The college students' response to customized information services based on Library2.0 technologies at universities in Nanjing

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Abstract   Through a questionnaire survey of students' response from 6 universities in Nanjing, this paper aims to determine their varying degrees of satisfaction about the customized information service based on Library2.0 technologies. In so doing, the authors carefully examined the data collected from the returned questionnaires about such key issues as the students' perceptions about the customized information service via a Library2.0 platform, self-initiated use experience of such a mechanism, their achieved information searching results *vis-à-vis* their expectations, etc. In addition, the authors also made a comparative study between information providers (i.e. librarians) and information consumers (i.e. students) at Chinese and American academic libraries.

Keywords   Academic library, Users' need, Library 2.0, Customized information service, University in Nanjing

1   Background

As a new concept of library practice stemming from the Web2.0[①] environment, Library2.0 customized information delivery services play a central role in today's multifaceted library functions of the society. Such an undertaking is derived from the theory and applicable technologies of Web2.0. It aims at meeting users' information demands in a customized manner and emphasizes the desirability of library users' interactive participation. Such a *modus operandi* is already widely practiced in academic libraries abroad, especially on American campuses and those of other developed countries[1].

[①] Web2.0 is a new generation Internet model. It is represented by websites including Flickr, Craigslist, Linkedin, Tribes, Ryze, Friendster and Del.icio.us, and some applications, such as Blog, TAG, SNS, RSS and Wiki. Nowadays, Web2.0 has been widely used to serve library users with customized information services. In comparison with Web1.0, Web2.0 focuses more on the interaction and content contribution for grassroots.

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In China, many prominent academic libraries such as those located in Taiwan, Hong Kong, Shanghai and Xiamen took the initial step to launch such a program. They have succeeded in varying degrees in their pioneering experimentation. Nowadays, many academic libraries in China have been working earnestly in promoting the practice of a customized information delivery scheme supported by Library2.0 technologies. But only a few literature studies have been conducted on the information users' expectations and their satisfaction degree about the customized information service. Therefore, we decided to conduct a questionnaire survey on college students about their experience in accessing customized information services. This survey has been carried out at 6 universities in Nanjing. Through the questionnaire survey and a supplementary website survey, we have gained a much clearer picture about the college students' information needs, their expectations for customized information services and the level of satisfaction about the quality of information service rendered by their university librarians via the Library2.0 platform.

2   Methodology

2.1   Survey types

Our study involved two types of surveys, i.e. a questionnaire survey and a website survey.

The questionnaire covers the ground of 6 universities in Nanjing, among them, two are "985 Projects" evaluated universities, such as Nanjing University and Southeast University; three are "211 Projects" universities[②], consisting of Nanjing Agricultural University, Nanjing Normal University and Nanjing University of Science and Technology, and one ordinary college, which is Nanjing University of Finance & Economics. The targeted respondents to our research is the matriculated full-time students currently enrolled in these 6 universities, that is, the most avid library users who can be easily attracted to new technologies and innovative ideas. In total, we sent 500 questionnaires (80 questionnaires per each and every university in average), and received 473 valid ones. The percentage of valid questionnaire returns was 94.6%, and the survey was conducted from April to the end of May, 2010.

Subsequently, we did a website survey from April to November, 2010. We aimed at two groups of academic libraries for our survey: One was taken from a sub list

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[②] "985- and 211-Projects evaluated universities" are normally famous universities with high reputation in China. At present, there are 112 "211-Project" universities, among them, only 39 are "985-Project" universities. In total, there are eight "211-Project" universities and two "985-Project" universities in the City of Nanjing.

of library rankings in the 100 top-rated American universities in 2010③ and the other from the 100 top ranking Chinese universities in 2010④, in which 9 of our surveyed universities in Nanjing are included. The total sum of the surveyed websites of academic libraries in Nanjing was 40. Our purpose of these two surveys was to get some idea about how Library2.0 technologies are being applied to augment the operation of the customized information services at both Chinese and American academic libraries.

