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The changing role of librarians in the digital world

Adoption of Web 2.0 technologies by Pakistani librarians

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Abstract
Purpose – The aim of this study was to explore the pattern and extent of the adoption of Web 2.0 technologies by Pakistani librarians.
Design/methodology/approach – A survey was conducted using web-based surveying software (SurveyMonkey) and Pakistan based LIS e-mail discussion groups. Professional librarians serving in all types of libraries participated in the study.
Findings – Instant messaging, blogs, social networking and wikis were the most popular Web 2.0 technologies. Librarians adopted such technologies in their professional and personal lives. Gender, length of professional experience and place of work have no effect on the frequency of use, while perceived skill level of internet use and perceived ease of Web 2.0 use have a significant effect on the frequency. Lack of computer literacy, and lower availability of computers and internet facilities were the major hindrances of Web 2.0 adoption by librarians. Awareness and training programs could enable librarians to cope with Web 2.0 technologies.
Research limitations/implications – Due to the use of a non-probability/non-representative sampling method, the results cannot be generalized.
Practical implications – This study will create awareness among LIS professionals toward the use of advanced technology in their professional environment. The findings of this study will contribute to the successful adoption of Web 2.0 in libraries.
Originality/value – This is the first study on the adoption of Web 2.0 technologies in Pakistani librarianship.

Keywords Web 2.0, Library 2.0, Worldwide web, Internet, Librarians, Blogs, Wikis, Technology adoption, Pakistan

Paper type Research paper

Introduction
During the last two decades rapid technological developments have affected library services. Specifically for the last five years, Web 2.0 technologies, a second generation of the world wide web, have had a significant impact on the higher education sector as well as on libraries all over the world. Introducing the term in 2004, O'Reilly (2006) defined Web 2.0 as:
Web 2.0 is the business revolution in the computer industry caused by the move to the internet as platform, and an attempt to understand the rules for success on that new platform. Chief among those rules is this: Build applications that harness network effects to get better the more people use them.

Collins (2007) identified the principles of Web 2.0 as:

Community: Open conversation can lead to a sense of community and belonging within social sites.
Conversation: User participation discussion and feedback are welcomed and encouraged.
Participation: New information is created via collaboration between users.
Everyone can create content; idea and knowledge for freely and are remixed and reused.
Experience: Engagement with other users and the community as a whole is rewarding and provides some type of fulfillment.
Sharing: Users can post about as much or as little of their lives as possible. (p. 253)

Many Web 2.0 technologies like blogs, microblogs, wikis, syndication of content through RSS, social bookmarking, media sharing, networking sites and other social software artifacts were incorporated in teaching and learning process in higher education. These technologies provide unique and powerful information sharing and collaborative features in teaching as well as with colleagues, administrative and libraries’ staff (Grosseck, 2009).

The traditional role of information professionals was to provide access to collection in the libraries. To provide services in emerging environment, libraries adopted Web 2.0 technologies with new nomenclature “Library 2.0,” the term coined by Michael Casey (Casey and Savastinuk, 2006). The concept of Library 2.0 means to take ideas and concepts from Web 2.0 and adopt them in library environment (Needleman, 2007). The Web 2.0 environment helps library patrons to access information, develop insight and generate knowledge. To meet the growing needs of the patrons, Heinrichs and Lim (2009) suggested that libraries needed to hire skilled librarians to provide expanded services to create and disseminate knowledge in the digital age.

**Internet use in South Asia**

The present study focuses on the adoption of Web 2.0 technologies by Pakistani librarians, therefore, it is necessary to provide basic information about internet use statistics in the country and its neighboring countries. Table I shows that Pakistan has more internet penetration among all countries in South Asia.

