue d'une promotion, ont la responsabilité de rédiger des rapports et évaluations annuels et représentent le candidat lors de l'examen de la promotion. Ce programme unique en son genre est considéré comme particulièrement efficace dans les bibliothèques de l'université Purdue. Il est également comparé à quatre autres programmes de co-tutorat de

l'Association des bibliothèques de recherche (ARL) par le biais d'une enquête et d'entretiens de suivi.

Transformational and transactional leadership and knowledge sharing in Nigerian University libraries**Influence du leadership transformationnel et transactionnel dans le partage des connaissances au sein des bibliothèques universitaires nigérianes**

Cyprian Ifeanyi Ugwu, Omwoyo Bosire, Madlene C Fombad

IFLA Journal, 46-3, 207-223

Résumé : Cette étude vise à examiner l'influence des styles de leadership transformationnel et transactionnel sur les pratiques de partage des connaissances des bibliothécaires. Elle adopte une approche quantitative, avec un questionnaire comme outil principal de collecte des données. Ces données collectées auprès de 216 bibliothécaires de diverses bibliothèques universitaires privées, d'état et fédérales au Nigeria sont analysées à l'aide de techniques de régression multiple et du test de comparaisons multiples dit test de Turkey DHS (différence significative honnête). Les résultats montrent que le leadership transformationnel a plus d'impact sur le partage des connaissances que les styles de leadership transactionnel. Par

conséquent, cette étude démontre de façon empirique que le leadership est l'un des facteurs ayant une influence sur le partage des connaissances dans un environnement bibliothécaire.

Knowledge management and innovation: Two explicit intentions pursued by Spanish university libraries

Gestion des connaissances et innovation: deux intentions explicites des bibliothèques universitaires espagnoles

Ana Reyes Pacios

IFLA Journal, 46–3, 224–233

Résumé : Cet article analyse le contenu de trois types de déclaration d'intention (mission, vision et valeurs) publiées sur les sites web de bibliothèques universitaires espagnoles. Le but est de déterminer si elles expriment un soutien explicite à la gestion des connaissances et à l'innovation dans les universités. L'analyse montre que 75% de la population étudiée (n=76) a publié au moins une déclaration de ce type. Parmi ces trois types de déclaration, la plus largement publiée est la déclaration de mission, 37 d'entre elles contenant les termes « connaissances » ou « innovation », et en particulier « connaissances », qui figure dans 33 déclarations. Dix-sept déclarations portant sur la vision des bibliothèques font référence à ces deux valeurs pratiquement dans les mêmes proportions. Le terme « innovation » apparaît dans la totalité des déclarations des 28 bibliothèques, montrant la grande importance que les bibliothécaires universitaires accordent à ce concept. Ces déclarations constituent la preuve que les bibliothèques considèrent l'innovation et une certaine part de gestion des connaissances comme des objectifs fondamentaux, viser à la création/la génération de connaissances étant l'objectif le plus fréquemment cité.

National and international trends in library and information science research: A comparative review of the literature

Tendances nationales et internationales de la recherche en bibliothéconomie: une étude comparative de la documentation

Mallikarjun Dora, H. Anil Kumar

IFLA Journal, 46–3, 234–249

Résumé : Cette étude s'efforce de comprendre les tendances de la recherche en bibliothéconomie en analysant les documents publiés à ce sujet. L'étude identifie et analyse trente-neuf articles sur les tendances de la

recherche en bibliothéconomie dans divers pays, trois articles sur les tendances de la recherche en bibliothéconomie dans les pays régionaux et treize articles sur les tendances de la recherche en bibliothéconomie dans une perspective internationale. Les conclusions de l'étude montrent qu'il existe une similarité entre différents pays en ce qui concerne les sujets de recherche en bibliothéconomie, mais avec une orientation différente en fonction des différentes périodes. Tout en s'efforçant de comprendre les tendances internationales de la recherche en bibliothéconomie, il est intéressant de noter que les tendances de la recherche en Chine sont similaires à celles de la recherche mondiale, alors que les tendances sont différentes dans d'autres pays.