2.2　Survey design

2.2.1　Questionnaire design

The questionnaire is composed of both single- and multiple-choice questions, which are further supplemented with fill-in-the-blanks and open-ended questions. The questionnaire consisted of three parts: 1) The basic information background of the respondents (the name of their universities, their educational background, current grade classification and discipline major, etc.); 2) the respondents' level of knowledge about Library2.0 (understand, use and acceptance, etc.); and 3) their demand for the customized information service rendered via technologies of Library2.0.

2.2.2　Website survey

From the perspective of university students, we visited all websites of selected academic libraries including 100 universities in America and 131 universities in China, mainly to know whether they have already provided Library2.0 customized information services and related tools, methods, as well as the types of services provided by these academic libraries.

2.3　Results of the questionnaire survey

Table 1 showed the tabulation of educational background from returned questionnaires on the captioned issue. A majority of the valid questionnaire returns were from undergraduate students, who represented 84.1% of the total (398 undergraduate students). Master level students made up 10.1% of the respondents, and doctoral students accounted for 5.7%. The majority of undergraduate participants of this survey were junior students, who accounted for a total of 32.8%. This was followed by sophomores, freshmen and seniors in a descending order, which was 21.8%, 16.5% and 13.1%, respectively. The distribution of the respondents' educational background for our survey analysis was deemed reasonably balanced and admissible.

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③　Available at http://www.uscolleges.cn/news/News_View.asp?NewsID=940.
④　Available at http://wenku.baidu.com/view/ff79b36925c52cc58bd6be01.html.

Table 1 Statistical tabulation of educational background of respondents at 6 universities in Nanjing

Educational background	Doctoral student	Master student	Senior	Junior	Sophomore	Freshman
Proportion (%)	5.7	10.1	13.1	32.8	21.8	16.5

Our questionnaire covered a broad scope of academic subjects as illustrated in Fig. 1. They included such academic disciplinary areas as humanities, foreign languages, economics, management science, information science, pure science, engineering and agriculture, and several other subjects. The proportion of subject coverage in the questionnaire was in the following descending order within the subject field, in which management science took the largest percentage (23.7%), followed by information science, economics, agriculture, pure science, engineering, foreign languages and humanities.
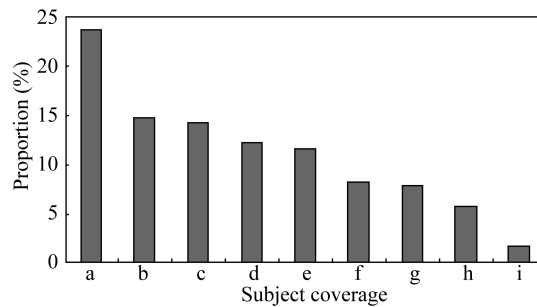

Fig. 1   Academic subjects distribution covered in our questionnaire. Note: a, Management science (23.7%); b, information science (14.8%); c, economics (14.2%); d, agriculture (12.3%); e, pure science (11.6%); f, engineering (8.6%); g, foreign languages (7.8%); h, humanities (5.7%); i, others (1.7%).

3   Analyses

3.1   Awareness about Library2.0 among college students

Our survey showed that 67% of the respondents had very little knowledge about the concept and practice of Library2.0; only 20 respondents (4.2%) manifested a sufficient knowledge level of such. Another 28.8% reported that they had a rudimentary knowledge. It showed that the level of college students' awareness about the customized information services based on technologies of Library2.0 had not yet taken root at most Chinese universities (Table 2).

Table 2   Level of understanding about Library2.0 among polled college students

Degree	Substantial	Moderate	Rudimentary	Nearly ignorant	Totally ignorant
Proportion (%)	0.6	3.6	28.8	39.1	27.9

3.2   Utilization of Library2.0 services at the surveyed universities

In our survey, only 9.3% of the respondents said that their colleges had provided certain services of Library2.0. In contrast, more than 60% of the respondents did not know whether their colleges had provided any Library2.0 services. Among those who were aware of Library2.0 services offered by their individual university libraries, only 65.9% had an occasional use, and 6.8% used them with a certain frequency. Thus, both the application and utilization of Library2.0 based services by the surveyed colleges were very low. The situation of both library provision and student utilization of Library2.0 based services is exhibited in Table 3.