**ICT application in Pakistani librarianship**

Many studies on attitude, status, application and utilization of ICT in Pakistani libraries have been conducted among LIS professionals as well as in academic libraries’

<table>
<thead>
<tr>
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<td>Bangladesh</td>
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<td>100,000</td>
<td>617,300</td>
<td>0.4</td>
<td>517.3</td>
</tr>
<tr>
<td>India</td>
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<td>5,000,000</td>
<td>81,000,000</td>
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<td>1,520.0</td>
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<tr>
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<td>133,900</td>
<td>18,500,000</td>
<td>10.4</td>
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<tr>
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<td>121,500</td>
<td>1,776,200</td>
<td>8.3</td>
<td>1,361.9</td>
</tr>
</tbody>
</table>

**Source:** Internet World Stats (June 2010)
setting (Ramzan and Singh, 2010; Ramzan, 2004; Haider, 1998; Khalid, 1998; Rehman, 1992). The findings of the studies showed that LIS professionals lack in ICT skills. Similarly many other LIS professionals in the country also emphasized the need to improve ICT skills among library professionals (Ameen, 2006; Khalid, 1998; Rehman, 1992). Most of the library leaders lack the ability to be innovative, creative, imaginative and visionary, in addition to lacking ICT and communication skills (Haider, 2004).

In a recent study, Mahmood (2010) surveyed 227 LIS professionals, working in all types of libraries in the country, to assess attitude towards the internet. He found that a majority of the respondents (79 percent) were using the internet daily. The findings of the study exposed that the professionals were much inclined towards Internet technology adoption. Owing to the findings, he suggested that the internet facility should be provided to all LIS professionals in the country. In respect of better use of the internet, library employers, LIS schools and professional associations should provide extensive internet training at pre- and in-service levels.

Web 2.0 in libraries
Technological advancement compelled libraries to adopt interactive online media for their survival (Maxymuk, 2007). The increasing trend of social networking sites’ usage affected the traditional approach to organize information on the Internet (Tonta, 2008). Web 2.0 provided innovative and interesting resources for librarians to serve their users as quickly and effectively as possible with new ways (Bradley, 2007). In the similar way, Keralapura (2009) stated that information technology influenced the functions of libraries and changed the information seeking behavior of readers. Being self-motivated and service minded, this was the responsibility of librarians to incorporate IT based resources and services to satisfy the customers in a better way.

During a survey of 60 universities, Chu (2009) explored that “where electronic services are becoming more and more popular, an increasing number of academic libraries are applying or planning to apply Web 2.0 technologies like wikis.” The study also highlighted the three most commonly reported difficulties; low participation rate of users, difficulty in promoting the new technology, and users’ lack of knowledge towards usage of wikis.

Aharony (2009) explored whether librarians working in school, public and academic libraries were familiar with the technologies of Web 2.0 as well as how they used them in the libraries. According to the findings of the study, personality characteristics (resistance to change, cognitive appraisal, empowerment and extroversion or introversion), computer expertise, motivation, importance and capacity towards studying and integrating different applications of Web 2.0 in the future, influenced librarians’ use of Web 2.0. The individual differences with respect to technology acceptance were existed. It was disclosed that library manager as compared to librarians were more inclined to incorporate Web 2.0 technologies to offer new services in the libraries. However the “librarians were quite exposed to these changes. They understood that in order to survive, remain relevant, attract new patrons, and be professional, they should master the newest technological applications and apply them in their changing work environment” (p. 34).

To explore the extent of Web 2.0 technologies applications, Xu et al. (2009) surveyed 81 academic library web sites in New York State. They found that 34 (42 percent) libraries incorporated one or more Web 2.0 applications for various purposes. The maximum usage of the Web 2.0 technologies was blogs while the least adopted
technology named podcasting in the libraries. Based on the study’s findings, they proposed a conceptual model of “Academic Library 2.0” which was comprised Web 2.0, User 2.0, Librarian 2.0 and Information 2.0. According to the model, users can be served in better way only if they are considered essential part of libraries’ operations and services. Linh (2008) conducted a similar research in Australia by conducting a survey of 47 Australian and New Zealand universities. Of the total 47, 32 university libraries (26 in Australia and six in New Zealand) used Web 2.0 technologies. The findings of the study showed that “at least two-thirds of Australasian university libraries deployed one or more Web 2.0 technologies. Only four Web 2.0 technologies were used for specific purposes and with some basic features” (p. 630).

