Information mashup through application of Web 2.0 tools: services and procedures

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Information mashup allows remixing of data from different sources to create new hybrid services with the help of API. In this study technical knowhow of implementation of the Web 2.0 services in OPAC using AddThis, an open source platform, has been discussed. The study has also tried to identify the services that are being provided by the top 10 central libraries of global, national (India), Asian as well as the state (West Bengal) universities using information mashup technology and makes a comparison of the same between the university libraries.

Introduction

The environment of information retrieval and dissemination has changed significantly over the past few years due to the convergence of computer, telecommunication and broadcasting technologies. The emergence of low cost electronic networks has paved the way for users to communicate daily with others around the world fast and inexpensively. All kinds of information such as text, databases, pictures, videos, sound and so on can be sent through electronic networks. With this technological development the concept of cloud computing, Web 2.0, library 2.0 and information mashup have come into existence and the library professionals are implementing the technologies in their services. They are gradually moving from the traditional library services to modern services by using the recent technologies.

Traditional library services are characterized by card catalogues, Browne charging system, manual entries in accession lists, shelf register, CAS (Current Awareness Service) by newspaper clipping service, literature survey, table of contents of periodicals received in library etc. But after the advancement of different software and Internet facilities, library and information centers are modernizing their traditional activities. OPAC (Online Public Access Catalogue) have replaced card catalogues, RSS (Really Simple Syndication or Rich Site Summary) based alerting service are being offered in place of CAS, Barcode and tools like RFID (Radio Frequency Identification Device), etc. are common. Commercial software are being replaced with Open Source Software (OSS).

The advent of Web 2.0 introduced Web standards that were commonly and widely adopted across traditional competitors and which unlocked the consumer data. At the same time, mashups emerged, allowing mixing and matching competitors' APIs (Application Programming Interface) to develop new services. The first mashups were used in mapping services or photo services to combine these services with data of any kind and to produce visualizations of data. In the beginning, most mashups were consumer-based, but recently the mashup is to be seen as an interesting concept useful to enterprise and university libraries as well.

A few related concepts like cloud computing, Web 2.0 and information mashup are discussed here elaborately with application in Central Libraries of State as well as Global universities.

Conceptual framework of cloud computing, Web 2.0 and information mashup

This section deals with the common features, basic structure and application of cutting-edge technologies like cloud computing, web 2.0 and information mashup in the platform of integrated library system (ILS).

Cloud computing and Web 2.0

Cloud computing is a relatively new business model in the computing world. According to the official NIST definition, "cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storages, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction"[1]. The origin of the term cloud computing is obscure, but it appears to derive from the practice of using drawings of stylized clouds to denote networks in diagrams of computing and communications systems[2]. The name comes from the use of a cloud-shaped symbol as an abstraction for the complex infrastructure it contains in system diagrams.

Web 2.0 and information mashup

According to the definition of wikipedia, Web 2.0 describes websites that use technology beyond the static pages of earlier websites. Web 2.0 services are applied to change the way users interact with the resources and services available in the web[3]. In other words, "Web 2.0 is the name used to describe the second generation of the world wide web, where it moved static HTML (Hyper Text Markup Language) pages to a more interactive and dynamic web experience. Web 2.0 is focused on the ability for people to collaborate and share information online via social media, blogging and Web-based communities"[4].

The meaning of the term Web 2.0 has evolved over time, but it has come to include social media as a major component. Although community has always been a part of the web, new web applications such as AJAX (Asynchronous JavaScript and XML) and more modern browsers began providing opportunities for people to express themselves online as never before, and to combine applications to create a more integrated web. By 2005, the term Web 2.0 was well-established, and companies such as Google made huge strides to integrate information online. For example, a website that reviews restaurants may use social media, user-generated content, photographs from Flickr, Google maps, and content from around the web to create a more complete user experience.