Table 3   Utilizations of Library2.0 based services by respondents at their colleges

Items	Availability of Library2.0 service in the college			Use frequency		
Answer	Yes	No	No idea	Very often	Occasionally	Never
Proportion (%)	9.3	28.5	62.2	6.8	65.9	27.3

As shown in Fig. 2, the five top-ranked customized information services offered by academic libraries were: 1) "The delivery of the latest news to library users", 2) "subject navigation", 3) "document delivery to library users", 4) "book lending notice", and 5) "book recommendations", which accounted for 100%, 96.9%, 87.5%, 84.4% and 81.3%, respectively.
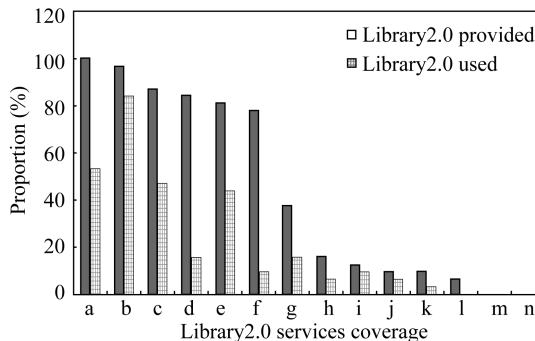

Fig. 2   A comparison of Library2.0 services provided and used. Note: a, Delivery of latest news to library users (100%; 53.1%); b, subject navigation (96.9%; 84.4%); c, document delivery to library users (87.5%; 46.9%); d, book lending notice (84.4%; 15.6%); e, book recommendations (81.3%; 43.8%); f, delivery of latest issue to library users (78.1%; 9.4%); g, subject aggregation (37.5%; 15.6%); h, special database (15.6%; 6.3%); i, online communication (12.5%; 9.4%); j, book tags (9.4%; 6.3%); k, others (9.4%; 3.1%); l, review blog (6.3%; 0); m, subject blog (0; 0); n, reference blog (0; 0).

But if we define the rate of customized information service utilization vs. the categories of such services as the efficiency of Library2.0 related services provided

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by an academic library, we found that the five top-rated service performance areas were: 1) Subject navigation (87.1%), 2) online communication (75%), 3) book tags (66.7%), 4) book recommendations (53.7%), and 5) document delivery to users (53.6%), respectively. After informal interviews with some librarians, we learned that the services of Library2.0 were widely used on university campuses, including RSS[⑤] information push, document delivery to users and book lending notice, etc. This reflects the fact that the polled libraries had done a lot of preparation work and had relatively good resource support. Navigation of subject resources was popular and heavily used by our surveyed students. By comparison, online communication and blog were those least utilized features.

3.3　Evaluations of the customized information services

Our survey showed that 46.9% of our respondents rated such service as "just OK", and respondents who regarded the services as "unsatisfactory" and "not quite satisfied" accounted for 37.5% and 6.3%, respectively. Only 9.4% of students claimed that they were "somewhat satisfied". Detailed evaluation of Library2.0 services is presented in Fig. 3.
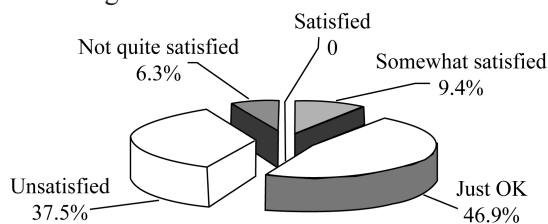

Fig. 3　The respondents' overview of Library2.0 operation in their own libraries.

3.4　Students' demand for Library 2.0 services

Through investigation we found that the majority of our respondents (90.3%) expected their universities to provide Library2.0 based customized information services. 80.5% believed that Library2.0 would improve their library information services. As shown in Table 4, students supported the provision of Library2.0 based services with high expectations.

3.4.1　Tutorials and tools in facilitating Library2.0 operation

The tutorials and Library2.0 tools can significantly improve the efficiency of Library2.0 based services and reduce difficulties of users' operations. 87.3% of

⑤ RSS, a short term for Really Simple Syndication, is a content aggregation platform for information resources sharing, pushing, subscriptions and distribution. RSS is one of the most commonly used applications of Web2.0 at present. Related technologies and software of RSS include RSS Feed, OPML and RSS Reader.