Taxonomy design methodologies: Emergent research for knowledge management domains

Méthodologies de conception d'une taxinomie: recherche émergente pour les domaines de gestion des connaissances

Virginia M. Tucker

IFLA Journal, 46–3, 250–258

Résumé : Une étude de recherche consacrée à la gestion des connaissances a été intégrée à un stage de consultant pour trois étudiants suivant un programme de master en bibliothéconomie et travaillant sous la direction d'un membre de la faculté. Le projet avait pour objectif d'organiser les connaissances à travers toutes les disciplines académiques représentées dans les structures de l'université, en soutien aux outils logiciels analytiques du client consultant, outils destinés aux éditeurs de revues savantes. La contribution originale de recherche de l'équipe chargée de l'étude a été une approche en quatre phases de conception et de validation de la création d'une taxinomie, utilisant en même temps des méthodes de recherche existantes. Les étudiants ont appris à mettre à profit leurs connaissances acquises pendant les cours dans un environnement de gestion des connaissances en entreprise et à appliquer la collecte de données et les méthodes d'analyse à un projet de recherche novateur.

The Effect of Information Literacy Instruction on Lifelong Learning Readiness

L'effet de la formation à la maîtrise de l'information sur la capacité d'apprentissage permanent

Leili Seifi, Maryam Habibi, Mohsen Ayati

IFLA Journal, 46–3, 259–270

Résumé : Cette étude a pour objectif d'examiner l'effet de la formation aux aptitudes de maîtrise de l'information sur la capacité d'apprentissage permanent des usagers des bibliothèques publiques en Iran. À cette fin, 30 usagers actifs de deux bibliothèques ont été répartis de façon aléatoire dans des groupes de contrôle et des groupes expérimentaux. Des aptitudes de maîtrise de l'information ont été enseignées au groupe expérimental pendant un mois et demi. Les résultats ont montré que l'instruction à la maîtrise de l'information augmente de façon significative la capacité à apprendre de façon autonome et à surmonter les facteurs dissuadant de participer. Selon les constatations, le fait de disposer d'aptitudes de maîtrise de l'information entraîne une différence significative pour la maîtrise de l'information des usagers des bibliothèques publiques en Iran. Les résultats de cette étude encouragent les bibliothèques publiques à mettre en place des formations à la maîtrise de l'information, afin de faire des bibliothèques publiques des centres d'apprentissage permanent.

Semantic modeling for education of library and information sciences in Iran, based on Soft Systems Methodology

Modélisation sémantique pour l'enseignement de la bibliothéconomie en Iran, basée sur la méthodologie des systèmes souples

Amir Radfar, Fatima Fahimnia, Mohammad Reza Esmaeili, Moluk al-Sadat Beheshti

IFLA Journal, 46–3, 271–289

Résumé : Une étude des textes récemment publiés et authentiques dans le domaine de l'enseignement de la bibliothéconomie révèle certains problèmes fondamentaux dans ce processus pédagogique. Selon différents acteurs concernés par ce processus, notamment professeurs, élèves, services de l'éducation et ressources d'apprentissage, faire face aux défis est considéré comme un problème complexe. Par conséquent, on a choisi dans cette étude d'appliquer une méthodologie des systèmes souples (Soft Systems Methodology, SSM) pour proposer un modèle intégral afin de résoudre ce problème. En utilisant les sept étapes de la méthodologie SSM, cette étude donne une image-contexte pour illustrer le processus de l'enseignement de la bibliothéconomie et sa difficulté à prendre en compte l'écosystème apparenté. En conséquence, on obtient un modèle final se composant de trois ontologies (élèves, professeurs et contenu éducatif). Pour valider le modèle sémantique, on a calculé le coefficient kappa de Cohen. Étant donné le coefficient d'accord élevé (92%), le modèle conceptuel obtenu a été approuvé. Pour exploiter ce modèle complet, on a utilisé le logiciel Protégé4.3 et le langage ontologique web OWL2.

Zusammenfassung

Designing a mentoring program for faculty librarians

Entwicklung eines Mentoring-Programms für Fakultätsbibliothekare/-innen

Erla P. Heyns, Judith Nixon
IFLA Journal, 46–3, 197–206

Abstrakt: Dieser Artikel beschreibt das vorgeschriebene Co-Mentoring-Programm der Purdue University Libraries. Es wurden Umfragen bei allen Fakultätsbibliothekaren/-innen der Purdue University Libraries sowie bestimmte Folgeinterviews durchgeführt. Dieses Programm unterstützt alle Fakultätsbibliothekare/-innen und unterscheidet sich von anderen Mentoring-Programmen, da es teambasiert ist, den Supervisor einschließt und bei der Beförderung berät. Diese Fakultätsprüfungsausschüsse integrieren Leistungsüberprüfungen mit Fortschritten auf dem Weg zur Beförderung und haben die Aufgabe, schriftliche Jahresüberprüfungen und Bewertungen vorzubereiten