Nowadays different Web 2.0 tools have emerged to support interactive, collaborative, and participative

library system. Libraries are using it as a platform to provide services. In 2005, Michael Casey in his blog (www.librarycrunch.com), first coined the term "Library 2.0" to denote applications of Web 2.0 and also to denote the possible changes in Web-enabled library services. Web 2.0 tools are also helpful for scholarly world. These tools harness collective intelligence from its contributors to update articles through collaborative creating, editing and updating process by a group of users. The best example is Wikipedia where people can create, edit and store information. There are different kind of tools of Web 2.0 which are blogs, Digg, Flickr, Instant messaging, podcast, RSS feed, wikis, LibraryThing, PaperBackSwap, Second Life, Technorati, etc.[5]

Categories of Web 2.0

Web 2.0 tools can be categorized into four major groups[6] are:

The Read Write web

Tools that are leveraging read/write Web include blogs, online storage and sharing tools (such as Facebook, MySpace, Podcasts, YouTube) etc.

Social networking component

Social networking component includes tools that support community communication and interaction in digital environment. Tools such as instant messaging, discussion forum, event listing (chronological and upcoming), Flickr, Jumpcut etc., are enhancing online socialization through community oriented communication and interaction.

Collective intelligence support component

Wikis are currently most popular tools for collaborative knowledge sharing, and the best-known example is Wikipedia. Other tools such as LibraryThing, PaperBackSwap, Second Life, Digg, Technorati, Folksonomy, Social bookmarking, Amazon services are also facilitating the collective wisdom movement in the next generation Web.

Information mashup component

Information Mashup tools allow remixing of data, technologies or services from different online sources to create new hybrid services through lightweight API.

Information mashup

The new ILS trend is to allow the users to be interactive, collaborative and participative in library workflows. Information mashup technology helps to make in sense of such idea. This section covers the concept, architecture, types, need and use of information mashup in library services.

Concept and architecture

A mashup (computer industry jargon), in web development, is a web page, or web application, that uses content from more than one source to create a single new service displayed in a single graphical interface. The term implies easy, fast integration, frequently using open API and data sources to produce enriched results that were not necessarily the original reason for producing the raw source data. The term mashup originally comes from British - West Indies slang meaning to be intoxicated, or as a description for something or someone not functioning as intended. In recent English language parlance it can refer to music, where people combine audio from one song with the vocal track of another—thereby mashing them together to create something new[7]. For example, a user could combine the addresses and photographs of their library branches with a Google map to create a map mashup.

The main characteristics of a mashup are combination, visualization, and aggregation. It is important to make existing data more useful, for personal and professional use. To be able to permanently access the data of other services, mashups are generally client applications or hosted online[7]. *Mashup architecture* is one of the outcomes of Web 2.0 paradigm that has been widely accepted and used for user-centric *information* processing. Architecture of enterprise information mashup is given in Figure 1.

Mashups are made possible via Web services or public APIs that (generally) allow free access. Most mashups are visual and interactive in nature. To a user, a mashup should provide a richer, more interactive experience. A mashup is also beneficial to developers because it requires less code, allowing for a quicker development cycle.

According to Techopedia, "mashup is a bit of a buzzword. It's frequently mentioned in the same context as cloud computing and Web 2.0. This is because version 1.0 of the Web was more about simply getting online, which many companies did by posting brochureware."[4] In other words, they took what they did offline and put it online. Web 2.0 implies greater collaboration between websites, and greater interaction with website users. In fact, website might be the wrong term; as more and more functionality is provided via the browser, Web application is becoming a better description.

Google Maps has spawned hundreds of mashup applications. These include applications that use Google Maps to rate areas in a city, delineate points of interest, or show roads that are under construction. These applications take some of the functionality and
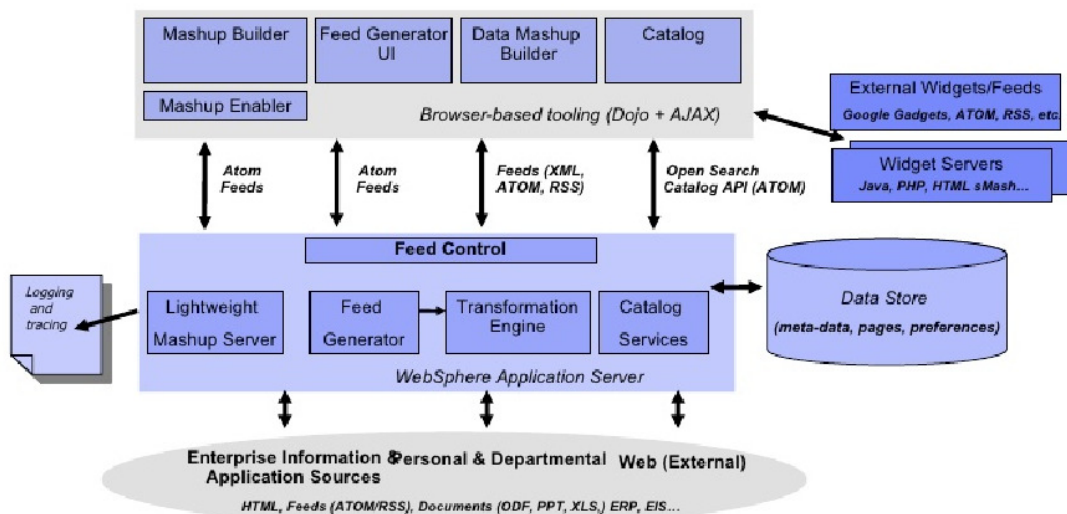

