Impact of Web 2.0 technologies on academic libraries: a survey of ARL libraries

Khalid Mahmood
Department of Library and Information Science, University of the Punjab, Lahore, Pakistan, and

John V. Richardson Jr
Department of Information Studies, University of California Los Angeles, Los Angeles, California, USA

Abstract

Purpose – The paper aims to present the results of a survey of academic libraries about the adoption and perceived impact of Web 2.0 technologies.

Design/methodology/approach – A total of 67 US academic libraries participated among the members of the Association of Research Libraries.

Findings – It was found that each library was using some form of technology, such as RSS, blogs, social networking sites, wikis and instant messaging. On a Likert-type scale the participant librarians significantly preferred the advantages of Web 2.0 over its disadvantages. There was a significant positive correlation between the extent of Web 2.0 adoption in libraries and librarians’ opinion about their advantages.

Originality/value – The paper is useful for future planning of the use of Web 2.0 technologies in academic libraries.

Keywords Academic libraries, Websites, Wikis, Internet

Paper type Research paper

Introduction

According to Wikipedia (2010), the free Web encyclopedia:

The term Web 2.0 is commonly associated with web applications that facilitate interactive information sharing, interoperability, user-centered design, and collaboration on the World Wide Web. A Web 2.0 site gives its users the free choice to interact or collaborate with each other in a social media dialogue as creators (prosumer) of user-generated content in a virtual community, in contrast to websites where users (consumer) are limited to the passive viewing of content that was created for them.

The term became popular because of the O'Reilly Media Web 2.0 Conference in 2004. “Although the term suggests a new version of the World Wide Web, it does not refer to an update to any technical specifications, but rather to cumulative changes in the ways software developers and end-users utilize the Web” (Abram, 2008).

As libraries and library managers have usually been early and enthusiastic adopters of new information technologies they have welcomed Web 2.0 with the same zeal. Applying the concept of Web 2.0 to libraries, Michael Casey coined the term “Library 2.0” in September 2005. It embraced a new philosophy of library service. “The heart of Library 2.0 is user-centered change. It is a model for library service that encourages constant and purposeful change, inviting user participation in the creation
of both the physical and the virtual services they want, supported by consistently evaluating services. It also attempts to reach new users and better serve current ones through improved customer-driven offerings” (Casey and Savastinuk, 2006). According to Boxen (2008), “Most tech-savvy librarians have embraced at least one or two aspects of Library 2.0 and incorporated them into either their library, their personal interactions, or both”.

**Literature review**

At the time of writing, no specific study has been conducted on the impact of Web 2.0 technologies on academic libraries. However, brief mentions on this topic are found in various surveys, case studies and opinion papers. The review presented here covers positive comments or benefits of such technologies as well as negative comments or problems and challenges related to the technologies.

In a survey of 1,241 European librarians conducted by Harnesk (2010), the participants opined about the goals of using social media in libraries as:

- maximize library exposure (78 percent);
- modernize the library image and e-reputation (59 percent);
- promote specific content offers (53 percent);
- build discussion groups and collaborative work (53 percent);
- reach a new audience of potential users (40 percent); and
- publish library news and press releases (38 percent).

Ninety-four percent of librarians showed positive impressions about the use of social media in libraries. The main Web 2.0 tools used by libraries include social networking, blogging, widgets, micro-blogging, social bookmarking, wikis, photo sharing, video sharing, and document sharing.

In a survey of Chinese librarians conducted by Cao (2009), the participants stated that Web 2.0 technologies added the following values to their libraries and their services:

- increased library’s relevancy to users;
- improved library’s image;
- allowed rich, interactive, timely, convenient services so as to improve service level and quality, and broaden range of services;
- increased users’ participation, and increased interactions and communication with users;
- broadened librarians’ perspective, and facilitated obtaining users’ feedback and following readers’ interest trends;
- drew on collective knowledge to better serve users;
- improved librarians’ inter-departmental communication and expedited information dissemination to the users;
- facilitated instant problem solving with the benefit of traceable services; and
- improved knowledge sharing and collaboration.