und den/die Kandidaten/-in bei der Beförderungsprüfung zu vertreten. Das Programm gilt in den Purdue University Libraries als sehr effektives und besonderes Modell. Dieses Programm wird auch mit vier anderen Co-Mentoring-Programmen der ARL verglichen; in diesem Zusammenhang werden eine Umfrage und Folgeinterviews durchgeführt.

Transformational and transactional leadership and knowledge sharing in Nigerian University libraries

Transformatorische und transaktionale Führung und Wissensaustausch in nigerianischen Universitätsbibliotheken

Cyprian Ifeanyi Ugwu, Omwoyo Bosire, Madlene C. Fombad

IFLA Journal, 46–3, 207–223

Abstrakt: Ziel der Studie ist es, den Einfluss transformativer und transaktionaler Führungsstile auf die Praktiken des Wissensaustauschs von Bibliothekaren/-innen

zu untersuchen. Diese Studie verfolgte einen quantitativen Ansatz und der Fragebogen stellte das Hauptinstrument der Datenerhebung dar. Die Daten, die von 216 Bibliothekaren/-innen verschiedener privater und staatlicher und nationaler Universitätsbibliotheken in Nigeria gesammelt wurden, wurden mit multiplen Regressionstechniken und dem türkischen Post-hoc-Test der Ehrlich Signifikanten Differenz (Honestly Significant Difference, HSD) analysiert. Die Ergebnisse zeigten, dass die transformatorische Führung den Wissensaustausch stärker beeinflusste als die transaktionalen Führungsstile. Daher hat diese Studie empirisch gezeigt, dass der Führungsstil einer der Faktoren ist, der den Wissensaustausch in einer Bibliotheksumgebung beeinflusst.

Knowledge management and innovation: Two explicit intentions pursued by Spanish university libraries

Wissensmanagement und Innovation: zwei explizite Ziele spanischer Universitätsbibliotheken

Ana Reyes Pacios

IFLA Journal, 46–3, 224–233

Abstrakt: In diesem Artikel wird der Inhalt von drei Arten einer Erklärung (Mission, Vision und Werte) analysiert, die auf den Websites spanischer Universitätsbibliotheken veröffentlicht wurden. Dadurch soll festgestellt werden, ob sie eine explizite Unterstützung in Bezug auf Wissensmanagement und Innovation an der Universität zum Ausdruck bringen. Die Analyse ergab, dass 75% der Beteiligten (n=76) mindestens eine solche Erklärung veröffentlichten. Die am häufigsten vorkommenden dieser drei Arten war das Leitbild, bei der 37 Mal die Begriffe „Wissen“ oder „Innovation“ enthalten waren, der erste der beiden Begriffe, nämlich 33 Mal. Die Unternehmensphilosophien von siebzehn Bibliotheken spielten auf beide – im praktisch gleichen Verhältnis – an. „Innovation“ erschien in allen 28 Bibliotheken mit Wertaussagen, die die hohe Wertschätzung dieses Werts durch die Universitätsbibliothekare/-innen zum Ausdruck brachten. Diese Aussagen sind ein Beweis dafür, dass Bibliotheken Innovation und eine gewisse Stufe des Wissensmanagements als primäre Ziele betrachten, wobei die Förderung der Aneignung und Schaffung von Wissen das am häufigsten genannte ist.

National and international trends in library and information science research: A comparative review of the literature

Nationale und internationale Trends in der bibliotheks- und informationswissenschaftlichen Forschung: eine vergleichende Übersicht über die Literatur

Mallikarjun Dora, H. Anil Kumar

IFLA Journal, 46–3, 234–249

Abstrakt: Die Studie ist ein Versuch, die Trends in der LIS-Forschung zu begreifen, indem die veröffentlichte Literatur zum Thema analysiert wird. Die Studie identifiziert und analysiert neununddreißig Forschungsarbeiten zu LIS-Forschungstrends in verschiedenen Ländern, drei Arbeiten zu LIS-Forschungstrends in regionalen Ländern und dreizehn Arbeiten zu LIS-Forschungstrends mit internationaler Perspektive. Die Ergebnisse der Studie zeigen, dass es eine Ähnlichkeit zwischen den einzelnen Ländern gibt, was die LIS-Forschungsthemen betrifft, jedoch mit einem unterschiedlichen Schwerpunkt zu verschiedenen Zeiten. Für das Verständnis der internationalen Forschungstrends in LIS war es interessant festzustellen, dass der Forschungstrend in China dem weltweiten Forschungstrend ähnlich war, während das Muster in anderen Ländern unterschiedlich war.

