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Semantic Web, Library 3.0 and Library Mashup - The emerging technologies to integrate contents and services in order to provide innovative services to the users

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ABSTRACT

When technology developed by researchers, scientists or developers then the users tried to apply that technology in every aspect of necessity. Such way technological advancement and development brought about and groundbreaking changes and revolution in the world of libraries. It enables library to go beyond the conventional walls. Nowadays, in the world of library the concept of web 3.0 is being used successfully. From a list of web 3.0 gifts we selected here three web based application like semantic web, library 3.0 and library mashups. Semantic web technology is to provide a better retrieval of precise information. Library 3.0 is the result of integration of all Web 3.0 facilities into the library and information science. Library Mashup enables library to mix up various content from different sources to make a new one to serve its users. These three technologies are not only to serve library users with information but also to share them in a wider range. This study is going to present the applications of those technologies in libraries.

Keywords: ICT, Web 3.0, Semantic web, Library 3.0, Library Mashup, Library Technology.

INTRODUCTION

A fatal and important change in Information Communication Technology (ICT) has been made since few decades. The changes are nothing but development in different aspect. And all the aspect is based on human need and demand, human satisfaction and human uses. Some other issues also there, but those also are revolved around human. With the time wheel rolled, human civilization stepping forward to the advancement. This advancement shows its result in the development of all aspects connected with human society. Technological development no doubt, takes place in this consequence. Though technology, itself becomes more complicated. Library which is one of the ancient institutions is greatly affected by the advancement of technology and also molded itself with the changing technology and time. Library is the service rendering institution. So it uses technology to enhance its service rendering process. Here come the three technologies of web 3.0 that is semantic web, Library 3.0 and Library Mashup technology to enrich the library services. Semantic web technology is that technology which is intelligent enough to response semantically to the queries. Library 3.0 is introduced to provide the facilities of Web 3.0 in the aspect of library and Library Mashup is the technology to mix up different sources into a single interface to provide a new service. Apparently they are three different technologies but their interconnection with each other cannot be denied. Present study is going to present the outline sketch of these three technologies.

Objectives

The study is basically about to discuss on –

1. To understand about web 3.0 and its utilities.
2. To understand major differences between Web 1.0, Web 2.0 and Web 3.0.
3. To understand about the Semantic Web.
4. To understand the tools and application of Library 3.0 and its utilities.
5. To understand about Library Mashups and uses.
6. To understand the way of uses ICT in the Library.

LITERATURE REVIEW

The Earlier web pages were static and in 1999 the 'Web 2.0' first coined which described the technology behind the earlier static web page. Many scientist, researcher and others from different discipline and area have done a lots of work on Web 1.0, 2.0 and 3.0. They also discussed on different tools and its application of such Web. No-doubt, Tim Berners – Lee is very much responsible for changes.

According to Tim Berners – Lee , "The Semantic Web will bring structure to the meaningful content of Web pages, creating an environment where software agents roaming from page to page can readily carry out sophisticated tasks for users."(Tim Berners-Lee, James Hendler and Ora

Lassila, 2001). Susan Halford and others has shown in their article about the importance of such web and linked data, "…the rapid growth of open data also has some fundamental implications for the World Wide Web. Currently, the Web is built as a system that enables us to share documents (which appear as Web pages) and to make links between them." (Susan Halford, Catherine Pope and Mark Weal, 2013). Besides, Tim McCall has shown that - "But as the market matures, tools will be created to manage the complexities. It won't happen overnight, and there will be headaches. But it will be worth it, because a flexible, versatile, reliable supply chain creates the greatest enterprise potential." (McCall, 2015).

However, in the present study it has been shown in the specific way about how actually libraries and its users are really benefitted using such applications.

METHODOLOGY

The present study is based on the conventional content analysis. Hence, the study tried to analysis the information already mentioned in different publication channels and documents.

The choice of need is to expose the said three topics which are very much relevant in the area or world of Library and Information Science and Service as well. The information seekers' or the users the library may get profit and can enrich themselves by using such thing. Besides for the users may get benefitted even from remote area by these concepts.

History of Web

A dramatically development has been noticed in context of Web Development. Web 1.0 was all about fetching**,** and reading information. Personal web pages were common, consisting mainly of static pages hosted on ISP-run web servers, or free web hosting services**.**

Web 2.0 is all about reading**,** writing**,** creating, and interacting with the end user. It was famously called the participative social web. Web 3.0 is the third generation of the World Wide Web, and is a vision of a decentralized web.

