University libraries: step towards a web based knowledge management system

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Abstract

Purpose – Web based knowledge management systems have opened new arrays in the present web based world. Because of innumerable features, they have become the first hand choice of every organization. The objective of this paper is to propose a web based knowledge management system for university libraries that will support the creation, organization, storage, dissemination and utilization of the institution's digital knowledge assets. The paper also aims to illustrate the requirements of a web based knowledge management system (WBKMS) for university libraries along with their key advantages.

Design/methodology/approach – Existing web based knowledge management systems were surveyed and a model framework was developed keeping in view the prevailing loopholes in the present systems.

Findings – The study evolves into a model web based knowledge management system catering for the needs of the users in the present bit and byte world.

Research limitations/implications – Further research can be conducted into designing web based knowledge management systems keeping in view the needs and behavior of the users they serve. Deep log analysis of the academically endeavored web based systems can be carried out for working out a better and productive WBKMS.

Practical implications – The outcome of the research will improve staff professionalism and will help in achieving coordination with other libraries and library users. Knowledge innovation in a web-based environment will help in the creation of better and enlightened knowledge based society.

Originality/value – The technologies discussed will help in achieving satisfaction levels both on the part of users as well as library professionals. The whole behavior of seeking information and knowledge will change because of generation, sharing and management of information and knowledge in a virtual mode. Such systems will help organizations strategically when their branches are located in different geographical locations and this will give a platform to the members/employees to share best practices, problems, customer interactions, and prevent reinvention of the wheel.

Keywords Worldwide web, University libraries, Artificial intelligence, Knowledge management

Paper type Research paper

Introduction

Knowledge management (KM) is viewed as a "process about acquisition, creation, packaging and application of reuse of knowledge" (Davenport *et al.*, 1998). Knowledge management is an increasingly important source of competitive advantage for organizations. Knowledge is fundamentally more complex than information or data, and systems supporting knowledge management have a broader range of design issues. Hundreds of millions of users can now access several billion documents on the web, and even larger data sets reside in organizations, intranets and web-accessible

databases (the so-called deep web). As the amount of available data continues to grow rapidly, it is increasingly difficult for users to find, organize, access, and maintain the information they require. At the same time, the notion of the semantic web promises to make web-accessible data more amenable to machine processing. The semantic web is about labeling (annotating) information so that computer systems (and humans) can process it more meaningfully. The semantic web (also called Web 3.0) is beginning to empower and energize content on the web and its basic principles and technologies can energize and enhance the long-standing knowledge-management discipline. Several frameworks within knowledge-management theory set contexts for scientific debate. Some emphasize the knowledge life cycle, others the knowledge product and many researchers have recently begun to emphasize the knowledge and social networking perspective. The rapid adoption of web based (Web 2.0 and Web 3.0) technologies create a firm bond between knowledge management, social networks and various implicit, formal, or powerful semantics.

Knowledge management system (KM system) refers to a (generally IT based) system for managing knowledge in organizations, supporting creation, capture, storage and dissemination of information. It can comprise a part (either necessary or sufficient) of a Knowledge Management initiative. The idea of a KM system is to enable employees to have ready access to the organization's documented base of facts, sources of information and solutions. For instance a typical claim justifying the creation of a KM system might run something like this: an engineer could know the metallurgical composition of an alloy that reduces sound in gear systems. Sharing this information organization wide can lead to more effective engine design and it could also lead to ideas for new or improved equipment.

A KM system could be any of the following:

- Document based i.e. any technology that permits creation/management/sharing of formatted documents such as Lotus Notes, web, distributed databases, etc.
- Ontology/taxonomy based, these are similar to document technologies in the sense that a system of terminologies (i.e. ontology) are used to summarize the document, e.g. author, subject, organization etc. as in DHTML and other XML based ontologies.
- Based on AI (artificial intelligence) technologies, which use a customized representation scheme to represent the problem domain.
- Provide network maps of the organization showing the flow of communication between entities and individuals.
- Increasingly social computing tools are being deployed to provide a more organic approach to creation of a KM system.