Taxonomy design methodologies: Emergent research for knowledge management domains Taxonomie-Gestaltungsmethoden: neue Forschung für Bereiche des Wissensmanagements

Virginia M. Tucker

IFLA Journal, 46–3, 250–258

Abstrakt: Eine Forschungsstudie zum Wissensmanagement (WM) wurde in ein Beratungspraktikum für drei Studierende in einem MLIS-Programm integriert, das unter der Leitung eines Fakultätsmitglieds durchgeführt wurde. Der Projektumfang umfasste die Organisation von Wissen aus allen akademischen Disziplinen, wie sie in Universitätsstrukturen vorkommen; dies diente als Unterstützung der Softwareanalyse-Tools des beratenden Kunden für wissenschaftliche Zeitschriftenverlage. Der ursprüngliche Beitrag des Studententeams zur Forschungsarbeit bestand in einem vierphasigen Design- und Validierungsansatz zur Erstellung einer Taxonomie, für die vorhandene Forschungsmethoden gemeinsam genutzt wurden. Die Studierenden lernten, ihr Kurswissen in ein WM-Umfeld in der Industrie zu übertragen und Methoden der Datenerhebung und -analyse auf ein neuartiges Forschungsprojekt anzuwenden.

The Effect of Information Literacy Instruction on Lifelong Learning Readiness

Die Wirkung von Informationskompetenzunterricht auf die Bereitschaft zu lebenslangem Lernen

Leili Seifi, Maryam Habibi, Mohsen Ayati

IFLA Journal, 46–3, 259–270

Abstrakt: In der vorliegenden Studie sollte untersucht werden, wie sich die Vermittlung von Informationskompetenz auf die lebenslange Lernbereitschaft der Benutzer/-innen öffentlicher Bibliotheken im Iran auswirkt. Zu diesem Zweck wurden 30 aktive Nutzer/-innen von zwei Bibliotheken nach dem Zufallsprinzip in den Kontroll- und Versuchsgruppen aufgenommen. Die Versuchsgruppe wurde eineinhalb Monate lang in der Vermittlung von Informationskompetenz unterrichtet. Die Ergebnisse zeigten, dass der Unterricht in Informationskompetenz einen beträchtlichen Anstieg der Bereitschaft zum selbstgesteuerten Lernen und der Bereitschaft aufwies, die Hemmschwelle bei der Teilnahme zu überwinden. Den Ergebnissen zufolge bewirkte der Unterricht zur Informationskompetenz einen signifikanten Unterschied in der Informationskompetenz der Benutzer/-innen iranischer öffentlicher Bibliotheken. Die Ergebnisse dieser Studie ermutigen öffentliche Bibliotheken, einen Unterricht zur Informationskompetenz zu planen, um aus öffentlichen Bibliotheken Zentren für das lebenslange Lernen zu machen.

Semantic modeling for education of library and information sciences in Iran, based on Soft Systems Methodology

Semantische Modellgestaltung für die Ausbildung in Bibliotheks- und Informationswissenschaften im Iran auf der Grundlage der Soft Systems Methodology