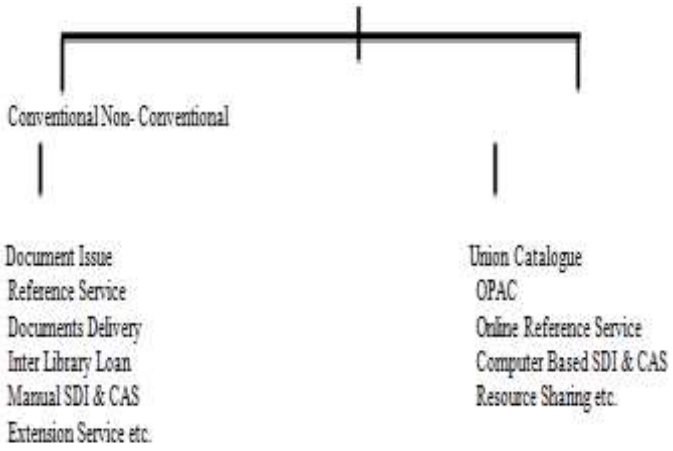
It is all about reading**,** writing**,** and owning. Web 1.0 to Web 2.0 added things are writing and editing and in question of Web 3.0, its differ from Web 2.0 is Owing.

Importance of Web in Library

To know the importance of Web and ICT as well in the libraries, first and foremost we need to know about the services of a library which is offered to its users.

In generalized way, library services can be categorized into two broad way i.e. Conventional and Non-conventional, and all the services can be distributed under these two category as follows –

Library Services



Dr. S. R. Ranganathan, years ago, provided the Laws of Library Science, where we find five laws which all are very much relevant for now and for future even. The all five laws are centered on the library services to the users.

Technological advancement does not abandon the conventional library services rather it enhances, modified and enrich those services to cope up with the changing environment. From the past to present the main library services are more or less remain the same, only the way to the users is changed. Web-enable services are those which are provided through web i.e. the World Wide Web or the internet. Technologies are the helping hand for the optimum use of the resources.

Semantic Web

'Beyond the Wall' – the term or the concept when applied for a library that means library is no longer limited within the boundary of four walls or within a limited space.

Library services or availability of library resources can be avail or found in rather way than its traditional system.

Here is the ways are comes either in digital, or virtual or in the web and internet as well. According to Tim Berners-Lee, "The Semantic Web is not a separate Web but an extension of the current one, in which information is given well-defined meaning, better enabling computers and people to work in cooperation."(Tim Berners-Lee, James Hendler and Ora Lassila, 2001).According to him, semantic web facility of human understandable content into machine understandable content, for searching, integrating and sharing information more easily than before. In search engine optimization (SEO) almost each

search engine now supporting semantic web capabilities when connecting information using specialized schemas about common categories of any things like movies, books, any products, any business and even recipes. In google search results these schemas helps to generate the summaries. According to them "The semantic web is not a separate web but an extension of current one, in which information is given well defined meaning, better enabling computers and people to work in cooperation".(Tim Berners-Lee, James Hendler and Ora Lassila, 2001). So in general we can say semantic web is linked up information which is extended like mesh in global scale and can be easily accessible through machine or computer.XML (extensible Mark-up Language), URI (Uniform Resource Identifier), RDF (Resource Description Framework), RDF Schema, ontology are the technologies on which Semantic web is based on.

Applications in library

The benefits of semantic web could be applicable in different field like e-commerce, agent technologies, e-governance, and Information science and of course in the world of library as it is able to bring structure to the meaningful content of web pages. Semantic web means to create an environment where software agents roaming from page to page can readily carry out sophisticated tasks for users.

It facilitates better knowledge management and organization according to the meaning.

It provides better searching facilities. It enables more precision in reply to a query and provides better information retrieval. Tim Berners-Lee stated that the semantic web is not for finding things more easily: it is about "creating things from data you've compiled yourself, or combining it with volumes of data from other sources to make new discoveries. It's about the ability to use and reuse vast volumes of data".

Libraries now a day provide access to various resources from the conventional publisher to various databases, digital libraries, institutional repositories and scholarly information. For this purpose, interoperability is needed to communicate among various platforms. Semantic web technology is able to provide this kind of interoperability of information.

It enables better and meaningful retrieval for keyword searching. Ontology languages can provide more flexible and precise information representation and retrieval. It not only helps to retrieve but also able to specify who can have access to what information.