The most common technologies used in libraries were blogs, RSS and wikis.
Bejune and Ronan’s (2008) survey of ARL member libraries reported the benefits of using social software as enhanced visibility, communication, marketing, better collaboration, improved service, and resource discovery. In a survey of librarians in the UK, Shoniwa and Hall (2007) found that the application of Library 2.0 created a new enthusiasm within the library environment:

Library 2.0 has made it possible to engage the users in ways that have not been possible before, for example, through podcasts [...]. A further impact of service delivery by Web 2.0 tools has been increased user-independence and thus a reduction in needs for end-user training.

RSS and blogging were the most popular services in British libraries. Fernandez (2009) listed the strengths and opportunities of social media for libraries as:
- They are easy to set up and ready to use almost immediately;
- Libraries can reach out to their clientele at large in the shortest time and in the most efficient manner; Users are able to contribute their own ideas about services and resources for libraries to consider;
- Social media allow librarians to think outside the box; Site administrators have some control over the content of their social media;
- Social media are excellent opportunities for librarians to market their services and collections to their clientele; Such media enable libraries to reach a wide range of their users and to attract new users; and Libraries have the opportunity to hear from their users about the kind of services they want.

According to Peltier-Davis (2009), there are four immediate benefits of implementing Web 2.0 technologies in library services, i.e.:
1. proactive services;
2. improved internal and external communications;
3. easy implementation; and
4. survival of libraries.

Miranda et al. (2010) mentioned the pros of Web 2.0 for librarians. They include “collaboration, customization, communication, knowledge generation, sharing, updating, flexible tools, speed, reduction of costs, training, and facilitates experimentation.” They also mentioned pros of such technologies for library users. They are “low level of complexity, requires little technical expertise, reduction of costs, flexibility, user involvement, time saving, reduces information overload, social tagging, idea sharing, and knowledge generation and sharing.”

In a study of institutional repository at Columbia University, Cocciolo (2010) established that the application of Web 2.0 in designing the project garnered significantly more community participation as user contributions increased by 9,728 percent. O’Dell (2010) mentioned that with the use of new social media, library staff enjoyed professional development opportunities at a very low cost. Nogueira (2010) noted the benefit of the use of Web 2.0 technologies as the “growing number of public they reach (visitors, potential users or actual users).”

The problems in the use of Web 2.0 in academic libraries are related to policy, technology, staff, and users. In a survey of European librarians conducted by Harnesk (2010), the participants mentioned difficulties they faced in implementing social media in libraries. They include:
- takes too much time to maintain (41 percent);
- too many social media features/tools to learn (28 percent);
• low interest of users (26 percent);
• restrictive internal organization policies (24 percent);
• information security (20 percent); and
• confidentiality issues (18 percent).

Bejune and Ronan’s (2008) survey of ARL libraries reported the challenges of using social software as:
• finding the time to learn and use the tools;
• developing staff expertise;
• competing priorities;
• getting staff buy-in;
• user privacy concerns; and
• keeping up with technology.

Issues in implementing Web 2.0 technologies in Chinese libraries, mentioned by Cao (2009), include management buy-in, lack of awareness, lack of user participation, and lack of technology staff. Garcia-Perez and Ayres (2010) surveyed the users of a wiki about the reasons of decline in its use. The answers included lack of time, lack of interest/need, and lack of direct accessibility through a desktop or homepage.

In a survey by Chawner (2008), LIS professionals in New Zealand mentioned problems like doubtful quality of information, privacy and security issues, increasing rate of change and challenge of keeping up, and lack of staff training. Based on a survey of Web 2.0 implementation in information literacy instruction, Luo (2010) stated the problems to be a lack of skilled staff, a lack of Web 2.0 knowledge among students, and online vandalism in wikis. In a focus group study conducted by Burhanna et al. (2009), students mentioned problems of authority of information and the privacy of users.

Mathews (2007) mentioned threats and dangers related to social networking sites. They include online predators, spyware/viruses, identity theft/stalking, cyber-bullying, invasion of privacy, and addiction. Morris and Allen (2008) summarized potential barriers to the successful implementation of Library 2.0 in academic libraries as:
• a perceived lack of privacy on the part of students;
• the possibility of identity theft;
• lack of peer-reviewed content;
• the perception that such services might create information overload;
• copyright infringement;
• the breaching of licensing agreements if students outside the organization are able to access the content;
• legal implications if individuals post illegal material such as race hate, defamation, pornographic or terrorist-encouraging materials;
• library and academic staff lacking the necessary skills to develop and use the system; and
• the difficulties and extra cost associated in making such systems.
Brown-Sica and Beall (2008) discussed the problem of hate speech in user-generated content in libraries. Byrne (2008) discussed the legal and ethical issues related to user-generated content in Web 2.0 libraries.

