

Role of Library and Information Professionals in Web 3.0 Era

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Abstract

There has been a definite transition in the nature of Librarianship or LIS Professionals over the recent years, the main reason being the technological advances which have influenced the field of Library and Information Sciences. Along with the changing nature of libraries, the job profile and responsibilities of the librarians or LIS Professionals have also changed manifold. In the changing times it has become necessary for the librarians to equip themselves with the upcoming and reigning technologies to remain relevant and to provide the required service to their potential users as well as actual users. This paper attempts to portray the various aspects of Web 3.0 and semantic web technologies and describes the changing role of the LIS professional in the present scenario.

Keywords: Semantic Web Technology, LIS Professional, Web 3.0, Web Ontology Language (OWL), RDF

1. Introduction

There has been a visible transition of web technology from Web 1.0 to Web 2.0 leading to Web 3.0. This has correspondingly changed the library scenario from Library 1.0 to Library 2.0 and then to Library 3.0. (Semantic Web Technology) This is due to the fact that the library professionals are constantly trying to adapt themselves to the technological changes being brought about there by incorporating the same in order to provide better and more efficient services to its users. This has helped the librarians to bridge the gap between the users and the library, and have also enabled to serve its clientele using current technological advancements.

Much has already been spoken about Web 3.0 as well and probably the next transition is towards Web 4.0. and Web 5.0. The distinction between these various technologies will be evident with time to come, but currently an attempt can be made to study the

practical applicability of Web 3.0 and how far the libraries are actually making use of this technology to provide its services.

For the clear understanding of Lib 2.0 a definite knowledge of Web 2.0 is essential. The term Web 2.0 describes a range of technologies, services, and trends which have created an active read and write web.

Becta has described Web 2.0 as It is about using the internet as a platform for simple, light-weight services that leverage social interactions for communication, collaboration and creating, discovering, re-discovering, remixing and sharing document to development of content. Typically, these services develop rapidly, often relying on a large community of users to create and add value to content or data. The availability and ease of use of Web 2.0 tools and services has lowered the barriers to production and distribution of content. Some examples of Web 2.0 services include: social networking sites, blogs, wikis, social bookmarking, media sharing sites, rich internet applications and web 'mashups'.



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Based on this understanding of Web 2.0 we can say that the concept of Lib 2.0 manifested from Web 2.0. Library 2.0 is generally perceived as the application of the interactive, collaborative and multimedia web based technologies to library services and collections.

2. Web 3.0

Web 3.0 refers to the use of emerging technologies such as the semantic web, cloud computing, mobile devices and established tools like federated search systems, to facilitate the development, organization and sharing of user-generated web content through seamless collaboration between users, experts and librarians. The main goal of library 3.0 is to promote and make library collections widely accessible, searchable and usable. The end result of Library 3.0 is the expansion of the 'borderless library', where collections can be made available readily to library users regardless of their physical location. The collections are available as online resources like e-books, e-journals, images, sound, video etc., and also offline resources like CD ROMs, DVDs etc. Web 3.0 is aimed at turning the unorganized web content into a systematic and organised body of knowledge by establishing a link between all the web contents.

3. Constituents of Lib 3.0

Lib 3.0 is a product of Web 3.0. Web 3.0 has brought about a revolutionary change in the way we understand the web. Web 3.0 is built on semantic web technologies, which will allow data to be shared and reused across application, enterprise and community boundaries. The main components that constitute Web 3.0 are the 3D web, the semantic web, web ontology and the real world web.

The above mentioned technologies have a significant role to play in providing library and information services. The maximization of these services will depend upon how well the services are being executed and how much they are being accepted by the users.

The current web today is growing at an amazing pace. However most of the web pages are designed in such a way that the information contained in them cannot be understood or processed by computers. Semantic web is web of information that is machine meaningful process to computers. Semantic web objectives at converting the current web dominated by unstructured and semi structured documents into a "web of data" or structured data via semantic web tools and technologies like Protege, Ontology software developed by Stranford University, Jenea fuseki apache web server, Sesame, etc. And also provides a common framework that allows data to be universally and uniquely shared and reused among people crossing across the globe. The Semantic Web or Web of data is that in which the machines help us to make a better use of structured information scattered on the Web at the granularity.

For the information to be made standardized highly structured formats like Resource Description Framework (RDF) can make the computer understand the meaning of the content and not mere matching of texts.