Library 3.0

If it is 3.0, then no-doubt there may be a previous something that is called 2.0 and when it is applying in the context of library then it called Library 2.0. The concept of Web 2.0 is introduced by Tim O' Reily and Dale Dougherty in 2004. And that 2.0 web become Library 2.0 when it is applicable for the library purpose. The term 'Library 2.0' is first coined by Michael Casey (Michael E. Casey and Laura C. Savastinuk, 2007)on his Library Crunch blog. However, the utilities of Library2.0 are - library is everywhere (Beyond the wall), library invites participation of the users; Reuse of resources; Flexible and best of breed system. It is quite difficult to explain proper about the definition of Library 3.0 rather discussion on difference in between Library 3.0 and Library 2.0 is quite comprehensive.

Definition:

It is not cleared that when and by whom the term Library 3.0 was given but it assumed that in the late of 2006 and early of 2007 the term came to exit. The researchers did not go for its definition but gave some prediction and reaction about the term. In real sense library 3.0 is devalue of Library 2.0. Library 3.0 is aimed at turning the unorganized web content into a systematic and organized body of knowledge(Tom Kwanya, Christine Stilwell and Peter G. Underwood, 2015). Library 3.0 is able to establish a semantic relationship of web content and even from so called 'invisible web'. Invisible web is popular because it can't be accessible through ordinary search engines. But in Library 3.0 it ensures the accessibility, availability, search ability and usability. Library 3.0 is not just merely select a book but also engaged with librarians those who have the ability to organize annotate and compare the documents and information from various perspectives. In this perspective Toma Kwanya well said "Library 3.0 environment should work as apomediaries, standing by the users and guiding them to high quality information without overbearing them"(Kwanya, 2014).

Application in Library

3.0 is a fast broadband connection to the internet always and everywhere. Library 3.0 helps to develop in many aspect of Library, Librarians and even users. It helps to develop professional skills of librarians, personal and impersonal development, management skill and research skills. Besides it helps to develop competency level such as information literacy, bibliographic organization, terminological development, legal and research. To be creative, learn and lessons make the job fun, go easily through divergent perspective, be creative and innovative, capacity building, engaging stakeholders, keeping vision and mission very clear. Some platforms are there through which library 3.0 facilities can be avail.

Blogs and Wikis, RSS Feeds, Synchronous messaging, Mashups, Tagging, Social networking sites etc which are very much known for Library 2.0 is also applicable for the Library 3.0. Some applications are as follows –

Blogs and Wikis: Blogs and Wikis are certainly the two main features of 'third generation' library service. Blog can be used as another platform for publications. Blogs are such specific types of websites where independents authors post their ideas, thoughts or content or share an expert opinion with a seamless audience and the users are allowed to get the concept or the modern trends or they can access the most relevance information of a subject.

And the Wikis are set of numerous web pages where author or contributors are allowed to contribute factual correct information collectively.(https://veolay.com/what-is-the-difference-between-a-wiki-and-a-blog, 2016)The online encyclopedia where any registered user can write or modify. Though both the blog and the wikis can be charged with authentication and reliability but still their values cannot be eliminated. They are quite able to enrich library collections. Blogs are the new mode of publication and wikis are the open group study room for the users. It is the critical responsibility for the librarian to add blog and wikis to the collection to provide reliable information to users. Here library itself also can play the role of a user.

RSS Feeds: RSS feeds are another application of web 2.0 to enrich library collection and also to provide better information service. They are used to republish the contents. It is able to give updates of new items, new services to the users. It also can be used as information discovery tool.

Synchronous messaging: This service is popularly known as Instant Messaging (IM) service. It is widely used in library community. It provides a real-time chat experience between the library staff and the user or patrons. This application is used to provide chat references service. Here users can asked any questions or complaints or suggestions to the librarian and also able to get replies from him.

Mashups: It is another very useful feature of Library 3.0. Mashup is the mixing of two different software applications to provide a new service.

Tagging: It enables a user to add or change content and also to create resource description (metadata). Through this new subject heading can be created by the users and that can be used for post coordinate searching.

Social networking sites: The most interesting application of 3.0 is the social networking site.

The social networking sites are the combination of chatting, tagging, blogging, instant messaging. Sites like Facebook, Flickr, MySpace got a great popularity. Library can share information on Facebook, MySpace and that enables users also to share their own. Those sites can be used as the promoting platform for libraries.

