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How the New Web Generations are Changing Library and Information Services

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ABSTRACT

The new Web generations are influencing the minds and changing the habits of software developers and end users. Users, librarians, and information services professionals can interact more efficiently, creating additional information and content and generating knowledge. This new scenario is also changing the behavior of information providers and users in health sciences libraries. This article reviews the new Web environments and tools that give librarians opportunities to tailor their services better, and gives some examples of the advantages and disadvantages for them and their users. Librarians need to adapt to the new mindset of users, linking new technologies, information, and people.

KEYWORDS: - Information professionals, librarians, library information services, Web 2.0, Web 3.0

1. INTRODUCTION

In the World Wide Web's first decade (1990–2000), most of the development focused on the ''back end,'' that is, the infrastructure. Programmers created the protocols and code languages to make Web pages. During that time, the Web had static sites=applications and portals (brochure-ware) and was primarily a network of documents. Web 1.0 can be visualized as a library or a source of information.

In the second decade (2000–2010), the focus shifted to the ''front end,'' and the era of Web 2.0 began. Web 2.0 is a read-write Web; now people use its pages as platforms for other applications. Some consider that now, in the Web's third decade (2010–2020), we are already at the end of the Web 2.0 cycle, with progression toward version 3.0 of the Web, which will make it simpler to index the contents, so information will be easier to understand. Web 3.0 will be the Web of data and knowledge. The next step (2020–2030) will be Web 4.0, with intelligent personal agents and intelligent machines. (Ref-1) A recent article published in Nature offers speculative ideas from researchers and business people on how technology might have changed our world by 2018(Ref-2)

The term Web 2.0 does not refer to an update of some technical specification, but to a perceived second generation of Web-based communities and hosted services.(Ref 3 & 4) In other words, it denotes a change in how software developers and end users are using the Web. Web 2.0 is a dynamic and fast-moving environment. One of the important implications is that Web 2.0 introduces a social network where people, organizations, or other social entities are connected, add and edit information, and share resources. Social networking sites, social bookmarking, blogs, wikis, and folk taxonomies—''folksonomies''—facilitate collaboration between users.

The term Web 3.0 was suggested by John Markoff in 2006 and refers to a generation of Internet-based services that might be called ''the intelligent Web,'' such as those using semantic Web technologies, micro formats, natural language search, data mining, machine learning, recommendation agents, and artificial intelligence technologies, which emphasize machine-facilitated understanding of information in order to provide a more productive and intuitive user experience.(Ref 5)

2. WEB 2.0 – NEW SERVICES

''Social tools,'' that is, social-networking sites, social bookmarking, blogs, wikis, and folk taxonomies (folksonomies), help librarians to tailor their services better, modifying them to meet users' specific needs (see Table 1). The key is to get things out quickly to users. This means librarians have to show willingness, flexibility, and confidence in coping with rapid change. Web 2.0 also encourages librarians and users to share their knowledge, and gives users the opportunities to play an active role in the services offered by libraries (see Table 2). Web 2.0 tools also foster constructive cooperation between librarians and users. Since the tools are constantly evolving, users are encouraged to return to their librarians for assistance, opinions, and suggestions. In addition, as classification specialists, librarians can help users build up expert vocabularies (''collabulary''—collaborative vocabulary) to improve their own personal tagging of subjects to index documents, files, sources, etc.; create additional information and content; and generate knowledge. Of course, feedback from users plays a

major role in the generation of new services and changes to old ones. The following describes several examples of services implemented by the authors using the Web 2.0 tools.

- Speeding up access to information
- Speeding up spread of information
- Filtering material chosen by users
- Organizing user information sources in standardized keyword and classification schemes
- Developing expert vocabulary

TABLE 1: Participatory Services

Social tools	Services
Blog (web-log)	Providing commentary or news on a particular subject and, thanks to rapid feedback from users, allowing easier updating with new information
Wiki	Giving users the possibility of developing ideas in collaboration with others, who can add pages of content themselves
Social bookmarking systems	Creating lists of bookmarks or favorites, for central storage on a remote service, and sharing them with other users
Social tag and folk taxonomies	Tagging documents, choosing and adding uncontrolled keywords to identify the documents more efficiently from the user's own point of view
Social network	Enabling communities of users who share the same interests to build their own online social networks for communicating or sharing resources

3. ADVANTAGES AND DISADVANTAGES OF WEB 2.0

With the advent of the ''Web 2.0 age,'' users and librarians have ample opportunities to collaborate. Social tagging, social bookmarking, and wiki services are greatly appreciated. Thus, the benefits of the Web 2.0 environment can be considered reciprocal. The dynamism imparted by Web 2.0 is boosting the tendency toward personalization to meet the needs of users, even of the single user, with more finely tailored products and services, and enables librarians to help and serve.