Fig. 1—Mashup centre architecture

data from Google Maps and combine it with their own programming to create a new application. Information mashup tools allow remixing of data, technologies or services from different online sources to create new hybrid services through lightweight API.[5]

So, information mashup is the activity of remixing of data from different databases (most of the time databases are not related to each other) seamlessly in real time situation without changing its original content to make existing data more useful, for different kinds of uses.

In mashup there are mainly three activities which are:

i) Data is extracted from a source website;

ii) This data is translated into a form meaningful to the destination website, and

iii) The repackaged data is sent to the destination site.[8]

Types of information mashups

Information mashups can be categorised as per their level of complexity and basis of integration[6].

Based on the level of complexity, information mashup can be of three types:

Basic mashup: These are basic and simple type mashup. Example: Widget based mashup.

Intermediate mashup: It is the complex type mashup. Example: Generation of RSS feeds.

Advanced mashup: These are complicated type. Example: Working with Web Services, Working with APIs, Building mash able contents from libraries etc.

Based on the level of intergration, information mashup can be of three types:

Presentation mashup: It is the lowest level integration of virtual contents such as maps, pictures, custom interfaces etc. It is simple type. Widget is utilized as a mechanism here. Widget helps a user to perform a function or access a service. Example: Integration of Google custom search engine with Koha OPAC.

Data mashup: It is the next level of integration of virtual contents of library resources based on matching rules. Here, on-the-fly integration of different databases occurs. Alerting service by

generation of RSS feeds are also an example of data mashup.

Process mashup: It is the most difficult type and complicated type mashup used in libraries. It requires interoperability standards like Z39.50 and OAI/PMH (Open Archives Initiative Protocol for Metadata Harvesting), Crosswalks and implementation of software tools for library management software like Yaz toolkit for Z39.50 client in LMS (Library Management Software).

Examples of information mashups in libraries

Integration of open contents with local library resources at the time of serving these resources through library OPAC is an example of a mashup useful for libraries, such as, Kohazon—where Koha OPAC is integrated with Amazon services. Alerting services can be set up through information mashups. In the information mashup, Z39.50 (a distributed cataloguing protocol through which it can search and fetch cataloguing record from different databases) has an important role. By searching and retrieving cataloguing records of a particular document from any database, the cataloguer can prepare an entry in his/her local database of library within limited time and at the same time cataloguer get some relief from typing data, as data related with the record is automatically filled up by the searching process.

Table of content is a service mashup to integrate cataloguing records with Library of Congress (LoC) table of contents service for book records. On the basis of title and ISBN matching rules, local catalog records can be linked with CatDir service of LoC. The benefit is that user can get full content page of a book from LoC from their local OPAC interface.[6]

Use of information mashups in general and in LIS

In general and in LIS there are various types of information mashups which include[5]:

Go-Go-Google-Gadget: Ann Arbor District Library's effort for integration of library OPAC with personalized homepage service offered by Google.

LibraryLookup: Integration of Google maps with library directory service in UK.

Mapskip: It is Created in August 2007, Mapskip (http://www.mapskip.com/) invites users to mark

points on the map and add their stories, images, and audio to the different places they have lived, visited, and experienced. Other users can comment on the posts, add their own stories about the place, or join in conversations about the place itself.

Molecular Visualization Wiki: Combining Jmol: an open source molecule viewer for chemical structure in 3D, and the chemistry-related content found in the JSPwiki Wiki engine, the mashup supports dynamic annotation, information foraging, and session playback for visualizations.