Still moving ahead, by linking this data to ontologies, that describe the relationship between topics (concept) and associations (relationship) or entity, objects, ideas the computers can now not only understand the content but also can derive new knowledge by reasoning about that content. When ontologies are defined for concept and context, they

bring the various terms and meanings with relationship together. For this purpose there are several web standards laid down by W3C such as RDF (Resource Description Framework), RDFS (Resource Description Framework Schema), SPARQL and OWL (Web Ontology Language) etc.,

Presently there are various web services which certainly bring an interaction and integration of web information like SADI (Semantic Automated Discovery and Integration). This helps in facilitating e-commerce or extending and automating a supply chain. This has given rise to entire panoply of standards described as Web Standards, e.g. Web Service Description Language and Web Service Business Process Execution Language, RDF.

4. Applications of Lib 3.0 in the Academic Scenario

Academic sector includes a wide range of students ranging from Pre-school to Graduates to Post Graduates up to the level of Research Scholar. It should be understood that there is a wide difference in the type and amount of information required at each level. Hence it is the responsibility of the LIS professional to make the required information available to their respective clientele.

School libraries play a major role in instilling good reading habits in children at a very young age itself. They function as centres of learning and have a big impact on the children. It is very important to expose them to the right kind of information and this can be made available to them both in the physical library space and in the virtual classroom.

Among the students of the Graduate and Post graduate level the role of the library is of prime importance as they have to depend upon the library for their various study or reading purposes. With the introduction of concepts like mediawiki, seman-

tic media wikis, blogs, word press, RSS and social media such as what'sapp, facebook, viber etc. systems through Web 2.0 technology, Lib 2.0 has encouraged and facilitating pro -sactive user participation and provision of feedback mechanism (LDAP) in the development and maintenance of library services.

Using semantic web technology libraries having collections of structured data can convert them into RDF 1.1 and the request for service is represented and executed in SPARQL internally, using .ql (query language) format and .ttl (Notation3 or tripple) format. An RDF graph with two nodes (subject and object) and a tripple connecting them (predicate). There can be three kinds of nodes in an RDF graph: IRIs, literals and blank nodes. Thus in the light of Lib 3.0 the main focus of the libraries has shifted from supporting the collections to supporting the users of the library. Due to the technological advances there is an increasing importance of personalized library services being provided to the users. Also there is a considerable amount of thrust on research and learning processes.

5. Case Studies on Use of Semantic Web

As an application of web 3.0 we can see how semantic web technologies are used by various institutions and companies. Case studies describe deployed systems that have been deployed within an organization.

- ▶ Korea Institute of Science and Technology Information (KISTI): KISTI is a government-funded research institute designed to maximize the efficiency of science and technology R&D and support high-tech R&D for researchers.

▶▶ OntoFrame 2008: A Semantic Portal Service of Academic Research Information. Its features are as below:

- ◆ Search portal for academic information for researchers
- ◆ It is based on a large OWL ontology developed at KISTI
- ◆ Reference to journals, proceedings, topics, location of authors.
- ◆ Portal is based on keyword based search plus extra information stemming from the ontology.

6. Key Benefits of Semantic Web Technology

- ▶▶ Ontology instances with URLs, URIs, and IRIs, can easily be connected to other ontology instances with their using relationships. This makes it easy to connect and fuse information, and also to develop knowledge service beyond the current information service.
- ▶▶ Using an ontology it has become more flexible to process academic research information, as compared to a database system in terms of adding new information or services.
- ▶▶ A semantic service is able to easily connect with external services by referring to URLs.
- ▶▶ Data represented in an ontology can be easily expanded by inference, so the data construction process has become convenient.

7. Changing role of the Librarian in the Present Scenario

The Library which is thought-about as a service institution existed from times immemorial and the Librarian was always an essential part of the library. The role of the librarian was always service oriented

and these services were either in anticipation or on user demand. Irrespective of their requirements, the librarian was well equipped with all the traditional fundamental functions like cataloguing, classification, reference service etc.,

Depending upon the type of library, whether public, academic or special, the role of the Librarian is of great importance and the librarian has various roles to play.

The information explosion has occurred due to the internet and internet archive (using Wayback machine) Various developments in information technology have changed the way in which libraries operate. The library too has been influenced by the technological advances and a voluminous change has occurred in the outlook towards the library. Before the internet, most of the information was available only in books and thus libraries were the main source of information.

Presently, there is a great influx of the electronic media and the information is available in a variety of formats, which require specialised equipments to read the information inscribed in it. The skills of the librarian are very much pertinent in the electronic environment. It became necessary for the librarians to equip and update themselves with the current technologies for providing the appropriate and up-to-date information. Contrary to the popular belief that the position of the librarian would become redundant with times, the fact is that the librarian has been raised to a more prominent position in any organisation on account of the responsibilities that have to be handled to deliver the contents or collection to connect to the right kind of information. Using various softwares like Dspace, Eprints, Open Semantic Frame Work, Drupal KOHA, NewGenlib, etc., that have been introduced in the LIS profes-

sion, the manual labour and the day to day routine activities have been much easier. Over a period of time the librarian's traditional roles have been taken over by the library softwares and digitization has further changed the function of the LIS professional. With the emergence of recent web 2.0 technologies like social media the nature of the library services have changed considerably, as well as the role of the LIS professional and this is due to the technological changes and the expectation from the users.