Web 2.0 tools are free! On the other hand, librarians may start to feel uneasy about their own ability to keep up with the rapid changes in technology and may have the impression they risk losing control of the environment in which they are training and supporting users.

A disadvantage is that the reliability and longevity of some Web 2.0 tools are uncertain. Many of those currently available have been developed by individuals who are committed to the open source and free software movement, but who may lack commercial backing. It is probably risky for librarians to rely on services that, given the lack of support contracts, could vanish at any time.

The low level of data protection, together with the potential for data loss or misuse, also raises the risk for librarians of widespread leakage of confidential information and data. Then, too, questions of data ownership and reliance on third parties with whom there may be no contractual agreements could generate legal concerns. From the user's point of view, Web 2.0 is a powerful resource for obtaining information from many sources and actively contributing to content creation. The tools are user-friendly, and the ease and speed of access to information through RSS saves users time and reduces the information overload. The flexibility allows them to develop and build up their personal libraries, bookmarks, and search engines.

TABLE 2: Pros and Cons of Web 2.0 for Librarians and Users

Librarians	
Advantages	Disadvantages
Collaboration Customization Communication Knowledge generation Sharing Updating Flexible tools Speed Reduction of costs Training Facilitates experimentation	Too many different tools Doubts about the reliability of tools Difficulties in standardization Low level of security & privacy Low level of cataloguing information The lifespan of tools Confidentiality concerns Ownership of data Legal concerns

Users	
Advantages	Disadvantages
Low level of complexity Requires little technical expertise Reduction of costs Flexibility User involvement Time saving Reduces information overload Social tagging Idea sharing Knowledge generation and sharing	Rumors Security and legal concerns Dependence Second-hand information Data loss Data misuse

Web 2.0 makes communication easier with each other, generating and spreading content, knowledge, and ideas between peers and creating expert professional networks. Tagging documents, and choosing and adding uncontrolled keywords, makes it easier to identify documents from the user's own point of view, although the lack of any control over the vocabulary could raise difficulties even at a basic level. These advantages bring with them certain risks. For instance, users have to rely on low-quality or second-hand information. Web 2.0 encourages user ''amateurishness,'' that is, the generation of content of no real value, whose source is not sure, but which nevertheless contributes to developing users' dependence on the Web 2.0 environment. For both librarians and users, there is potential security and legal concerns, for example, copyright, data protection, data loss, or data misuse.

4. WEB 3.0: THE SEMANTIC WEB

The third-generation Web environment will pose another challenge for librarians, as the Semantic Web will probably change completely how scientific knowledge is produced and shared. Table 6 compares some of the features of Web 2.0 and Web 3.0. Web 3.0 is a dynamic, 3-D environment with close integration of tools. Documents will be indexed better using standards for describing objects (Resource Description Framework), ontologies (semantic systems of concepts and relations), and controlled vocabularies and meta-data (data about other data), facilitating the retrieval of important information and its meaning through intelligent agents.(Ref 6) Web agents, which gather information from the Web, have the ability to process and understand natural language. The concept of a ''ubiquitous and pervasive Web'' means that with Web 3.0, users can access information and interact with the global community wherever they might be, by whatever method is available, and wherever all their data and applications reside. That means they will have at their fingertips the right content, at the right time, in the right place, on the right device.10,11 Since librarians are experts in cataloguing, indexing, and information organization and are thus familiar with using ontology and meta-data to classify and describe information sources, they could become vital players in the development of Web 3.0, creating ontologies and metadata.

TABLE 3: Comparison of Some Features of Web 2.0 and Web 3.0

Web 2.0	Web 3.0
Static systems Keyword searches Syntactic Web Social Web Documents Search engine algorithms information Personal & community Web pages	Dynamic, 3D Natural-language queries Semantic searches, media searches Web agents; Intelligent Web Controlled vocabularies, Meta-data Ontologies, control of Adaptive systems More integration tools Ubiquitous technology Pervasive Web

5. CONCLUSION

Librarians are perfectly compatible with the new tools of the Web 2.0 and with the arrival of Web 3.0 and the Semantic Web. They have all the necessary qualifications and basic skills to play an active part in this progression. Their expertise in alerting, tagging, cataloguing, customizing information, and in judging and selecting information sources will be a passe-partout to follow the evolution of the Web—and users' needs. Librarians can and must follow the continuous progression of the Web generations; they must view them as new opportunities, not as something they need to be afraid of getting involved in. They need to keep an eye open for emerging trends and changes in users' expectations and determine how they can meet those expectations. They also need to work together to share ideas and experiences, implement developments, and learn from each other. Of course they can rise to the challenge of the latest ''Web era''—it is just a question of re-casting themselves yet again!

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