Libraries, like other organizations, can benefit from KM initiatives. Some researchers from the library profession have attempted to identify the requirements by which libraries can promote knowledge sharing among librarians, their users and suppliers in their every day activities. However, this is an emerging interest that is relatively new in this field, and therefore approaches that deal with these issues are mainly general in nature. Among the first librarians who introduced the concept "knowledge management" to the LIS profession are Xiaoping (1999) and Rui (1999). Shanhong (2000) also describes how libraries can manage the creation and sharing of knowledge

among their staff. She proposes that libraries should create and develop their own "document information resources". She also emphasizes that, in sharing of knowledge, libraries should make comprehensive utilization of expert systems and all media. White (2004) reports finding of a case study she carried out at Oxford University Library Services (OULS) and found how academic libraries can benefit from KM in integrating professional knowledge into the whole process of library services. She concludes that an effective knowledge sharing culture exists at OULS and that librarians consider their organization as a learning organization. Similarly, Sinnote (2004) explores KM in terms of its relevance for Library and Information Science professionals. In a general approach, Sinnote describes the key points where LIS professionals can be involved in KM initiatives. Parirokh and Fattahi (2005) report how sharing of knowledge among librarians can improve organizational learning in academic libraries.

Based on the above recent emphasis on importance of the creation, organization, storage, and dissemination of information with the help of web technologies in today's university libraries, this study presents a conceptual knowledge management system called web based knowledge management system (WBKMS). The study proposes a framework for a web based knowledge management system (WBKMS) for university libraries and highlights the associated technologies that can impart success to its proper working.

Problem
Society is drifting towards the third generation of knowledge management. It is impossible even for big organizations, including libraries, to find out what will be the next technology in the years to come. What sort of information/products and services the users/researchers will look for? What is working today for any library/company will work tomorrow also? Here all innovations, learnings are targeted to future market requirements. Products are developed to set new standards. No one has asked Sony to produce Walkman; neither had they found the demand for such a product from any market research. MS Office developed by Microsoft keeping in eye the growing use of PC in every day life and long before they anticipated the requirement. The implementation of Web Based KM System in libraries will help them to find out the future requirements of their users without any visible indication from the present environment.

Objectives
The main objectives of implementing web based knowledge management systems in libraries are to:

- improve library staff's professionalism;
- encourage coordination with other libraries and library users;
- promote knowledge innovation;
- create more web accessible databases for users;
- find out future requirements; and
- create knowledge based society.

Web based knowledge management in university libraries
Library 2.0 is an emerging technology in library and information centers. Library 2.0 is the application of interactive, collaborative and multimedia web based technologies to web based library services and collection. The basic idea of Library 2.0 is to transform library services by making them more personalized, more interactive, collaborative, more web-based, driven by community needs.

In the knowledge economy era, the libraries will attach importance to vocational training and lifelong education of library staff to raise their knowledge level and ability of acquiring and innovating knowledge. The main purpose of an academic library is education and research. To achieve this goal there is a need to use the whole knowledge and information accurately, precisely and systematically. In the digital age, as we know, academic libraries face challenges from both within (academia) and without (the business sector). So libraries must strive to provide the right amount of information to the right clientele properly with appropriate financial and human resources to improve its organizational performance.

Today web based knowledge management is playing a very important role in big libraries. It has become more vital along-with the development of knowledge economy. The major components of web based knowledge management in libraries are:

· *Human resource management*: human resource is the main component of web based KM system. It is impossible for any library to survive in this web world without the library and information technology professionals.

· *Knowledge resource management:* by using expertise, libraries have to provide information from different resources (print, e-resources and online resources), resource usage, usage evaluation and measuring the impact of usage of the resources (Research output). They have to provide information about Open Access resources and educating the users about Open Access. They also have to exert much in building institutional repositories for their patrons.

· *Financial management*: one of the important components of KM system is knowledge resources. Finance is the backbone of knowledge resources without which it cannot be acquired and accessed.