Web 2.0 in developing countries
Web 2.0 technologies have been much discussed theoretically in different forums, conferences, listservs, seminars, and so on. In this regard, Indian library science schools were suggested to revise syllabus and include practice-oriented ICT skills. The proper implementation of ICTs could help to solve a number of problems relevant to the Indian education. “For example, a combination of virtual classroom, online tutorials and digital libraries, and the virtual reference tools in local language could help the rural Indian youth to compete with the outside world and move towards information literacy path irrespective of their socio-economic status” (Gokhale and Chandra, 2009, p. 11).

As compared to developed world, limited research has been found on Web 2.0 application in Indian libraries. In a recent study, Harinarayana and Raju (2010), Indian LIS researchers, surveyed top 100 universities web sites of the world to see Web 2.0 applications in the libraries. For this purpose, web sites of universities were visited and data on their Web 2.0 features (such as Blogs, RSS, Instant Messaging, Wikis and the like) were collected and analyzed. No Indian university was included in the survey. Bansode et al. (2009) emphasized that Indian librarians should opt new publishing trends like RSS. It has become mandatory for the librarians to use RSS which is an affordable and relatively easy way to communicate with users and colleagues. In another descriptive study, Aswath (2007) proposed a conceptual model of social bookmarking, a product of Web 2.0, which can be used to organize widely scattered information resources to access information by patrons 2.0 in higher education.

In an exploratory survey, conducted by Chew (2009) to know how library institutions in the South East Asian region, Hong Kong, India, Indonesia, Japan, Malaysia, People’s Republic of China, Philippines, Singapore and Taiwan, have implemented Web 2.0 technologies? It was found in the survey that academic libraries were using more Web 2.0 technologies, blogs, RSS feeds, wikis, or the use of services like Flickr, YouTube, de.lici.ous, as compare to public libraries. While commenting on Web 2.0 technologies applications in Indian libraries, the author stated:

For examples in India, help came from a librarian in Singapore who answered the enquiry that I posted to a mailing list, as well as non-librarians who gave me the following initial leads:Indian Institute of Information Technology and Management-Kerala (IIITM-K) library blog – http://iiitmklibrary.blogspot.comLibrary@Kendriya Vidyalaya Pattom in Kerala and its use of Twitter (http://twitter.com/librarykvpattom) to broadcast messages to patrons of new books/ notices to return books and other Web 2.0 tools (p. 227).

Librarians in Iran are also lagging behind in using information technologies. In a survey that covered 17 libraries belonging to Shahid Bahonar University, Kerman
Medical University and Islamic Azad University, located in Iran, it was found that among the serious difficulties to provide better services in the libraries were IT illiterate librarians (Mohsenzadeh and Isfandyari-Moghaddam, 2009).

Web 2.0 in Pakistan
In Pakistan, libraries are generally not using Web 2.0 technologies too much. The review of literature reveals that no study was conducted on the adoption of Web 2.0 in librarianship. A limited literature existed with respect to the use of Web 2.0 technologies in the country, e.g. social networks and blogging. Shaheen (2008) conducted a survey of 420 students studying in three public sector universities based in twin cities; Rawalpindi/Islamabad. This study described how students communicated among themselves when the then President, General Pervez Musharaf, of Pakistan declared emergency in the country on November 03, 2007. Along with other communication channels, the study found that the youth used social networks like Facebook, Orkut, MySpace, Classmates.com and MSN Spaces to promote freedom of speech and political awareness against the imposition of state of emergency in the country.

In another study titled “Blogging in Pakistan: Election 2008 as case study,” Zeb (2008) surveyed LIS professionals, bloggers and conducted four interviews of information professionssals as well as journalists. A total of 30 LIS professionals and 13 bloggers responded to the survey. He found that even after removing state emergency, which was imposed in 2007, the people of Pakistan were facing problems to communicate during the general election 2008 in the country. Due to the lack of interest, restriced access to the Internet and unfamiliarity of the old age generation towards ICT’s usage, mostly the young people used blogs as communication channel during the general election. The interviewees suggested that more blogs should be created in Urdu, the national language. In addition, “most of the respondents described blogging as an effective tool to spread democratic thought in Pakistan” (Zeb, 2008, p. 56). From the findings of these two studies, it can be concluded that Web 2.0 technologies were already being used in the country in the fields other than librarianship.