Table 4   Responses to Library2.0 based customized information services

Options	Do you need the Library2.0 services?			Could Library2.0 improve library services?		
	Yes	Yes and/or no	No idea	Yes	No	No idea
Proportion (%)	90.3	6.6	3.2	80.5	5.7	13.7

respondents considered it necessary for their library to provide Library2.0 related tutorials and tools. In the survey, 91.5% respondents indicated that they need brief introduction of the system, 87.7% need software or tools, 79.7% tutorials, and 72.1% wanted to have technical training sessions offered by the libraries (Table 5).

Table 5   Students' demand for having introduction courses and tools of Library2.0

Options	Necessity for such training			Requirements			
	Very strong	No idea	Not so strong	Introduction	Operations	Training	Software or tools
Proportion (%)	87.3	8.9	3.8	91.5	79.7	72.1	87.7

3.4.2   Various categories of Library2.0 based customized services

By means of a preliminary website survey on academic libraries in America, we learned that the current Library2.0 based operation had dozens of species in America. Taking account of this situation, we carried out a website survey by presenting 20 questions with multiple-choices in 3 categories; i.e. 1) Conventional services, 2) professional services, and 3) entertainment services. The results showed that the Chinese students' expectations to service contents of Library2.0 were wide-ranging.

In addition to the demand for professional subject reference services, a significant portion had conspicuous demands for entertainment services (such as film appreciation, online communication, lifestyle coaching and career guidance, etc). This rising extra-curricular interest of Chinese students should prompt our library and university administrators to ponder about the possible impact of the changing environment on students information need (Table 6). Granted that academic library's primary responsibility to serve the curriculum-related information needs for teaching, learning and research conducted on their own campus will not cope with the changing educational environment in this digital era.

3.4.3   Access approaches to Library2.0 customized information services

As reflected in Table 7, 87.3% participants indicated that Library2.0 should be dedicated to support their university's curriculum offerings. 81.2% respondents wanted Library 2.0 services to be provided in conjunction with using QQ and MSN

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Table 6 Students' expectations of Library2.0 customized information services

Types of Library2.0 based services	Proportion (%)	Types of Library2.0 based services	Proportion (%)
Entertainment	95.6	Subject-specific Blog	66.0
Online communication	91.3	Unique database for users	56.7
Lifestyle coaching	89.4	Information delivery of the latest contents table	56.4
Career guidance	85.4		
Study skills	81.8	Subject aggregation	51.8
Delivery of the latest information	81.6	Book lending notice	50.5
Document delivery to library users	79.5	Book tags	35.3
Professional guidance	77.4	Book review Blog	33.6
Subject navigation	71.5	Open access resources	32.1
Book recommendations	70.0	Others	29.6
Reference Blog	68.9		

software, and 83.3% of the respondents required the incorporated use of a cell phone while carrying out Library2.0 services. Thus, when academic libraries carried out the construction of Library2.0, they need use modern mainstream communication tools and back it with unique and subject-specific information resources as to provide timely, convenient and high degree customized information services for users.

Table 7 Expected access to customized information services under Library2.0 environment

Questions	Answer			
	Yes (%)	No difference (%)	No (%)	No idea (%)
Should the Library2.0 customized information service be offered with a focused combination with academic disciplines?	87.3	8.2	4.5	0
Should the Library2.0 customized information service be provided in conjunction with using QQ and MSN software?	81.2	5.9	3.6	9.3
Should the Library2.0 customized information service be used with cell phone devices?	83.3	4.0	4.9	7.8

Our survey also showed that most of our respondents expected to meet their personal information needs through e-mail and ListServe© software (90.3% and 74.2%, respectively). However, their willingness for providing their real names and phone numbers was relatively low, representing only 26.6% and 15.9%, respectively. One reason for this could be the complexity of the network environment which is usually associated with security intrusion issues. Nowadays, many Internet users

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© ListServe can automatically update a user's status and timely excavate his/her needs after the user has established a database. Through ListServe, academic libraries can improve the loyalty and retention of their users, thereby enhancing the functions of Library2.0 services.

have been annoyed by spam from the Internet. It will make them more exposed to a greater risk by using mobile library service operations. How to resolve this problem in a more satisfactory way is a thorny issue which need be further studied in the near future (Table 8).