· *Application of information communication technology (ICT)*: digital publishing technologies and global networking have given rise to the development of a wide variety of digital libraries. Web based knowledge is the application of ICT in an information handling activities. The induction of ICT in libraries has to be addressed more as a major change in management exercise than providing technological solutions to the existing problems. The rapid developments in information technology brought revolutionary changes in information processing, storage, dissemination and distribution and became a key ingredient in bringing-up great changes in over all aspects of society. Thus, the information stored in libraries has taken a major shift from volume-limiting paper to limitless multimedia digital form.

· *Interoperability:* standards are important for web based knowledge management. The exchange of information or resource sharing through web or any sort of network is possible only if two terminals are interoperable and followed compatible standards and procedures for information and knowledge transfers. Z39.50 Standard Protocol for Information Retrieval, approved by ANSI

(American National Standards Institute) in 1988, is a standard for computer-to-computer query and retrieval. One part of the standard specifies the format of computer-to-computer queries, while another part specifies the way information is returned in response to these queries. With the Z39.50 HTML Gateway libraries can use web browser to search remote databases over the Internet. From the Library of Congress (LC) homepage, it is possible to reach the Z39.50 gateway by choosing Library Services and then clicking on Catalogs of Other Libraries.

- *Information retrieval tools:* unless and until the information is being retrieved for use, it does not matter how much information is available in the web databases. Almost all search engines provide various information retrieval techniques or search techniques to retrieve web knowledge through free text search and search with advanced algorithms so that all the relevant knowledge can be retrieved effectively and efficiently. Using information retrieval tools libraries can provide seamless integration to different databases, electronic and online resources.

- *Meta data:* metadata is simply data about data, which helps the users to retrieve the required information easily.

The university library should take into contemplation the above basic components while designing a web based knowledge management system and adopt new policies, strategies and implementation of knowledge management for rendering qualitative services to its users so as to increase faith in the organization. Its main objective should be to serve as an institution to nurture a reading society and to provide the required information to promote reading and knowledge. Its ultimate goal should be to make society a knowledge rich society.

Barriers to implement proper knowledge management system in library
The library has to keep pace with the challenges to increase their operational efficiency within the limited budgets allocated. The most effective tool that can help in this reference is "Web based knowledge management". MacDermott and O'Dell (2001) listed the following obstacles in the proper implementation of knowledge management in libraries:

- Ignorance-not knowing who has the right information required for the job.
- Lack of time to find out and absorb the best practices recommended.
- Lack of a relationship between the source and recipient of knowledge.
- Time lag taken to implement best practices recommended across departments.

Steps in web based knowledge management
- *Knowledge capture*: with the adoption of tools and techniques, librarians and information professionals can capture, shape and reshape knowledge to make it accessible through web and usable to users. In simple terms, it is gathering and evaluation of digital information contents (Figure 1).

- *Knowledge organization*: after knowledge capture an organization or library values and uses its own knowledge in reflective ways that lead to profound shifts

in directions, values, beliefs and operating assumptions. This process is also known as "Construction of digital/cyber collections".

- *Knowledge filtration*: library must be able to provide right information, in right time to the right person from right resource.
- *Knowledge preservation*: after collecting and codifying the knowledge, it must be stored and maintained in a suitable form in the organization's digital knowledge bases.

Requirements of a web based KM system

Knowledge management requires technologies to support the new strategies, processes, methods and techniques to better create, disseminate, share and apply the best knowledge, anytime, anyplace, across the team and across several organizations, especially its clients, customers, partners, suppliers and other key stakeholders. The key technologies are communication and collaboration technologies that are web based for internet and intranet usage, as well as mobile technologies such as personal digital assistance's (PDA), personal computers's, telephone and videoconferencing. With recent development in Internet technology and its wider acceptance and popularity there are many products available today to facilitate knowledge sharing using web technologies. The main advantage of web-based technology is that it can be deployed in a networking environment within the organization. Internet is also used to create a virtual private network (VPN) using it as medium of data transmission. Organizations including big libraries have used different platforms to deploy a knowledge management (KM) system but in almost all cases a web browser is used as client end tool to access the KM system. Some of the important technologies required are described in the following sections.