Cvetkovic (2009) discussed why Library 2.0 services fail to have the expected impact. The reasons include:

- implementation of such technologies without proper goal setting;
- lack of staff time;
- lack of maintenance;
- lack of user awareness and interest;
- lack of staff training; and
- privacy concerns.

Kelly et al. (2009) identified barriers to the effective deployment of Web 2.0 services to include sustainability risks, digital preservation risks, user disinterest, and accessibility issues. DeFebbo et al. (2009) stated the limitations of microblogging to be the very small character limit, a lack of archiving of posts, and a lack of authority. Mincic-Obradovic (2009) noted that as anyone can edit the text in a wiki, it “lacks authority and control over its entries, and is prone to vandalism”.

Fernandez (2009) listed the weaknesses and threats of social media for libraries as:

Some social media have limitations on the amount of information you can input; Libraries may be exposing themselves to criticism; Some social media require downloading, which can be a problem in some organizations; Social media may be open to unsavory elements that can sabotage social websites in many ways; These sites are usually beyond the control of the librarians who manage them; and social media users can easily unsubscribe at the click of a button.

Phillips (2009) noted the problem of addiction to Web 2.0 technologies, particularly in young adults. Mullan (2009) mentioned concerns associated with using social media by law librarians as lack of privacy, time consuming, information overload and “frolleagues”.

Miranda et al. (2010) mentioned the cons of Web 2.0 for librarians. They include:

- Too many different tools, doubts about the reliability of tools, difficulties in standardization, low level of security & privacy, low level of cataloguing information, the lifespan of tools, confidentiality concerns, ownership of data, and legal concerns.

They also mentioned cons of such technologies for library users. They are “rumors, security and legal concerns, dependence, second-hand information, data loss, and data misuse”. According to Nogueira (2010), many organizations associate Web 2.0 applications with personal leisure. They do not recognize these applications as “official” or valid. The other disadvantages, she mentioned, include data protection issue, possibility of anonymous users using abusive language, and the time-consuming nature of these applications.

Discussing the use of microblogging in libraries Hricko (2010) argued that many microblog applications were open source technologies; they could easily disappear. Another problem is that user accounts can attract a wide range of unwanted connections and inappropriate material. Some blogging sites require money for
additional space. Additional equipment may be needed. More staff time is required to run and monitor such services. Security and privacy are also serious issues.

Joint (2010) stated concerns related to Web 2.0 technologies as being poor quality of information on social networking sites and lack of data protection and privacy. Rudman (2010) listed risks related to the application of Web 2.0 technologies as:

- security threats relating to electronic intrusion by hackers or malicious software;
- placing reliance on external software;
- continuous changes in user interface;
- shortages of technical skills and resources;
- software and websites may not be adequately tested;
- data leakage and loss of confidentiality and privacy;
- untrustworthy information sources;
- unproductive use of organizational resources and time; and
- exposing an organization to legal liability and financial penalties from regulatory compliance breaches, including copyright breaches or plagiarism.

Redden (2010) mentioned a drawback of social tagging by stating that folksonomies cannot be equated to taxonomies:

Tags are messy. They lack precision and have no ability to control synonyms or related terms. Tagging also presents challenges in structure, such as single and plural terms, difficulty in using phrases as tags and homonyms, and potential confusion with homographs.

**Problem statement and objectives**

There are various technologies that have been grouped as Web 2.0, the second version of the worldwide web. As in other spheres of life, these technologies have their place in academic libraries. Libraries and their users are enjoying the benefits of Web 2.0 technologies but they are also prone to problems and threats. However, no empirical data are available on the impact of such technologies in libraries. In order to improve the use of these technologies in libraries, there is a need to study librarians’ perceptions (whether positive or negative) of Web 2.0 technologies with regard to academic library services.

This study was conducted to accomplish the following objectives:

- to identify the adoption of various Web 2.0 technologies in academic libraries; and
- to articulate the perceptions of academic librarians about advantages and disadvantages of these technologies for libraries.

In order to do this, the following null hypotheses were tested in this study.