Problem statement
There are various technologies that have been grouped as Web 2.0, the second version of the world wide web. Like other spheres of life these technologies have made their space in libraries. It is assumed that librarians in Pakistan have also adopted these tools in their personal and professional lives. However, no empirical evidence is available on the use pattern of such technologies by this group. In order to improve the services offered by librarians and enhance efficiency in their personal lives, there is a need to explore the extent of adoption and pattern of use of Web 2.0 technologies by LIS professionals.

Objectives and methodology of the study
The present study was conducted to achieve the following objectives:

- to identify the Web 2.0 technologies adopted by Pakistani librarians;
- to find out how frequently librarians use these technologies; and
- to see the difference in the frequency of Web 2.0 use based on various personal and professional characteristics of librarians.
To achieve the objectives of this study the survey method was used. The participants of the survey comprised library professionals serving in academic, special, school and public libraries in Pakistan. The survey was administered through the online survey software (SurveyMonkey) and various Pakistani LIS e-mail discussion groups. Based on a literature review, a questionnaire was designed and pre-tested on five librarians. The data collection instrument consisted of questions regarding demographic information, type and purpose of Web 2.0 technologies adopted by librarians, need for training, perceived skill level of using internet and perceived ease of Web 2.0 technologies. Frequency of the use of Web 2.0 technologies was measured on a five-point scale. Additional space was also provided for suggestions to improve the quality and rate of adoption of Web 2.0 technologies by librarians.

Professional librarians were invited through listservs to participate in the survey. After two reminders 210 responded. The data from 192 completely filled in and usable questionnaires were analyzed using Statistical Package for Social Sciences (SPSS) version 16. The participation in this survey was voluntary. The respondents do not statistically represent the population of above 4,000 librarians in Pakistan. Although the results of this study present an insight into the topic but these cannot be generalized to the larger population.

Results and discussion

The personal and professional profile of the respondents is shown in Table II. Three-fourths of the participants were male. Although there are no statistics available

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
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<td>76</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>46</td>
<td>24</td>
</tr>
<tr>
<td>Professional experience</td>
<td>Up to 5 years</td>
<td>67</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>6-10 years</td>
<td>42</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>11-15 years</td>
<td>42</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>16 years or more</td>
<td>41</td>
<td>21</td>
</tr>
<tr>
<td>Place of work</td>
<td>University libraries</td>
<td>89</td>
<td>46</td>
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<td></td>
<td>College libraries</td>
<td>30</td>
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</tr>
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<td></td>
<td>School libraries</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Special libraries</td>
<td>41</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Public libraries</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>22</td>
<td>12</td>
</tr>
<tr>
<td>Perceived internet use skills</td>
<td>Novice</td>
<td>24</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Intermediate</td>
<td>69</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Expert</td>
<td>99</td>
<td>52</td>
</tr>
<tr>
<td>Perceived ease of Web 2.0 use</td>
<td>Easy</td>
<td>154</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Difficult</td>
<td>38</td>
<td>20</td>
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<tr>
<td>Purpose of Web 2.0 use</td>
<td>Professional</td>
<td>76</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Personal</td>
<td>77</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Both</td>
<td>39</td>
<td>20</td>
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Table II. Personal and professional profile of the respondents

Need for training in Web 2.0 use

<table>
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<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>148</td>
<td>77</td>
</tr>
<tr>
<td>No</td>
<td>44</td>
<td>23</td>
</tr>
</tbody>
</table>
on the gender ratio of the users of e-mail discussion groups in Pakistan, it is assumed that an equal number of female librarians are the members of these groups. However, females are less frequent in sending messages and taking part in surveys.