Amir Radfar, Fatima Fahimnia, Mohammad Reza Esmaeili, Moluk al-Sadat Beheshti

IFLA Journal, 46–3, 271–289

Abstrakt: Die Durchsicht der kürzlich veröffentlichten und authentischen Texte im Bereich der Bibliotheks- und Informationswissenschaftlichen Bildung weist auf einige grundlegende Probleme in diesem pädagogischen Prozess hin. Je nach den einzelnen Faktoren, die mit dem Prozess zu tun haben, z. B. Bildungsabteilungen, Professoren, Lernenden und Lernressourcen, wird die Bewältigung der Herausforderungen als eine komplexe Angelegenheit betrachtet. Daher wurde in dieser Studie die Methodik Soft Systems Methodology (SSM) gewählt, um ein umfassendes Modell zur Lösung der genannten Probleme vorzulegen. Bei der Nutzung der sieben Schritte des SSM zeichnet diese Studie ein deutliches Bild, das den Prozess der LIS-Ausbildung und seine Probleme im Zusammenhang mit dem entsprechenden Ökosystem illustriert. Dementsprechend wurde das endgültige Modell erstellt, das aus drei Ontologien (Lernende, Professoren und Bildungsinhalte) besteht. Zur Validierung des semantischen Modells wurde der Kappa-Koeffizient nach Cohen berechnet. In Bezug auf den hohen Grad des Übereinstimmungskoeffizienten (92%) wurde das erreichte konzeptionelle Modell bestätigt. Um das umfassende Modell nutzen zu können, wurde es mit der Software Protégé4.3 und der Sprache OWL2 implementiert.

Аннотация

Designing a mentoring program for faculty librarians

Разработка программы наставничества для библиотекарей учебных заведений

Эрла П Хейнс, Джудит Никсон

IFLA Journal, 46–3, 197–206

Аннотация: В данной работе описана обязательная программа совместного наставничества библиотек университета Пердью. Были проведены опросы среди всех библиотечных работников библиотек университета Пердью, а также избирательные повторные интервью. Данная программа направлена на поддержку всех библиотечных работников

и отличается от прочих программ обучения, поскольку проводится в группах, предполагает участие руководителя и является основанием для повышения по службе. Такие профессиональные наблюдательные комитеты сопоставляют оценку эффективности работы сотрудника и его прогресс в области карьерного продвижения и обязаны составлять ежегодные обзоры и оценки, а также представлять кандидата во время оценки возможности его повышения в должности. Данная программа считается в библиотеках университета Пердью очень эффективной, а также рассматривается как уникальная модель. Также приводится сравнение данной программы с четырьмя другими программами совместного наставничества Ассоциации научно-технических библиотек (ARL) методом проведения опроса и повторных интервью.

Transformational and transactional leadership and knowledge sharing in Nigerian University libraries

Влияние трансформационного и операционного лидерства на обмен знаниями в университетских библиотеках Нигерии

Сиприен Ифизнни Угву, Омвойо Босайре, Мэдлин С Фомбад

IFLA Journal, 46–3, 207–223

Аннотация: Целью работы является исследование воздействия трансформационного и операционного лидерства на методы обмена знаниями между библиотекарями. Для исследования выбран количественный подход, и основным инструментом сбора информации являлся опросный лист. Были проанализированные данные опроса 216 библиотекарей из библиотек различных университетов Нигерии: частных, государственных и федеральных; были использованы разнообразные регрессивные методы, а также вторичный анализ средневзвешенного Тьюки. Результаты показали, что трансформационное лидерство оказывает более значительное влияние на обмен знаниями, чем методы операционного лидерства. Таким образом, настоящее исследование экспериментальным путем продемонстрировало, что лидерство является одним из факторов, влияющих на обмен знаниями в библиотечной среде.

Knowledge management and innovation: Two explicit intentions pursued by Spanish university libraries

Управление знаниями и инновации: Две четкие цели, преследуемые университетскими библиотеками Испании

Ана Рейес Пасиос

IFLA Journal, 46–3, 224–233

Аннотация: В рамках данной статьи проводится анализ содержания трех типов корпоративных деклараций (миссия, видение и ценности), опубликованных на веб-сайтах университетских библиотек Испании. Цель заключается в том, чтобы определить, выражается ли в них явная поддержка управления знаниями и инноваций в университете. Анализ показал, что у 75% из выборки (n=76) было опубликовано как минимум одно подобное утверждение. Наиболее часто публикуемой из трех оказалась декларация миссии, в 37-ми из них содержатся термины “знания” либо “инновации”, последнее, в частности, присутствует в 33-х. В декларации о видении

17-ти библиотек содержатся ссылки на оба эти понятия практически в той же пропорции. “Инновации” присутствуют в соответствующих декларациях о ценности всех 28-ми библиотек, что указывает на то, как высоко ценится это вычурное понятие университетскими библиотекарями. Эти декларации служат подтверждением того, что инновации и некоторая степень управления знаниями рассматриваются библиотеками как первостепенные задачи, при этом наиболее часто упоминается поддержка создания / формирования знаний.