In the era of Lib 3.0 it is the responsibility of the LIS professionals to adapt pro-actively to the advancing technologies and to make use of it in the most effective manner.

The entire thrust is on web semantics and ontology; the librarian thus cannot be satisfied by only providing basic services over the mail or with other electronic resources.

The function of the librarian always included the responsibility of building, designing gathering, updating, capturing and re-capturing the information to suit the requirements of its users. These functions become all the more important since there is a huge requirement of information at the shortest possible time and which need to be filtered and gathered from the humongous amount of data available on the Internet and Intranet. Thus librarians are re-establishing their relevance as information professionals, who will work for the patrons by collecting, filtering and collating the relevant information and providing them wherever and whenever required and anyone, anywhere, anytime, using any device and network.

8. Relevance of Web 3.0 to the Information Professionals

It is an indisputable fact that huge amount of data is being created on the Internet and there will always be an addition to it on a continuous basis. The users will find it very difficult to identify and make sure that they have got the right information at the proper time and have not missed out any information due to incomplete or inaccurate searches. The need for faster and more accurate retrieval of information becomes significant especially in the clinical libraries and health care and pharmaceutical companies where major decisions depend upon the information collected about similar researches and patents already made in that particular field.

Hence, the role of the information professional today is neither to locate the relevant sources nor provide the required specific piece of information. The actual role lies much beyond that. For a subject specialist librarian it is essential to have a deep knowledge of the subject and an extensive knowledge of the various sources in the concerned field. It is here where the importance of semantic web technology and ontology arises. Semantic web technology and ontology are the two areas which are the foundations for future generation library practice.

Ontology or artificial intelligence as a concept will help in organising the data and to establish relationship between various concepts and things. Ontology will provide a systematic view of the relationship between multiple things and concepts that can answer questions that are coined in a human language. To develop ontology in any field will require skills on the part of the librarian. As information specialists, or LIS Professionals they should be able to understand ontology rules and concepts (Top-

ics), their definitions and relationships (Association) between concepts (like the Main Class in any classification scheme) to help develop ontologies and semantics web.

9. Skills Required by Information Professional

Prior to creating an ontology it is essential for the Information Professional to know the following:

- ▶▶ The LIS professional need to do a constant survey to identify the new sources of information, to identify the new technologies being developed and to incorporate them into their area of work.
- ▶▶ The LIS professionals should develop their skills so as to know how to develop an ontology from a taxonomy.
- ▶▶ Before creating an ontology an in depth study needs to be done as to who will be the target audience using the ontology; why would the users use this ontology; and what kind of questions they might ask while using the ontology.
- ▶▶ The LIS Professionals should be able to identify the terms and establish a relationship between various concepts.
- ▶▶ They should develop their knowledge and regularly update the ontologies and the various concepts.
- ▶▶ The LIS professionals can also look forward for creating ontologies of various subjects and connecting it with ontologies of other subjects, thus increasing the scope of the subjects concerned.
- ▶▶ To describe an ontology or other knowledge structures or to apply web semantics in their respective fields it would become necessary for the librarians to have a knowledge of languages such as RDF (Resource Description Framework),

RDFS (Resource Description Framework Schema), OWL (Web Ontology Language).

10. Conclusion

Information is available anywhere and everywhere and at any time through Internet and Intranet. Today, information is available at the finger tips of the users as there are innumerable sources of obtaining the same. However, filtering from the vast sources of information and making available the right information at the right time and to the right user is presently required.

Web 3.0 technologies and Ontology have enabled Library 3.0. and have brought about fundamental changes in the way the information is collected and disseminated. With the role of the information professional becoming more and more prominent, the library professional will have to additionally learn about the related subjects along with the existing knowledge base. The library personnel will have to be professional in their approach and deal with various matters intelligently keeping in mind the target audience. In the context of Web 3.0, Crawford and Gorman have re-interpreted Ranganathan's Laws of Library Science. The role of the information professional in the present scenario goes hand in hand with the third law which states that "Use technology intelligently to enhance the service". Accordingly, by using various web 3.0 technologies the library professional will be able to necessarily provide the information as per the requirements of the target users.

Thus, in today's times the role of the LIS professional is that of a bridge between an information specialist – the subject matter experts and – the users.

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