Library Mashup

As the world is moving towards the Knowledge society, technology plays a great role in this convulsion. As being the part of Information society and as well as the Knowledge society it is more important to a person to be dynamic or multidimensional. Users' choice and need have been changed. So that libraries can take more responsibilities to serve their users' changing requirements.

In this context library mashup is a great help. Library Mashup is one of the facilities that is provided by Library 3.0.

The term Mashup originally used in the world of Pop music for remixing two songs with each other. This term is borrowed by the web experts to justify the processes of mixing two or more software applications to create a new one.

Definition:

Mashup is the mixing of information of different sources to create a new one and presenting them through a single interface or website. A mashup is a web application that uses content from more than one source to create a single new service displayed in a single graphical interface. Jack.

M. Maness stated that mashups "are ostensibly hybrid applications, where two or more technologies or services are conflated into a completely new, novel service".(Maness, 2006). Mashups is a web page or application that combines dada from two or more external online services.

Structure:

Data source or content provider: The ecosystem is consists of open data sources available in the cloud. Open data sources can be easily accessed as there remains no boundary of licensing. Data providers (Google, Yahoo, Amazon etc.) easily provide the access to their data through RSS feed, XML format or through API. Mashup application: this is the processing unit of the whole process. The quarries are written in programming language like JavaScript, PHP, Python, Perl etc. to collect the data from the data provider.

User interface: It is the last window to show the whole new package to the users or consumers. Last but not the least; the ecosystem is incomplete without the creator and the consumer or users. Creator is the one who mash up the

contents from different sources to create a new service and consumers are the users of the new service. The most important think of mashup is that a user and creator position is interchangeable.

Applications in library:

Library location: Map Mashup is the most popular one. It can be created by adding a map link to the library location page.

This link with a pushpin is able to show the location of the library in Google map with some basic information (library hour, total member).

Create library catalogue: This enable users to create catalogue by their own. Library Thing is a site which provides this kind of facility and also promotes sharing of the catalogue.

Collection discovery: Mashup technology facilitates discovery of collection. Through this list of books can be added with book covers. It also enables to add library pictures with the Google map.

Enrich library catalogue: It facilitates to add Google book reviews with the library catalogue, so that searching of a particular book is able to show its review also. X ISBN serves information about a particular intellectual work along with its ISBN that is represented in World Cat. It is also able to provide a list of related ISBNs for a query.

CONCLUSION

The concept of library has changed. The services and other things are not going as so called "Traditional library". A modern library system is the combination of both conventional and non-conventional setups. It is hard to believe a whole library system without any application of technologies. From the above study it is very clear that these three technologies have great implications in providing better library services. The way to look at the information or knowledge has been changed. It is no more remain 'searching' but rather 'finding'; 'access' has been changed into 'sharing' and 'editing'. It is the time to getting global rather than closed inside the library system.

These technologies are the helping hands to be opened up in the wide. Library 3.0 is itself the mashup of blogs, wikis, instant messaging, and tagging, social networking sites. A Mashup play a role like an aggregator and semantic web technology is facilitates information discovery, processing, integration, reuse and interoperability among various applications. But no technology is perfect. Authentication and reliability problem cannot be denied for the applications of Library 3.0. On the other hand the first things come into the mind for Mashup are the problem concerning privacy, rights management and reliability. For the Mashup technology there must remain respect for copy right and also should have understanding between the content providers.

Semantic web itself a complicated technology. Still there remains the confusion about the existence of this technology. Some believe that it just a mere concept. But it cannot be denied that if not totally but to some extent it is functioning with potentiality. Library 3.0 technology including library Mashups are used popularly in libraries across the world. The applications of semantic web technology are also stepping forward in libraries for providing services, though there are more miles to go to get the state of saturation. However Library 3.0 is a smart communication between library and its users.

In India, being a developing country, certain problem arises on the way of the development in library sector. ICT education is compulsory for being benefitted with tools.

But in our context 'Digital divides' is one of the main hindrances on the way of making modern, up to date library system. Illiteracy, poor educational infrastructure and economic condition and lack of library or information awareness suffer a lot for being hundred miles away from such facilities. But at the end note it can be said that we are hopeful for our country. It is going forward in various aspects, so that one day it will certainly reach to its goal and a better developed library system will be opened up with all technological features to provide better service to its users. But delay can't be an excused as web is changing rapidly and hope Library 4.0 is no more in far distance.

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