The majority of the respondents were youthful with less professional experience. 57 percent of them had up to ten years experience in the profession. About half participants were from university libraries. It was already established in many studies that university libraries in the country were in a better position with good technological infrastructure. Another group with comparatively better facilities is special libraries – represented by 21 percent of respondents. Owing to the poor ICT facilities, college, school and public librarians are less represented in this survey.

The participants were asked to give opinion on their perceived skills of using internet. About half considered themselves expert while 36 percent were at intermediate level. They were also asked to show their perception regarding the ease of use of Web 2.0 technologies. A large majority (80 percent) were of the opinion that these tools were easy to use. The results reveal that librarians were using Web 2.0 tools to fulfill their professional as well as personal needs.

In response to the question “Do you need training to use Web 2.0 technologies in the library?” 77 percent said “yes.” The results reveal that a group of librarians, who were “experts” in using the internet and perceived Web 2.0 technology as “easy to use,” needs more training to use these tool in libraries. It shows their eagerness towards using these innovations in their professional work.

Instant messaging was the Web 2.0 technology that was used by most of the respondents (113). The next most common technology was the social networking (Facebook, etc.) used by 98 librarians. Blogs and wikis were also popular. RSS and podcasting were least popular among the respondents (Figure 1). These results are generally in conformity with the findings of similar studies in advanced countries. Instant messaging, blogs, social networking, wikis and RSS have been popular among librarians of USA and UK.

The results reveal that the respondents were not very frequent users of Web 2.0 technologies (Table III). On average, they were providing reference services through
instant messaging and reading wikis and blogs on monthly basis. They occasionally participated in social networks, used RSS and posted messages to blogs. They rarely edited entries in wikis. The low adoption of Web 2.0 tools by librarians can be interpreted as the lack of awareness among them. They did not know the usefulness of such technologies in improving library services and their personal lives.

Inferential statistics were calculated to test the hypotheses regarding the possible differences in the frequency of technology use in various groups based on personal and professional characteristics. The results of Independent Samples t-test (two groups) and Analysis of Variance – ANOVA (more groups) are shown in Table IV.

There was no significant difference in the frequency of Web 2.0 use between male and female librarians. This finding rejects the perceptions about a Muslim society with conservative attitudes about the use of internet among women. The internet is not perceived as good for morality in common middle class families in Pakistan. Some

<table>
<thead>
<tr>
<th>Rank</th>
<th>Statement</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I provide reference service through instant messaging</td>
<td>2.80</td>
<td>1.78</td>
</tr>
<tr>
<td>2</td>
<td>I read wikis</td>
<td>2.53</td>
<td>1.69</td>
</tr>
<tr>
<td>3</td>
<td>I read blogs</td>
<td>2.51</td>
<td>1.68</td>
</tr>
<tr>
<td>4</td>
<td>I participate in social network</td>
<td>2.40</td>
<td>1.65</td>
</tr>
<tr>
<td>5</td>
<td>I add messages to blogs</td>
<td>1.95</td>
<td>1.44</td>
</tr>
<tr>
<td>6</td>
<td>I use RSS</td>
<td>1.88</td>
<td>1.39</td>
</tr>
<tr>
<td>7</td>
<td>I edit entries in wikis</td>
<td>1.44</td>
<td>1.08</td>
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**Table III.**
Descriptive statistics of various uses of Web 2.0 technologies

<table>
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<tr>
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<th>Values</th>
<th>Mean</th>
<th>Statistics</th>
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</thead>
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<td>$t = 0.651$</td>
<td>0.516</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>2.12</td>
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<td></td>
</tr>
<tr>
<td>Professional experience</td>
<td>Up to 5 years</td>
<td>2.11</td>
<td>$F = 1.446$</td>
<td>0.231</td>
</tr>
<tr>
<td></td>
<td>6-10 years</td>
<td>2.45</td>
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<td>11-15 years</td>
<td>2.33</td>
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<td></td>
<td>16 years or more</td>
<td>2.03</td>
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<td></td>
</tr>
<tr>
<td>Place of work</td>
<td>University libraries</td>
<td>2.26</td>
<td>$F = 0.524$</td>
<td>0.758</td>
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<td></td>
<td>College libraries</td>
<td>2.06</td>
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<td></td>
<td>School libraries</td>
<td>1.57</td>
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<td>Special libraries</td>
<td>2.21</td>
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</tr>
<tr>
<td></td>
<td>Public libraries</td>
<td>2.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>2.37</td>
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</tbody>
</table>