Table 8   Willingness of providing personal information in facilitating Library2.0 operation

Revealing personal information	Real name	Number of cell phone	E-mail	ListServe
Proportion (%)	15.9	26.6	90.3	74.2

3.5   Areas for further improvement in carrying out Library2.0 services

Based on our survey, more attention and efforts are required from librarians and university administrators to meet students' needs of Library2.0. These include enhanced publicizing of Web2.0 concept and technologies, such as offering training courses related to Web2.0 technologies, providing increased financial support for further simplifying operations, raising the knowledge level of library practitioners about Web2.0, and ensuring information reliability and security. Last, more energy and resources should be channeled to the immediate need for implementing a more human feeling-sensitive *modus operandi* for Library2.0 customized information services (Fig. 4).
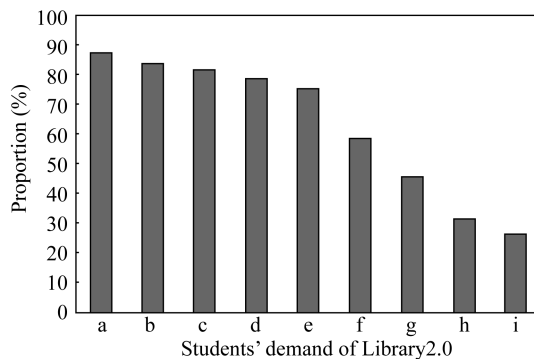
Fig. 4   Current deficiencies about Library2.0 operation. Note: a, Publicizing of Web2.0 concept and technologies (87.5%); b, financial support (83.7%); c, simplicity of operations (81.6%); d, support from library and university management team (78.6%); e, information reliability (75.5%); f, knowledge level of library practitioners about Web2.0 (58.8%); g, information security (45.5%); h, practicability (31.3%); i, others (26.2%).

4   Website survey findings

In this study we also conducted a website survey to compare the Library2.0 operation at Top 100 academic libraries located in the United States *vis-à-vis* those in China.

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The results showed that academic libraries in China for this operation generally suffered the following syndromes:

4.1 Library2.0 practice in Chinese academic libraries lag far behind than those of top American counterparts

The practice of Library2.0 based service operation at Top 100 American academic libraries was quite active and prevalent. As of Nov. 15, 2010, the application of such practice in each detailed category on these American campuses can be summarized as follows: RSS (95%), Blog or Podcast (71%) and IM (68%) were more than or close to 70%, and Wiki reached 45%. By comparison, the application at 131 Chinese academic libraries for RSS was close to 60%, for Blog, Wiki and IM, it accounted for 10%, 2% and 32%, respectively.

American academic libraries also had a wide use of such software as Facebook, MicroBlog, Myspace, Toolbar, Plurk and Flickr. By contrast, these technologies were rarely seen in Chinese academic libraries. Their practical use was very limited both in terms of the number of institutions and in their scope of subject coverage. As a matter of fact, most Chinese libraries' operations of Web2.0 were still embedded in the developmental stage of Web1.0[②]. These libraries were focusing on recommending whatever their own resources may be at the moment available to users, the user-centric library services embedded in the operational environment of Library2.0 had not been realized. Thus, there was a big gap of popularity and effectiveness in performing information delivery services based on technologies of Library2.0 between China's academic libraries and those academic libraries in developed countries.

4.2 The range of Library2.0 services were narrow in Chinese academic libraries

As compared with American university libraries, Chinese academic libraries provided not only a fewer services of Library2.0, but their functional features were also much simpler. For instance, RSS is mainly in handling press release, announcing new book arrivals and listing resources that is recently made available in local libraries. Other services, such as information retrieval service, subscription service to Blog (Podcast) or to other types of reference resources, service for Wiki or information literacy training were very rare.

As to the functional capacity of the Blog, the Blog operation on Chinese campuses was narrowly confined to Blog aggregation, group Blog, curator Blog, department

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② Web1.0 is the traditional Internet service model. Users can get information resources by browser, which is a one-way process for users to visit the websites. Representative portals are Sina, Sohu and Netease, etc.