*H0.* There is no significant difference between the perceptions of academic librarians about advantages and disadvantages of Web 2.0 technologies in libraries ($\mu_{\text{advantages}} = \mu_{\text{disadvantages}}$).

*H0.* There is no significant relationship between extent of the adoption of Web 2.0 technologies and perceptions of academic librarians about their impact.
Methodology
A common survey research method was employed in this study. A questionnaire was developed for collection of data based on the review of literature. A list of various Web 2.0 technologies was provided, with an option for “other” to identify the adoption of these technologies in libraries. To secure data on the perceptions of participants, two sets of statements were devised showing the advantages and disadvantages of Web 2.0 technologies in academic libraries. With both sets of statements, a five-point Likert-type scale was used, which is one of the most popular rating scales to measure attitudes (Dunn-Rankin et al., 2004).

A draft of the data collection instrument was sent to experts for content validity and suggestions for improvement. Ninety-five persons in various countries who had authored books and articles on Web 2.0 were contacted for this purpose. Twenty-eight experts commented on the instrument. Sixty percent of them validated the statements, while the others helped in improving the draft. Cronbach’s $\alpha$ is a known numerical coefficient to measure the reliability of summated scales. It evaluates the internal consistency of scales (Gliem and Gliem, 2003). Both scales used in this study were found to be highly reliable, as the $\alpha$ values were 0.845 and 0.921 for advantages and disadvantages, respectively.

The population for this study consisted of 100 academic libraries in the USA listed in the Association of Research Libraries’ membership list (see www.arl.org/arl/membership/members.shtml). ARL member libraries from Canada and non-academic libraries were excluded to ensure the homogeneity of population. Although the ARL has a membership of almost all large academic libraries, these are not a representative sample of US academic libraries. Therefore, the results of this study should not be generalized.

The survey was conducted during September-October 2010. A web-based survey tool, SurveyMonkey, was used for data collection. A survey form, designed in Microsoft Word, was also sent to the participants via e-mail as an alternative means of data collection. After three reminders, 67 libraries responded (61 online and six by e-mail). The Statistical Package for Social Sciences (SPSS) was used for descriptive and inferential analysis of data.

Results and discussion
Analysis of the data from 67 libraries reveals that each library was using some form of Web 2.0 technology. RSS, blogs, social networking sites, wikis and instant messaging were found to be the most adopted technologies, as these were used in more than 80 percent of academic libraries. Among the list of 16 Web 2.0 technologies, the least used include customized/personalized webpages, virtual environments/worlds, and vertical search engines (Table I). The results of this study confirm those of previous studies. The less used technologies are not only new, but many librarians are not aware of their usefulness for their work.

With the basic philosophy of interacting with users, libraries use Web 2.0 tools in various ways. Really simple syndication (RSS) enables users to receive content from library blogs and other web pages. Using this function, multiple information sources are aggregated into one page so that users can scan information and select articles of interest for more detail, alleviating information overload. Blogs enable libraries to share news and new acquisitions with users. Users can give their feedback by commenting on items in blogs. Microblogging software, such as Twitter, “allows users to share their thoughts instantly with everyone in its network, as long as entries are
140 characters or less. The word limit forces authors to compress and summarize their thoughts. For the reader, it reduces information overload because the essence of information can be quickly scanned (Kim and Abbas, 2010). Through social networking sites (SNS) like Facebook, libraries are marketing their services. Wikis facilitate knowledge sharing, collaborative authoring, and online discussion in libraries. Instant messaging (IM) is an interactive way to provide library reference services. Other tools are being used in libraries for media sharing with their users.

Among the list of 19 advantages or positive features of Web 2.0 technologies, the participants agreed with many of them (Table II). The most preferred features, with \( \mu \) scores of greater than 3.5, include their ability to design innovative services, sharing library news, communication between staff and users, marketing of service and resources, enhancing library image, soliciting user feedback, and inter-departmental communication. There is no feature for which the participants showed disagreement. The cumulative \( \mu \) score (3.68) can be interpreted as an overall agreement of the respondents with the advantages of these technologies for their libraries.

The academic librarians showed less agreement with the disadvantages of Web 2.0 technologies in libraries (Table III). There is only one feature that got the attention of 57 percent of the respondents, i.e. the lack of archiving of shared content. Although there were mentions of disadvantages of these technologies in the literature, most of the participants in this study did not consider them a serious threat for libraries.