Web server
The hardware of the web server is to be decided based on the traffic, network configuration, etc. Web server operating system is the part of the system, which delivers the required files to the client browser after required processing. Web Server is to be selected based on the scripting (programming) language, database supports, etc. There are many web servers available in the market today and Microsoft's Windows Server is a major player in the corporate market today. Windows 2003 server is the most recent one. In the other hand the Linux Server is of great demand as a part of Open Source Community. Window server usually runs IIS (internet information server) as the web server and in the same way Linux Server runs APACHE as the web server.

Programming language and database
Depending on the server support the programming language can be selected. Some of the languages popularly used for scripting are Java Server Pages (JSP), Advanced
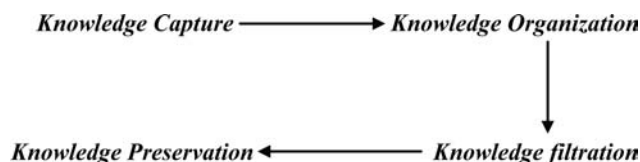

Figure 1.
Steps in web based
knowledge management

Server Programming (ASP) or ASP dot Net, Hypertext Preprocessor (PHP), Cold fusion, Perl, etc. Database support is a common requirement in such cases as details of files; clients; system tracking; etc. are to be stored. Popular database for web applications are SQL (Structured Query Language), MySQL, MSSQL, Oracle, etc. In the client side any web browser can be used to access the server. Popular browsers are MS Internet Explorer, Netscape Navigator, FireFox, etc.

Network

An existing network can be used to develop a web based KM system. Internet also can be used for this with required access limitations. Organizations with offices in scattered geographical locations can use VPN (Virtual Private Network), which uses internet to create a private network. In such a system organization can keep its web server inside its premises and through VPN outside offices can access the server. Social Networking is a sort of networking service uses software to build online social networks for communities of people who share interest and activities or who are interested in exploring the interests and activities of others. Most services are primarily web-based and provide a collection of various ways for users to interact, such as chat, messaging, e-mail, video, voice chat, file sharing, blogging, discussion groups and so on.

KM portal

One web portal can be developed using any internet hosting solutions and access can be restricted by login systems. Users with different levels of permission can access contributions/articles of different authors. This type of system helps in sharing best practices, experiments, innovations, failure stories, etc. KM Portals are developed with database support to keep the records of authors, members, access levels, visitor tracking and many other requirements. Usually all contribution of these members passes through a veteran approval system first then it goes to the public view or the user view. Members posting to the author, rating system, feedback of users/members management, admin areas, etc. are some of the features generally used in KM Portal. Within the KM Portal, it is very useful to have a facility and underlying process to enter any "Urgent Request" into the portal and receive back any responses from across the organization. Rather than needing to know "who might know" the request is entered blindly and responses will be made if it is known in the organization and people are willing to support and respond to this activity. This is a very effective way of better leveraging the knowledge across the organization.

Web based discussion board or forum

A virtual community can be created by using web based discussion boards. Different sections or areas can be created to create different sections for discussions. Here the discussions are available for all in the organization to view/post/reply to the topics. This is an ideal solution for branch offices, communities located in different geographical areas but having common area of interest. They can share there common problems, areas of concerns, experience and help each other in building a strong bond of networking. Little help from organization in creating trust among members by organizing face to face interactive sessions will encourage the members to actively participate in the forums. There are many ready-made scripts available in the market

and one such system can be developed in-house keeping in mind the requirements of the organization. Under open source community some scripts are popular for web application like PHPBB (Hypertext Preprocessor Bulletin Board), VBulletin, Ikonboard, etc. PHPBB.com is a high powered, fully scalable, and highly customizable Open Source bulletin board package. VBulletin is a powerful, scalable and fully customizable forums package for your web site. It has been written using the web's quickest-growing scripting language; PHP, and is complimented with a highly efficient and ultra fast back-end database engine built using MySQL. Ikonboard is a comprehensive web bulletin board system used by many webmasters.