Blog and subject Blog. As for academic subject Blog, its range of subject coverage was narrow and shallow, which was not conducive to the task of user-generated knowledge sharing and knowledge creation. Tagging service performed by academic libraries in China was primarily embedded in the widely used information retrieval service of OPAC and its function was limited in scope. Most Chinese systems of Library2.0 varieties still hold the stereotype of the traditional library automated system of being less interactive. Their service versatility, customization and resourcefulness need to be further organically orchestrated.

4.3　Chinese academic libraries showed low integrations of Library2.0 customized services

In comparison with America, the integrated application of a number of technologies of Library2.0 was very popular in American university libraries. In our survey, 79 American libraries provided 3 or more technical services, but only 17 Chinese academic libraries offered Library2.0 services. In practice, RSS in Chinese academic libraries operated frequently unsuccessfully since RSS Feeds addresses were often invalid. Blogs provided by Chinese academic libraries often aimed at internal communication for librarians. Subject-specific Blogs were almost non-existent. The type and scope of IM services were limited, which were essentially based on MSN and QQ software. The reaching-out library services supported by SNS came close to a nil. This indicates a big gap from reaching what the underlying philosophy of Library2.0 purported to advance. In addition, the design and layout of domestic technologies of Library2.0 were not mission-effective for optimal resource utilization by prospective users. Some links of libraries' websites failed to work (e.g. 12.5% of 40 academic libraries' website in Nanjing had this problem), which directly affected the function of customized information delivery services.

4.4　User-oriented humanistic assistance failed in Chinese Library2.0 customized information services

From the aspect of human services, although academic libraries in China provided user-centric assistance, most of the assistances rendered were too simplistic. They usually did not provide any related service instruction. Academic libraries in America paid more attention to providing thoughtful support for Library2.0 operation. In practice, RSS supported service provided by Chinese academic libraries fell short about such humanized help. Take the case of the often appeared XML code for instance, users did not know what it represents and how to operate. If there was a written instruction provided for its operation, such instructions were so peripheral as touching only on the concept of RSS, downloads and a brief description of RSS[2]. Meanwhile, the identifiers of various functions of Library2.0 features were confusing,

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which made them inconvenient for use. In general, librarians at domestic universities had insufficient training and limited practical experience in executing the Library2.0 supported services. Such inadequacy in training and in practical experience has greatly weakened the leadership role of Chinese library practitioners in promoting Library2.0 services.

4.5   The customized service system in China lag far behind

Library2.0 customized service system acts as a digital resources portal for information service delivery. Such a system is constructed under the design principle of a user-centric and user-friendly mechanism in accessing the free-flow of networked information resources. This kind of system is alternatively named as "My Library", "My Gateway" and "Personal Library" at home and abroad. Our survey showed that 85% of those polled American academic libraries and 33.6% of their Chinese counterparts had established a "My Library" platform. There were 67.5% academic libraries in Nanjing providing "My Library" service on their websites. However, the range of subject contents and the types of service delivery methods in vast majority of the Library2.0 based service systems in China were monotonous and also at low level. Their functionality and styles followed the traditional library practice based on physical information objects such as print monographs and journals. With the further development of Library2.0, a few bright ideas are in the offing for the further development of the library customized service system. For instance, Chongqing University Library built a platform named "My den"[3], which integrated such tools and services as RSS, Blog, My album, personalized customization, Wiki, Book reviews, Tag and IM into a single access operation. This made the customized library service more valuable to those users who are in the business pursuit of knowledge exchange and knowledge creation.

5   Conclusive remarks and recommendations

Based on our survey and comparative analyses, more efforts about the betterment of Library2.0 supported information services still need be made especially in the following areas:

5.1   Heightening the publicity and training for Library2.0

Based on our survey, there were only 33% of student respondents who had some understanding of Library2.0, and most of them still knew nothing about it. In the mean time, 90.3% of our respondents said that they had a high expectation of Library2.0 services and held positive opinion about it. As such being the case, we recommend that academic libraries should work more energetically on the following three aspects:

- Firstly, taking all necessary measures to strengthen the publicity. Those university libraries that have not yet made available the Library2.0 customized information services should do so by making the distinct advantages of such an operation widely known to the prospective users, a base of solid mass support for its quick establishment need gain strong popular support. Conversely, those libraries that have already established such a service should take serious steps, such as through vigorous and intensified publicity, a goal-oriented training program and providing adequate amount of self-directed online learning modules, to help users learn how to take full advantage of a customized information service delivery operation based on Library2.0.