National and international trends in library and information science research: A comparative review of the literature

Национальные и международные направления развития исследований в библиотековедении и науке об информации: Сравнительный обзор литературы

Малликарджун Дора, Х. Анил Кумар

IFLA Journal, 46–3, 234–249

Аннотация: Настоящая работа представляет собой попытку понять исследовательские течения в библиотековедении и науке об информации (БНИ) путем анализа опубликованной литературы по указанной теме. В рамках данной работы подобрано и проанализировано тридцать девять исследовательских работ по теме библиотековедения и науки об информации и их исследовательских течениях в различных странах, а также три работы об исследовательских направлениях БНИ в региональных государствах и тринадцать работ об исследовательских течениях БНИ в международной перспективе. В ходе исследования выяснилось, что существует сходство между различными странами в области тематики исследований БНИ, при этом для каждого периода характерны собственные приоритеты. В процессе понимания международных направлений исследования БНИ был с интересом отмечен тот факт, что в Китае направление исследовательской деятельности согласуется с общемировой тенденцией, в то время как модели других стран от нее отличаются.

Taxonomy design methodologies: Emergent research for knowledge management domains

Методы формирования таксономии: Новейшее исследование для сферы управления знаниями

Вирджиния М. Таккер

IFLA Journal, 46–3, 250–258

Аннотация: Исследование в области управления знаниями было интегрировано в курс консультативной практики для трех студентов курса обучения для получения степени мастера библиотековедения и науки об информации, работающих под руководством преподавателя. Проект включал в себя организацию знаний в рамках всех учебных дисциплин в соответствии с тем, как они представлены в структуре университета, в качестве поддержки аналитических средств программного обеспечения клиента-консультанта для издателей научного журнала. Оригинальным исследовательским вкладом рабочей группы была выработка четырехфазного подхода к формированию и обоснованию классификации и систематизации на основе сочетания существующих методов исследования. Студенты научились применять знания, полученные в рамках курса обучения, в условиях управления знаниями, а также использовать методы сбора и анализа информации в новом проекте.

The Effect of Information Literacy Instruction on Lifelong Learning Readiness

Влияние обучения информационной грамотности на готовность к обучению в течение всей жизни

Лейли Сейфи, Мариам Хабиби, Мосен Айяти

IFLA Journal, 46–3, 259–270

Аннотация: Цель настоящего исследования заключается в анализе влияния обучения навыкам информационной грамотности на готовность пользователей публичных библиотек Ирана к обучению в течение всей жизни. Для этого 30 активных пользователей двух библиотек были в случайном порядке помещены в контрольную и экспериментальную группы. В экспериментальной группе в течение полутора месяцев велось обучение навыкам информационной грамотности. Результаты показали, что обучение информационной грамотности существенно повысило готовность к самостоятельному обучению, а также готовность преодолевать барьеры на пути к участию в таком обучении. Согласно выводам, обучение навыкам информационной грамотности существенно изменило уровень информационной грамотности пользователей иранских библиотек.

Результаты настоящего исследования служат толчком для планирования введения обучения информационной грамотности с целью превращения публичных библиотек в центры обучения на протяжении всей жизни.

Semantic modeling for education of library and information sciences in Iran, based on Soft Systems Methodology

Семантическое моделирование для обучения библиотековедению и науке об информации в Иране на основании методологии “мягких систем”

Амир Радфар, Фатима Фахимния, Мохаммад Реза Эсмаэили, Молук аль-Садаг Бехешти

IFLA Journal, 46–3, 271–289

Аннотация: Обзор недавно опубликованных, а также неадаптированных материалов в сфере обучения библиотековедению и науке об информации выявил некоторые фундаментальные проблемы данного педагогического процесса. С учетом многообразия участников данного процесса, таких как профессорский состав, учащиеся, отделы образования и образовательные ресурсы, противостояние всем проблемам считается простым занятием. Поэтому в рамках настоящего исследования была выбрана методология “мягких систем” для создания комплексной модели, которая должна помочь в решении вышеназванных проблем. Используя семь шагов методологии “мягких систем”, данное исследование создает богатую картину, иллюстрирующую процесс обучения библиотековедению и науке об информации, а также взаимодействие его задач с соответствующей экосистемой. С учетом этого была получена финальная модель, включающая в себя три онтологии (учащиеся, преподаватели и обучающие материалы). Для проверки семантической модели был рассчитан коэффициент каппа статистики Коэна. Достигнув высокого уровня коэффициента согласия, 92%, полученная концептуальная модель была одобрена. Для реализации данной комплексной модели было использовано программное обеспечение Protégé4.3 и язык OWL2.