SEDUITE: It is an information system especially designed for academic institutions. It aims to retrieve and then broadcast "scholar" information (events, timetable) to students and teachers. Based on a WSOA, it exposes information sources as services and uses orchestrations to retrieve and then compose information.

TerraClues: Google Maps-based mashup which leverages the effort and interests of its own community for content creation, not only making district, campus, and teacher-created quests possible, but also allowing learners to create their own quests based on individual interest or as part of in-school history, biology, literature, or geography projects.

Unthirsty: It is a combination of Google Maps and Happy hour finder, which shows the nearest happy hour place against user query.

WikiBios: It is a mashup where user can create online biographies of each other in a Wiki setup.

Wikimapia: A combination of wiki and google maps.

Knowhow of Web 2.0 services in OPAC

An open source platform AddThis has been used to add different types of Web 2.0 services in OPAC. Procedures of using the technology in the Integrated Library Management System (ILMS) or Content Management System (CMS) have been depicted (Fig. 2 to Fig. 7).

Information mashups and library services

Library and information centers can provide different services by using information mashups. The various services are given below[6]:

OPAC service (Traditional and Interactive)

Google custom search engine can be integrated in OPAC through 'Global System Preference' module. We can develop a single search interface. So it will be
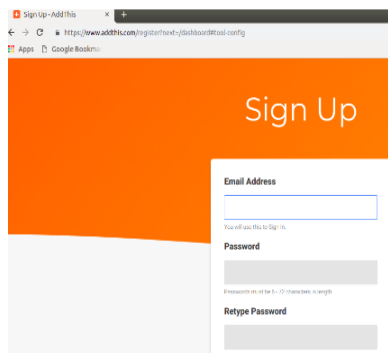

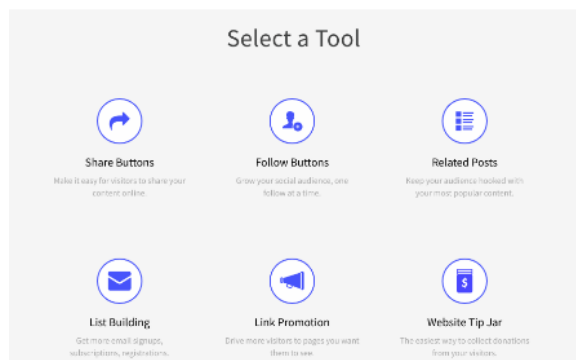Fig. 2—Sign Up to AddThis via Google account
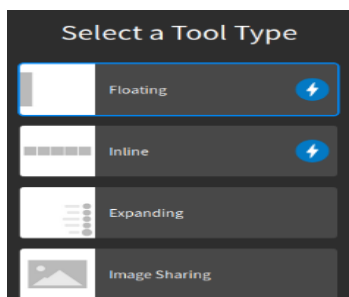

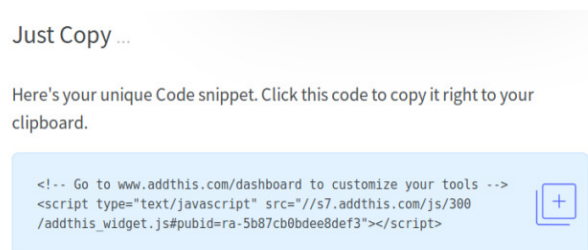Fig. 3—Various services of AddThis

Fig. 4—Type of tools in AddThis

Fig. 5—Copy to clipboard of AddThis HTML code

```
OPACSearchForTitleIn    <li><a  href="http://worldcat.org/search?q={TITLE}"
                        target="_blank">Other Libraries (WorldCat)</a></li>
                        <li><a href="https://scholar.google.com/scholar?q=
                        {TITLE}" target="_blank">Other Databases (Google
                        Scholar)</a></li>
                        <li><a href="http://www.bookfinder.com/search/?author=
                        {AUTHOR}&title={TITLE}&st=xl&ac=qr"
                        target="_blank">Online Stores (Bookfinder.com)</a></li>
                        <li><a href="https://openlibrary.org/search/?author=
                        ({AUTHOR})&title=({TITLE})" target="_blank">Open
                        Library (openlibrary.org)</a></li>
                        <!-- Go to www.addthis.com/dashboard to customize your
                        tools --><script type="text/javascript"
                        src="//s7.addthis.com/js/300
                        /addthis_widget.js#pubid=ra-5b87cb0bdee8def3"></script>

                        Click to collapse
```