A paired samples \( t \)-test was applied to calculate the difference between cumulative \( \mu \) scores of advantages and disadvantages (Table IV). The result rejected the null hypothesis and found a significant difference in opinions of the participants as they generally favored statements on advantages while they disfavored those on the problems of Web 2.0 in libraries.

Pearson’s product-moment correlation coefficient \((r)\) was calculated to find the relationship between the extent of Web 2.0 adoption in libraries and cumulative \( \mu \) scores for statements on advantages and disadvantages (Table V). The analysis revealed a...
A statistically significant positive relationship in the case of advantages, i.e. the null hypothesis was rejected. Librarians who had experienced more forms of Web 2.0 technologies showed a stronger opinion in favor of their advantages and benefits for libraries. In the case of disadvantages, no statistically significant relationship was found. Therefore, the null hypothesis, stating the absence of such relationship, was accepted.

The descriptive and inferential statistical analysis of data on the use and impact of Web 2.0 technologies in academic libraries reveals a positive opinion of librarians towards the benefits of such technologies. Although there were problems, they did not bother users.

The participants were provided a space for further comments on the topic. Sixteen respondents contributed their opinion in this free text box. Most of them praised the role of Web 2.0 technologies for library services. They believed that such tools were essential for the twenty-first century research library. These were generally low-risk investments having real promise to “force us to change the ways in which we think about both information and information literacy”. “Some tools are wonderful and immediately embraced by our users”. “Web 2.0 technologies are extremely useful, low-cost, and can be easy to set up and use without specialized programming help. They improve two-way communication with our users”.

Some respondents complained of the problems related to Web 2.0 technologies. “Most of us have very little idea of how Web 2.0 is best implemented in libraries. Web 2.0 is a vague concept that has many different interpretations and applications”. One participant was concerned about rapidly changing trends or fads. One was of the opinion that “most of the students do not like these technologies. Instead, they prefer to

<table>
<thead>
<tr>
<th>Rank</th>
<th>In general, Web 2.0 technologies . . .</th>
<th>Mean</th>
<th>SD</th>
<th>Percentage who “agreed” or “strongly agreed”</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Can design new services that were not possible before</td>
<td>4.25</td>
<td>0.70</td>
<td>91</td>
</tr>
<tr>
<td>2</td>
<td>Effectively share library news/events/announcements</td>
<td>4.19</td>
<td>0.68</td>
<td>88</td>
</tr>
<tr>
<td>3</td>
<td>Increase interaction between staff and users</td>
<td>4.15</td>
<td>0.63</td>
<td>90</td>
</tr>
<tr>
<td>4</td>
<td>Effectively market library services and resources</td>
<td>4.00</td>
<td>0.67</td>
<td>78</td>
</tr>
<tr>
<td>5</td>
<td>Enhance library image among users</td>
<td>3.94</td>
<td>0.69</td>
<td>79</td>
</tr>
<tr>
<td>6</td>
<td>Easily solicit user feedback</td>
<td>3.87</td>
<td>0.74</td>
<td>78</td>
</tr>
<tr>
<td>7</td>
<td>Improve inter-departmental communication and knowledge sharing among library staff</td>
<td>3.72</td>
<td>0.81</td>
<td>64</td>
</tr>
<tr>
<td>8</td>
<td>Create enthusiasm in library staff</td>
<td>3.49</td>
<td>0.75</td>
<td>55</td>
</tr>
<tr>
<td>9</td>
<td>Are low-cost or free</td>
<td>3.48</td>
<td>1.15</td>
<td>52</td>
</tr>
<tr>
<td>10</td>
<td>Require little user training as most tools are user-friendly</td>
<td>3.43</td>
<td>0.87</td>
<td>57</td>
</tr>
<tr>
<td>11-13</td>
<td>Improve students’ information literacy competencies</td>
<td>3.40</td>
<td>0.78</td>
<td>48</td>
</tr>
<tr>
<td>11-13</td>
<td>Make searching for information easier</td>
<td>3.40</td>
<td>0.91</td>
<td>49</td>
</tr>
<tr>
<td>11-13</td>
<td>Make use of library resources and services more effective</td>
<td>3.40</td>
<td>0.63</td>
<td>45</td>
</tr>
<tr>
<td>14</td>
<td>Increase number of library users</td>
<td>3.36</td>
<td>0.71</td>
<td>40</td>
</tr>
<tr>
<td>15</td>
<td>Save users’ time by providing personalized information</td>
<td>3.31</td>
<td>0.70</td>
<td>37</td>
</tr>
<tr>
<td>16</td>
<td>Are best source of information democratization</td>
<td>3.28</td>
<td>0.74</td>
<td>31</td>
</tr>
<tr>
<td>17</td>
<td>Effectively involve users in collection development</td>
<td>3.10</td>
<td>0.84</td>
<td>30</td>
</tr>
<tr>
<td>18</td>
<td>Decrease user-dependence on library staff</td>
<td>3.06</td>
<td>0.83</td>
<td>30</td>
</tr>
<tr>
<td>19</td>
<td>Effectively organize library resources</td>
<td>3.03</td>
<td>0.85</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Cumulative</td>
<td>3.68</td>
<td>0.44</td>
<td>30</td>
</tr>
</tbody>
</table>