Resúmenes

Designing a mentoring program for faculty librarians

Diseño de un programa de tutorías para bibliotecarios universitarios

Erla P Heyns, Judith Nixon

IFLA Journal, 46–3, 197–206

Resumen: En este artículo se explica el programa de cotutorías obligatorio de las bibliotecas de la Universidad Purdue. Se realizaron encuestas a los bibliotecarios de todas las bibliotecas de dicha universidad y se llevaron a cabo algunas entrevistas de seguimiento. Este programa está dirigido a todos los bibliotecarios universitarios y difiere de otros programas de tutorías en que se basa en equipos, incluye supervisión y ofrece asesoramiento sobre promoción. Estos Comités de Revisión Universitaria combinan revisiones del rendimiento con el análisis de progresos, y se encargan de elaborar revisiones y evaluaciones anuales por escrito y representar al candidato en la revisión de promoción. Las bibliotecas de la Universidad de Purdue consideran que el programa es muy efectivo y tiene un carácter único. Se compara con otros cuatro programas de cotutorías de la ARL que emplean una encuesta y entrevistas de seguimiento.

Transformational and transactional leadership and knowledge sharing in Nigerian University libraries

Liderazgo transformador y transaccional e intercambio de conocimientos en las bibliotecas universitarias nigerianas

Cyprian Ifeanyi Ugwu, Omwoyo Bosire, Madlene C Fombad

IFLA Journal, 46–3, 207–223

Resumen: El estudio tiene por objeto investigar la influencia de los estilos de liderazgo transformador y transaccional en las prácticas de intercambio de conocimientos de los bibliotecarios. Adoptó un enfoque cuantitativo y un cuestionario fue el principal instrumento de recogida de datos. Los datos recogidos de 216 bibliotecarios de bibliotecas universitarias privadas, públicas y federales de Nigeria se analizaron mediante diversas técnicas de regresión y una prueba *post-hoc* de diferencia honestamente significativa (HSD) de Tukey. Los resultados revelaron que el liderazgo transformador afectó al intercambio de conocimientos en mayor

medida que los estilos de liderazgo transaccionales. Por tanto, este estudio ha demostrado de forma empírica que el liderazgo es uno de los factores que afectan al intercambio de conocimientos en un entorno bibliotecario.

Knowledge management and innovation: Two explicit intentions pursued by Spanish university libraries

Gestión de conocimientos e innovación: dos objetivos explícitos perseguidos por las bibliotecas universitarias españolas

Ana Reyes Pacios

IFLA Journal, 46–3, 224–233

Resumen: En este artículo se analiza el contenido de tres tipos de declaraciones corporativas (misión, visión y valores) publicadas en los sitios web de bibliotecas universitarias españolas. El objetivo es determinar si expresan un apoyo explícito a la gestión de los conocimientos y la innovación en la universidad. El análisis reveló que el 75% de la población (n=76) publicó como mínimo una declaración de este tipo. El más común de estos tres tipos era la declaración de misión, 37 de las cuales contenían los términos «conocimientos» o «innovación», especialmente el primero, presente en 33 declaraciones. Diecisiete declaraciones de visión de las bibliotecas aludían a ambos términos, prácticamente en la misma proporción. El término «innovación» aparecía en los sitios web de las 28 bibliotecas que tenían declaraciones de valores, lo que denota la alta estima en la que las bibliotecas universitarias tienen esta pretensión. Estas declaraciones demuestran que las bibliotecas consideran la innovación y cierto grado de gestión de conocimientos pilares básicos, siendo el objetivo más citado la promoción de la creación/generación de conocimientos.