Fig. 6—Paste that code in appropriate space of personalized ILMS / CMS

```
SocialNetworks    Enable  ∨  social network links in opac detail pages
```
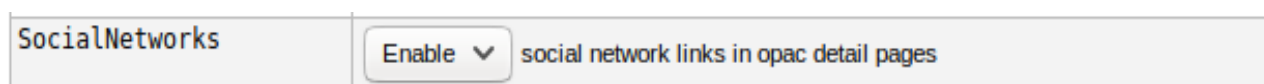
Fig. 7—Lastly enable this option in personalized ILMS / CMS

Fig. 8—Search result in Koha OPAC and integration with Amazon

easier to find information in both local as well as Global databases. Fig. 8 shows integration of Amazon in Koha OPAC.

To make the search results attractive, 'on the fly integration' is needed. It is the integration of image of books' cover page of Amazon in OPAC with the help of a third party tools, namely 'AddThis'.

Users search their required documents from OPAC. Application of Information mashup is required to make the searching results more attractive. If the particular book is available in the database of Amazon then the cover page will be displayed in Koha OPAC. Application of Web 2.0 technology in OPAC has been adding more value to the searching results and now Traditional OPAC has emerged into an Interactive OPAC.

It indicates availability of dialogue supporting facility in OPAC like review submission option, commenting submission, tagging submission etc. This study has taken following tools in consideration as elements of interactive OPAC.

Alerting service

Current awareness services have given way to alerting services though RSS feeds (Fig 9). Libraries by using different feed readers (like Liferea, etc.) can access feed of journals. Open journals are available from different repositories like DOAJ (http://www.doaj.org), DOAR (http://www.opendoar.org), ROAR (http://www.roareprints.in), etc. By accessing feeds, users are able to know about the recent topics and these can keep them up to date.

Z39.50 and OAI/PMH service

Z39.50 is a copy cataloguing protocol. By using it, a cataloguer can search and can gather cataloguing records for a particular document from other different databases where the entry of that particular document

Fig. 9—RSS feed service

is being done previously and in this way we can prepare many entries within a limited time.

OAI/PMH is a light-weight standard protocol for harvesting metadata records from 'data providers' to 'service providers'. It is produced by Open Archives Initiative.

Table of Contents (ToC) Service

Table of content mashup service integrates cataloguing records with LoC table of contents service for book records. The benefit is that user can get full content page of a book from their local OPAC interface that is stored in LoC database.

Applications of information mashup in library webpages: local to global

This study focused on the use of information mashup in library web services of university libraries of West Bengal (W.B.), national, Asia and globally. We have selected top 10 universities from each group as per the ranking status of 2019. Data was gathered from National Institutional Ranking Framework (NIRF)[i], 2019 for Indian Universities and Times Higher Education[9] (THE)[ii] University Rankings 2019

for regional and global universities. Five universities of West Bengal were selected as there are no other universities which are enlisted in the NIRF ranking. These universities are Calcutta University, Jadavpur University, University of Kalyani, University of Burdwan and Visva Bharati University. We considered top 10 universities of India from the NIRF list excluding two universities of West Bengal (Calcutta University and Jadavpur University) as those have already included in the earlier category. The top 10 Indian universities as per NIRF ranking 2019 are Indian Institute of Science, Karnataka; Jawaharlal Nehru University, Delhi; Banaras Hindu University, Uttar Pradesh; University of Hyderabad, Telangana; Anna University, Tamil Nadu; Amrita Vishwa Vidyapeetham, Tamil Nadu; Manipal Academy of Higher Education, Karnataka; Savitribai Phule Pune University, Maharashtra; Aligarh Muslim University, Uttar Pradesh and Jamia Millia Islamia, Delhi.