**Table IV.**
Differences in Web 2.0 use based on various personal and professional characteristics of librarians (independent samples t-test and ANOVA)

Perceived internet use skills
- Novice 1.81
- Intermediate 1.89
- Expert 2.54

Perceived ease of Web 2.0 use
- Easy 2.33
- Difficult 1.74

**Note:** * Significant at $p < 0.01$
people do not allow women to use it (Shafique and Mahmood, 2009). In the case of librarians, all can freely use new technologies on the internet.

No significant difference was found in four groups based on the length of professional experience. It also rejects the perception that the internet is a tool for younger generation. All professional librarians were using this new technology on the same pace. Place of work also do not have any effect on the use pattern of librarians. Librarians of all types of libraries, who participated, were using Web 2.0 tools with the same frequency.

A statistically significant difference was found among groups based on the perceived internet use skills of the participants of the study. A high difference ($F = 10.294$) was found between “experts” and other two groups. “Experts” were more frequent users of these new technologies than the less skilled. This finding shows that the level of expertise in the use of internet positively affects the use of innovative web technologies among librarians.

Similarly, perceptions of the respondents regarding the ease of Web 2.0 use have a significant relationship with the frequency of use. The librarians who perceived Web 2.0 as “easy to use” were more frequent users than the others. It shows that the self-efficacy has a direct relationship with the use of technology as many studies have already suggested.

A total of 88 respondents used the space for suggestions to improve the adoption of Web 2.0 technologies among Pakistani librarians and libraries. They mentioned that there was a lack of awareness about Web 2.0 technologies among library staff. Lack of computer literacy, less availability of computers and internet facility are major hindrances toward using Web 2.0 technologies in library setting. The library professionals suggested that the training programs could bring revolutionary changes in this area.

**Conclusion and recommendations**

The literature has provided evidence that Web 2.0 technologies are being used in library setting all over the world. In Pakistan, no study regarding adoption of Web 2.0 technologies by librarians was conducted so far. The same situation persists in the neighboring developing countries. In the present study, a majority of the respondents were serving in the academic libraries. The respondents having excellent skills of internet use were more inclined toward adoption of Web 2.0 technologies in the libraries. Although all the library professionals were using the internet but 20 percent of respondents were unable to use Web 2.0 technologies easily. The frequency of use revealed that Pakistani librarians were generally less inclined toward adoption of Web 2.0 technologies. Lack of computer literacy, low availability of computers and internet facilities were the big hindrances toward adoption of Web 2.0 technologies by librarians. Training programs could enable a librarian to cope with the Web 2.0 technologies.

The following recommendations can improve the quality and extent of Web 2.0 adoption in librarians of Pakistan:

- LIS professionals in the country should be made oriented with the usefulness of Web 2.0 technologies in their professional as well as personal lives. Professional library associations, library schools and employers can arrange seminars on this topic.
• ICT infrastructure in the libraries should be upgraded. For this purpose, the Higher Education Commission of Pakistan should improve existing ICT infrastructure in university libraries. To improve infrastructure in college, public and special libraries, additional budget should be provided by the federal, provincial and local governments.

• Training programs on technical aspects and implementation of Web 2.0 technologies should be arranged. The role of library schools (for pre-service training) and library associations (for in-service training) is vital in this regard. It is suggested that the Higher Education Commission should provide foreign training opportunities to LIS professionals.

• To explore the factors affecting the adoption of Web 2.0 technologies in libraries and librarians, a comprehensive study should be conducted on the country level. Further studies should also be conducted on the use of individual technologies in Web 2.0.

References


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