Notes: 1 = Strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree
### Table III.
Perceptions of participants about disadvantages of Web 2.0 technologies

<table>
<thead>
<tr>
<th>Rank</th>
<th>In general, Web 2.0 technologies ...</th>
<th>Mean</th>
<th>SD</th>
<th>Percentage “agreed” or “strongly agreed”</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lack in archiving/preserving shared contents</td>
<td>3.48</td>
<td>0.93</td>
<td>57</td>
</tr>
<tr>
<td>2</td>
<td>Create doubts on longevity of tools as you rely on a third party’s rapidly changing services</td>
<td>3.25</td>
<td>0.99</td>
<td>49</td>
</tr>
<tr>
<td>3-4</td>
<td>Are difficult to maintain for lack of staff time</td>
<td>3.21</td>
<td>0.99</td>
<td>49</td>
</tr>
<tr>
<td>3-4</td>
<td>Lack in standardization of tools</td>
<td>3.21</td>
<td>0.85</td>
<td>36</td>
</tr>
<tr>
<td>5</td>
<td>Are affected by institutional barriers like firewalls or filtering software</td>
<td>3.16</td>
<td>0.93</td>
<td>43</td>
</tr>
<tr>
<td>6-7</td>
<td>Are difficult to design and maintain as staff lack special training</td>
<td>2.85</td>
<td>0.96</td>
<td>33</td>
</tr>
<tr>
<td>6-7</td>
<td>Create information overload</td>
<td>2.85</td>
<td>1.06</td>
<td>34</td>
</tr>
<tr>
<td>8-9</td>
<td>Create threats to user privacy</td>
<td>2.79</td>
<td>0.81</td>
<td>19</td>
</tr>
<tr>
<td>8-9</td>
<td>Are perceived as personal leisure by users and decision makers do not value them</td>
<td>2.79</td>
<td>0.88</td>
<td>25</td>
</tr>
<tr>
<td>10</td>
<td>Are too hard to choose from the varied options available</td>
<td>2.73</td>
<td>0.90</td>
<td>19</td>
</tr>
<tr>
<td>11-12</td>
<td>Create threats to data security</td>
<td>2.64</td>
<td>0.85</td>
<td>15</td>
</tr>
<tr>
<td>11-12</td>
<td>Carry legal implications as users post race hate, defamation or pornographic contents</td>
<td>2.64</td>
<td>0.85</td>
<td>18</td>
</tr>
<tr>
<td>13</td>
<td>Provide unauthentic content/unreliable information</td>
<td>2.55</td>
<td>0.91</td>
<td>18</td>
</tr>
<tr>
<td>14</td>
<td>Are difficult to use as users lack awareness and training</td>
<td>2.49</td>
<td>0.81</td>
<td>12</td>
</tr>
<tr>
<td>15-16</td>
<td>Consume too much time of users</td>
<td>2.42</td>
<td>0.78</td>
<td>9</td>
</tr>
<tr>
<td>15-16</td>
<td>Breach copyright law/licensing agreements</td>
<td>2.42</td>
<td>0.84</td>
<td>9</td>
</tr>
<tr>
<td>17</td>
<td>Make library dependent on staff and facilities of IT center</td>
<td>2.40</td>
<td>0.95</td>
<td>16</td>
</tr>
<tr>
<td>18</td>
<td>Are irrelevant to users’ needs resulting in their low participation</td>
<td>2.27</td>
<td>0.79</td>
<td>6</td>
</tr>
<tr>
<td>19</td>
<td>Slow down the network speed</td>
<td>1.97</td>
<td>0.74</td>
<td>2</td>
</tr>
<tr>
<td>20</td>
<td>Require high cost hardware/software</td>
<td>1.93</td>
<td>0.75</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Cumulative</td>
<td>2.66</td>
<td>0.68</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:** 1 = Strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