The top 10 Asian universities selected are Tsinghua University, China; National University of Singapore, Singapore; Hong Kong University of Science and Technology, Hong Kong; University of Hong Kong, Hong Kong; Peking University, China; Nanyang Technological University, Singapore; Singapore Chinese University of Hong Kong, Hong Kong; The University of Tokyo, Japan; Seoul National University, South Korea and Sungkyunkwan

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i   https://www.nirfindia.org/2019/UniversityRanking.html

ii   https://www.timeshighereducation.com/world-university-rankings/2019/world-ranking#!/page/0/length/25/sort_by/rank/sort_order/asc/cols/stats

Table 1—Web 2.0 tools application in libraries of West Bengal universities

University	RSS	Twitter	Facebook	YouTube	Blog	Others	OPAC (Traditional)	OPAC (Interactive)
Calcutta University	N	N	N	N	N	N	Y	N
Jadavpur University	N	N	N	N	N	N	Y	Y
University of Kalyani	N	N	N	N	N	N	N	N
University of Burdwan	Y	N	N	N	N	N	Y	N
Visva Bharati University	Y	Y	Y	N	N	N	Y	N
	2	1	1	0	0	0	4	1
	40%	20%	20%	0%	0%	0%	80%	20%

University (SKKU), South Korea. Top 10 world universities include University of Oxford, United Kingdom (UK); University of Cambridge, UK; Stanford University, United States (US); Massachusetts Institute of Technology, US; California Institute of Technology, US; Harvard University, US; Princeton University, US; Yale University, US; Imperial College London, UK and University of Chicago, US.

Application of Web 2.0 tools in university libraries of West Bengal

The Indian state of West Bengal has India's first modern university and in all 33 universities of West Bengal are listed under the University Grants Commission. West Bengal is the 4th most populated state located in the eastern part of India. It is one of the largest contributors to the gross domestic product of the country and it is a pioneer state in providing modern education[10].

Application of Web 2.0 tools in the central libraries of West Bengal universities have been studied by surfing their webpages and OPAC. Most of the university libraries used only OPAC service without any kind of Web 2.0 tool. Central libraries of Calcutta University, Visva Bharati University and University of Burdwan are providing RSS service through Traditional OPAC, but Jadavpur University is providing Interactive OAPC service. Visva Bharati Library is the only one who is providing services through Twitter and Facebook. It can be said from Table 1 that Web 2.0 tools have been used less effectively in the central libraries of selected universities in West Bengal.

Application of Web 2.0 tools in Indian university libraries

Public and private universities, both are included in the higher education system in India. Former types are supported by the Government of India and the state governments, while other types are mostly supported by various bodies and societies. "Universities in India are recognized by the University Grants Commission (UGC), which draws its power from the University Grants Commission Act, 1956". [11]

Central libraries of top ten Indian universities have been considered here. The web pages and OPACs were visited and it was found that 90% of them are providing searching facility to their resources through traditional OPAC and 30% of them are providing interactive OPAC. Three universities (Indian Institute of Science, University of Hyderabad and Jamia Millia Islamia) out of top 10 are providing interactive OPAC service. RSS, blog and other Web 2.0 based services like Pinterest, IGM Library blog, Google+ are used by 30% of the library. Table 2 shows that Twitter and Facebook are offered by 20% libraries followed by Youtube (10%). Central libraries of Banaras Hindu University (Rank 3) and Aligarh Muslim University (Rank 11) are providing most of the Web 2.0 services to their users.

Application of web 2.0 tools in Asian university libraries

The ranking of the best colleges and universities in Asia have been revealed by THE in 2019. Japan leads with 103 universities and China comes second position with 72 institutions out of 350+ institutions, but Hong Kong is the most represented zone in the top 10 with three universities included.[12]

All the universities are using OPAC services and 90% of them are providing services through Facebook. The library of Tsinghua University of China does not provide any kind of service using Web 2.0 tool except OPAC. National University of Singapore (Asia rank 2) and Hong Kong University of Science and Technology (Asia rank 3) use most Web

Table 2—Web 2.0 tools application in central libraries of Indian Universities (Top 10)