- Secondly, utilizing various forms and channels so as to draw sufficient attention and funding support from all segments of the university, especially from its decision-making body about the need and advantages of establishing a Library2.0 operation (i.e. for the sake of the universities' academic reputation and competitiveness in the academia).

- Thirdly, upgrading libraries' standards of job performance. It is crucial for librarians to have sufficient knowledge and working skills about the Library2.0 related new services[4]. Librarians must be actively involved in a program of continuing education for themselves so as to keep their knowledge and working skills up-to-date. They should also dedicate themselves to foster an organizational culture that is in the perpetual pursuit of professional excellence, the case of undertaking a Library 2.0 operation may exemplify[5].

5.2   Enhancing the functionalities of Library2.0

Library2.0 operated in China is a single-mission oriented type, low in technological integration and not enough in performing humanistic assistance. There exists a sharp contrast between what library users' needs and what Library2.0 backed services are actually available at the website of academic libraries at present time. Thus, Chinese academic libraries need to enhance the multifarious, integrated and user-friendly functional features of Library2.0 from the following four aspects:

- Firstly, providing more technologies, ranging types of services and subject contents embedded in Library2.0 operation so that student users may have a wider choice to meet their specific information needs.

- Secondly, strengthening the functional feature of amalgamating multiple technologies embedded in Library2.0 operation so as to optimize their aggregated advantages stemming from different types of technologies of Library2.0, and make the customized information service more sensible and meaningful.

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- Thirdly, providing users with detailed introduction handouts and access tools to Library2.0, unifying the types of identifiers of Library2.0 to make them more user-friendly and result in cost-savings for the users.
- Fourthly, conducting users' need surveys regularly. Tracking the user's information changing needs, exploring different types of users' needs of information resources and services so as to provide customized information services accordingly.

5.3 Constructing a powerful Library2.0-backed customized information service platform

Academic libraries can serve users' information needs better with an efficient, open and intergrated platform. The Chinese version of "My Library" is a prototype of the customized information service platform. However, it cannot fully meet the users' specific, wide-ranging and interactive information needs because of its monotonous subject coverage, inconvenient operations and a closed system feature. Therefore, constructing a powerful platform for Library2.0 operation is essential. There are four aspects involved in engaging such an endeavor:

- Firstly, incorporating all latest new elements of Library2.0 for building a platform suitable for executing customized information delivery services. Academic libraries need continuously upgrade the system modules and their capability for integrating diversified resources and services in a timely manner, and changing the operational outlook from monotonousness to that of multifariousness.
- Secondly, taking full advantages of local unique resources. We need connect local and remote resources in a seamless way so as to maximize the potentials of a customized information service structure based on Web2.0 technologies.
- Thirdly, constructing a powerful interactive communication platform for users. Providing Blog, forums and community service groups and using a variety of ingenious ways to interact with system users so as to solve any problem that may occur in using this system instantly.
- Fourthly, enhancing usability and practicality of systems.

5.4 Improving the library's website with a user-centric orientation

The website of a library provides a stable and efficient means to access that library's service. We found from our survey that there were several shortcomings in the design layout, links and information security for users, etc., which need be addressed with a special focus on the following areas:

- Firstly, upgrading the libraries' websites according to the Information Architecture Theory and a user-centric principle embedded in their website

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architecture, function modules, graphic design, information organization system, navigation system, search system and tagging identification system, etc.

- Secondly, incorporating a variety of technologies of Library2.0 into the libraries' websites to maximize its functionality for providing high quality customized information services.
- Thirdly, strengthening libraries' websites maintenance and management so as to ensure the website's safety and accessibility (e.g. removing dead links, duplicate links and broken links; using a variety of filtering techniques to filter spam; repairing those vulnerable spots of the Library's website in a timely fashion to assure its normal running).

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