### Table IV.
Result of t-test regarding perceptions about advantages and disadvantages

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
<th>t</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.68</td>
<td>2.66</td>
<td>8.839</td>
<td>0.000*</td>
</tr>
</tbody>
</table>

**Note:** *Significant at p < 0.01

### Table V.
Pearson’s correlation between extent of Web 2.0 adoption and perceptions

<table>
<thead>
<tr>
<th>Perception</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceptions about advantages</td>
<td>0.321*</td>
</tr>
<tr>
<td>Perceptions about disadvantages</td>
<td>−0.180</td>
</tr>
</tbody>
</table>

**Note:** *Significant at p < 0.01
have information pre-packaged and delivered in more formal settings, e.g. the classroom, etc.”. One respondent complained of the implementation strategy. “There is not enough communication to and among library staff about Web 2.0 to make its adoption welcome or desired. Decisions are made without input from front-line public service staff that still interacts with users in the physical world, creating an aura of distrust and non-acceptance”. One participant argued that proper implementation can minimize the disadvantages:

Several of these impacts, e.g. legal implications, are dependent more on the policies and practices followed as they are implemented than on the technology itself. It is important to establish necessary policies and practices as technologies are implemented to keep information safe and to ensure that user privacy and legal implications are taken into account.

A few participants also criticized the statements devised to measure their perceptions. They said that the statements were broadly defined, while different Web 2.0 tools performed specific functions. Therefore, it was hard to interpret the questions to give one answer for all Web 2.0 tools.

Conclusion
The results of this study reveal that all participant academic libraries were using some form of Web 2.0 technologies. However, there was a difference in their adoption. Some tools were more popular than others. That librarians favor the advantages of some tools more strongly reveals the potential these technologies have shown in improving library services. Librarians who have experienced more forms of such technologies showed more agreement with their positive features. Although the majority of the librarians did not agree with most of negative features, there were some problems that gained the attention of a reasonable number of participants. These include doubts regarding the longevity of tools, lack of staff time for maintenance, lack of standardization, institutional barriers in implementation, lack of staff training, and information overload. There is a need to promote the potential these technologies for libraries. The preferences of librarians that surfaced in this study can be used for this purpose. Libraries worldwide can follow the best practice models in using Web 2.0 technologies. It is also necessary that decision makers and technologists overcome the problems in their proper implementation and the threats that these technologies pose to their users.

Although some participants complained of the broad nature of the scale used in the measurement of their opinion, it is the first scale to be developed for this purpose. The statements were overwhelmingly validated by experts in the field. Statistical measures also confirmed the high reliability of the scale. This scale is a contribution to the literature on Web 2.0 in libraries. It can be used in future studies. Future research should also focus on the benefits and problems related to individual technologies in libraries. Other types of libraries should also be studied.

References


Gliem, J.A. and Gliem, R.R. (2003), “Calculating, interpreting, and reporting Cronbach’s alpha reliability coefficient for Likert-type scales”, paper presented at the Midwest Research to Practice Conference in Adult, Continuing, and Community Education, Ohio State University, Columbus, OH.


About the authors
Khalid Mahmood is a Professor of Library and Information Science at the University of the Punjab, Lahore, Pakistan. He is the author of five books and more than 100 research articles. His areas of interest include the use of information and communication technologies in libraries and LIS education. Khalid Mahmood is the corresponding author and can be contacted at: khalidmahmood@yahoo.com or khalid.dlis@pu.edu.pk

John V. Richardson Jr is a Professor of Information Studies at the University of California, Los Angeles (UCLA), USA. He is an internationally renowned scholar in reference work and history of education for librarianship. He has contributed ten books and many articles in these areas and has won numerous awards. He has also served as the Editor of Library Quarterly, the oldest scholarly journal in library and information studies.

To purchase reprints of this article please e-mail: reprints@emeraldinsight.com
Or visit our web site for further details: www.emeraldinsight.com/reprints