Name of University	State	RSS	Twitter	Face book	You Tube	Blog	Other	OPAC (Traditional)	OPAC (Interactive)
Indian Institute of Science	Karnataka	Y						Y	Review
Jawaharlal Nehru University	Delhi	Y	Y	Y		Y		Y	N
Banaras Hindu University	Uttar Pradesh		Y	Y		Y	Pinterest	Y	N
University of Hyderabad	Telangana	Y				Y	IGM Library blog	Y	Review
Anna University	Tamil Nadu							Y	N
Amrita Vishwa Vidyapeetham	Tamil Nadu							Y	N
Manipal Academy of Higher Education	Karnataka		Y	Y	Y		Instagram		
Savitribai Phule Pune University	Maharashtra							Y	N
Aligarh Muslim University	Uttar Pradesh		Y	Y	Y		Google+	Y	N
Jamia Millia Islamia	Delhi	Y						Y	Review
	Total	3	2	2	1	3	3	9	3
	Percentage	30%	20%	20%	10%	30%	30%	90%	30%

2.0 tools. The libraries of these two universities are providing services through RSS (20%), Twitter (50%), Facebook (90%), YouTube (60%), Blog (30%), OPAC (100%) and other (50% - i.e, Instagram, Flickr and LinkedIn) as shown in Table 3. The libraries of South Korean Universities do not seem to use many Web 2.0 tools.

Application of Web 2.0 tools in Global University libraries

University Rankings of THE 2019 includes more than 1,250 universities. The list of the best performing universities in the world is led by the University of Oxford with University of Cambridge in the second position.[13]

The libraries of the global universities have been studied to draw the outline about their active participation in information mashup technology. OPAC is the common facility for all the top 10 university libraries for resource navigation. The next most used tools are Twitter (80%) followed by Facebook (70%) and other tools (70%) like LinkedIn, Instagram, Flickr, Creative Commons (CC), Weibo, etc (Table 4). University of Oxford, UK (Rank 1) and University of Chicago, US (Rank 10) are using most of the Web 2.0 tools. The library of the University of

Oxford is using some innovative Web 2.0 tool like Apple Podcast, Instagram and LinkedIn. Massachusetts Institute of Technology, US; California Institute of Technology, US (Rank 4); Princeton University, US (Rank 7) and Imperial College London, UK (Rank 9) are using 70% of Web 2.0 tool to reach their users. It has been found from the study that information mashup technology did not get importance in Yale University library, US (Rank 8). Stanford University, US (Rank 3) is providing service only via RSS feed to its users. Blog (20%) gets very less importance in comparison to RSS (40%) and YouTube (40%).

Discussion

"The concept behind Web 2.0 refers to rich web applications, web-oriented architecture and social web. It refer to changes in the way web pages are designed and used by the users, without any change in any technical specifications"[16]

Web 2.0 examples include blogs (WordPress), Microblogging (Twitter), Web applications (Google Docs, Flickr), wikis (MediaWiki), hosted services (Google Maps), video sharing sites (You Tube), social networking (Facebook), folksonomies (Delicious), podcasting (Podcast Alley) & content hosting services

Table 3—Web 2.0 tools application in Asian Universities (Top 10)

Name of University	State	RSS	Twitter	Face book	You Tube	Blog	Others	OPAC (Traditional)	OPAC (Interactive)
Tsinghua University	China							Y	N
National University of Singapore	Singapore	Y	Y	Y	Y	Y	Instagram, Flickr	Y	N
Hong Kong University of Science and Technology	Hong Kong	Y	Y	Y	Y	Y	Instagram, LinkedIn	Y	N
University of Hong Kong	Hong Kong			Y	Y		Instagram, ISSUU	Y	N
Peking University	China			Y			Weibo	Y	N
Nanyang Technological University, Singapore	Singapore		Y	Y	Y	Y	Instagram, LinkedIn	Y	N
Chinese University of Hong Kong	Hong Kong		Y	Y	Y			Y	Tag
The University of Tokyo	Japan		Y	Y	Y			Y	N
Seoul National University	South Korea			Y				Y	Tag
Sungkyunkwan University (SKKU)	South Korea			Y				Y	N
Total		2	5	9	6	3	5	10	2
Percentage		20%	50%	90%	60%	30%	50%	100%	20%