National and international trends in library and information science research: A comparative review of the literature

Tendencias nacionales e internacionales de investigación en el ámbito de la biblioteconomía y la documentación

Mallikarjun Dora, H. Anil Kumar

IFLA Journal, 46–3, 234–249

Resumen: El estudio trata de entender las tendencias de investigación en el ámbito de la biblioteconomía y la documentación (ByD) mediante el análisis de la literatura publicada sobre este tema. El estudio identifica y analiza 39 artículos de investigación sobre las tendencias de investigación ByD en países de la región y trece artículos sobre

las tendencias de investigación ByD con una perspectiva internacional. Los resultados del estudio revelan que existe una similitud entre varios países por lo que se refiere a los temas de investigación sobre ByD, pero que se adoptan distintos enfoques en diferentes períodos. A la hora de tratar de entender las tendencias internacionales de investigación ByD, cabe destacar que la tendencia de investigación en China era similar a la tendencia de investigación mundial, mientras que el patrón difería en otros países.

Taxonomy design methodologies: Emergent research for knowledge management domains

Metodologías de taxonomía: nueva investigación sobre dominios de gestión del conocimiento

Virginia M. Tucker

IFLA Journal, 46–3, 250–258

Resumen: Tres estudiantes que participaban en un programa de Máster de ByD integraron un estudio de investigación sobre gestión del conocimiento (GC) en un prácticum de consultoría bajo la dirección de un miembro del profesorado. El objeto del proyecto era organizar los conocimientos por disciplinas académicas, según su representación en las estructuras universitarias, para promover las herramientas de análisis de software del cliente de la consultoría para editores de revistas académicas. La contribución de la investigación original del equipo de estudio fue un enfoque de diseño de cuatro fases y validación de la creación de la taxonomía, utilizando los métodos de investigación existentes. Los estudiantes aprendieron a integrar sus conocimientos académicos en un entorno de GC y aplicar métodos de recogida y análisis de datos a un novedoso proyecto de investigación.

The Effect of Information Literacy Instruction on Lifelong Learning Readiness

El efecto de la enseñanza de alfabetización informacional en la preparación para el aprendizaje permanente

Leili Seifi, Maryam Habibi, Mohsen Ayati

IFLA Journal, 46–3, 259–270

Resumen: El objetivo de este estudio consiste en examinar el efecto de la enseñanza de habilidades de alfabetización informacional sobre la preparación para el aprendizaje permanente de los usuarios de bibliotecas

públicas de Irán. A tal fin, 30 usuarios activos de dos bibliotecas se asignaron aleatoriamente a los grupos de control y experimental. Durante un mes y medio se ofreció enseñanza de habilidades de alfabetización informacional al grupo experimental. Los resultados revelaron que la formación en alfabetización informacional tuvo una influencia importante sobre la preparación para el aprendizaje autodidacta y la preparación para superar factores disuasorios en relación con la participación. Atendiendo a los resultados, la formación en habilidades de alfabetización informacional marcó una diferencia importante en la alfabetización informacional de los usuarios de las bibliotecas públicas iraníes. Los resultados de este estudio animan a las bibliotecas públicas a planificar la implantación de formación en alfabetización informacional para convertir las bibliotecas públicas en centros de aprendizaje permanente.

Semantic modeling for education of library and information sciences in Iran, based on Soft Systems Methodology

Modelización semántica para la enseñanza de biblioteconomía y documentación en Irán

Amir Radfar, Fatima Fahimnia, Mohammad Reza Esmaeili, Moluk al-Sadat Beheshti

IFLA Journal, 46–3, 271–289

Resumen: La revisión de los textos auténticos y de reciente publicación en el ámbito de la enseñanza de biblioteconomía y documentación revela la existencia de algunos problemas fundamentales en este proceso pedagógico. Teniendo en cuenta diversos factores relacionados con el proceso, como docentes, alumnos, departamentos educativos y recursos de aprendizaje, la confrontación de los retos se considera un asunto complejo. Por lo tanto, la metodología de sistemas blandos (SSM) se eligió en esta investigación con vistas a proponer un modelo integral para resolver dichos problemas. Mediante la utilización de los siete pasos de la SSM, esta investigación traza un completo panorama que ilustra el proceso de enseñanza de biblioteconomía y documentación y sus problemas en relación con el ecosistema relacionado. Como resultado se obtuvo el modelo final, compuesto por tres ontologías (alumnos, docentes y contenido educativo). Para validar el modelo semántico se calculó el coeficiente kappa de Cohen. Al pertenecer dicho coeficiente (92%) al nivel alto de coeficiente de acuerdo, se aprobó el modelo conceptual. Para utilizar el modelo integral, este fue implantado por el software Protégé4.3 y el lenguaje OWL2.