Table 4—Web 2.0 tools application in Global Universities (Top 10)

| University	Country	RSS	Twitter	Face book	You Tube	Blog	Others	OPAC (Traditional)	OPAC (Interactive)
University of Oxford	United Kingdom		Y	Y	Y	Y	Linked In, Oxford in Apple Podcast, Instagram, Medium Corporation	Y	Tag
University of Cambridge	United Kingdom		Y			Y		Y	N
Stanford University	United States	Y						Y	N
Massachusetts Institute of Technology	United States	Y	Y	Y			Instagram, Flickr	Y	Review, Tag
California Institute of Technology	United States	Y	Y	Y			Creative Commons (CC)	Y	N
Harvard University	United States		Y	Y			Creative Commons (CC)	Y	Tag
Princeton University	United States		Y	Y	Y		Instagram, Snapchat, LinkedIn	Y	N
Yale University	United States							Y	N (Redirect to Google Review)
Imperial College London	United Kingdom		Y	Y	Y		Instagram, LinkedIn, Weibo	Y	Tag
University of Chicago	United States	Y	Y	Y	Y		Instagram, Tumblr	Y	N
Total		4	8	7	4	2	7	10	4
Percentage		40%	80%	70%	40%	20%	70%	100%	40%
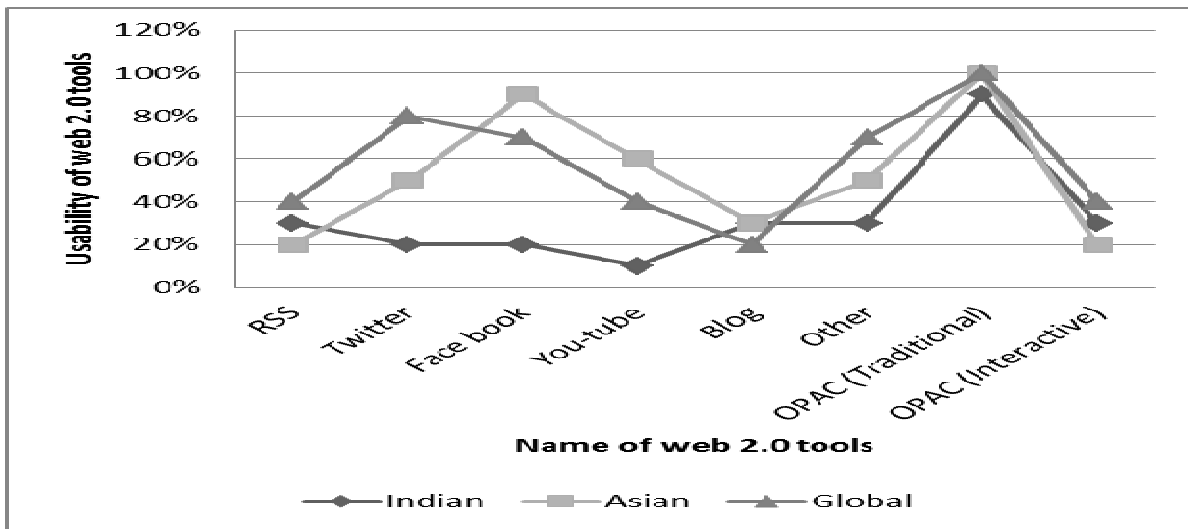
Fig. 10—Comparison of Web 2.0 application in central libraries of universities

and many more. Libraries have been creating mashups for years to satisfy their user need.

Comparison between the usability of Web 2.0 tools in libraries of Indian, Asian and global universities, show that top 10 Asian universities are the most effective in such services than other Global as well as Indian universities. Traditional OPAC service (90%–100 %) is more common as compared to interactive OPAC (20%-40%) for all the three regional Universities (Figure 10). Blogs are negligibly used by libraries in all categories. Facebook, Twitter and Youtube have been used by the Asian and Global university libraries more effectively than Indian university libraries. Facebook is used by almost all libraries under study. Use of Facebook and Youtube in libraries of Asian universities is more as compared to global universities.

Conclusion

Information mashups may help library professionals to improve their services and gives better options to attract users to visit library webpages. Indian university libraries do not seem to use the information mashups as much as it is being used by university libraries in other parts of the world. Though the library management softwares like Koha and LibSys are providing OPAC 2.0, but Indian university libraries don't seem to use these.

Mashup is a central idea for entire Web 2.0 genere of tools. It may produce many integrated services on-the-fly from a limited set of available bibliographic data, for example georeferencing, link to author biography, locating full-text version of a local resource in global Web, integrating recommenders from other sources and many more such services. It is the about time for academic libraries in India to explore and implement features and facilities of information mashup.

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