Blogs
A Blog (WEBLOG) is a web site that contains dated entries in reverse chronological order (most recent first) about a particular topic (http://www.answers.com/topic/blog). Web Blogs are popular nowadays and organizations have utilized this tool to create awareness and evolve opinions on different issues. Blogs can be hosted in the institutions/companies/libraries intranet or popular Blog sites like blogspot.com can be used to give a platform to the users/employees to post their views.

Wikis
A disruptive innovation has rocked the business world. A new information technology (IT) tool is fast being adopted by many organizations, in many different ways. This new tool is called a Wiki and is part of a new suite of tools being dubbed "Web 2.0" or "Enterprise 2.0." These new tools and Wikis in particular are being trumpeted as revolutionary new tools for knowledge management. Wiki is a collaborative website whose content can be edited by any one who has access to it. It is a web application that allows users to add content, as on an Internet forum, but also refers to the collaborative software used to create such a website. Wikis are a knowledge management tool because they combine two tools that are already used for knowledge management. On one hand, they are a content management system. They can be used to manage web pages (articles) as well as other documents as all information in a Wiki can be searched and categorized. On the other hand they are a form of groupware, used to enhance communication and collaboration. Wiki pages can be changed by anyone; people can work together to create web documents. The combination of a content management system and a collaboration system into one system is significant and different. This new tool allows for content to be worked on collaboratively and produced at the same time. Put another way, it's a tool for knowledge creation (collaboration) and a tool for sharing explicit knowledge (content management) rolled up into one.

Expert systems
Many organizations do not know what they know. By encouraging members/employees posting their problems or difficulties to an expert system, organizations especially libraries can save their time and money in finding best solutions to their problems. Expert's database with profile updating can be kept for the public view and queries can be posted to specific experts based on the areas of domain and expertise of the exports. This helps in creating innovation and learning culture in libraries.

Electronic management system:
The document library is typically the location where all documents are stored. The library should be context relative and allow the ease of control over any document type. Many libraries now employ an electronic document and records management system (EDRMS) for this requirements but the integration of the EDRMS with all other relevant information and knowledge sources is imperative.

Podcasts
A portmanteau of Apple's "I Pod" and "broadcasting" is a method of publishing files to the internet allowing users to subscribe to a feed and receive new files automatically by subscription usually at no cost. It first became popular in late 2004, used largely for audio files.

WBKMS for university libraries, why?
Librarians can no longer meet the information needs of faculty and students through the traditional avenue of simply adding to their collections (Hawkins and Battin, 1998). The librarians of any library have to extend their expertise in selecting, organizing, and preserving information to new forms of less formal, unpublished material, they must be willing to get outside the routines and the walls of the traditional library and work more directly with technologists, faculty, and students. It means librarians will not be merely the custodians of information but they will act as knowledge managers who will work with users in collecting and analyzing tactical intelligence and to act as trainers and consultants to transfer knowledge throughout the organization. The key advantages of WBKMS are:

- This is easy to maintain, as development requirements are limited to the server side. Changes can be done to the system easily and continuous improvement can be done to the system.
- In the client side any web browser can be used to access the server. From the users point of view they are comfortable with a web browser (thanks to internet) and they know the common system of login/logout, form entry, etc. So using a browser at client end is always advantageous than using any custom made front-end tool. This is one of the main reasons to go for a web based KM system. Any new employee/member joining the library can use the system without any formal training on portal.
- At the server end, the up-gradation is very much easy.
- The reach of the portal is not limited as any one can access from any part of the internet or intranet. The access area of the portal increases with the expansion of the network.
- Easy to get technical staff as common features are used.
- Staff receives feedback information and takes appropriate measures in time from knowledge management software.
- Users receive sought-for information from web based knowledge base softwares without staff involvement.
- Decisions are being made objectively, not subjectively with knowledge management software.

- Employees and departments work more efficiently, avoiding re-inventing the wheel, reducing redundant work.
- Information networks and communication facilities allow consolidation of staff members and groups, including ones from remote regions.
- Retention of intellectual property i.e. prevents knowledge from leaving when an employee leaves.
- It reduces employee training time and gain ability for new and existing employees to acquire job knowledge faster, reducing training time and providing higher job quality.

Alavi and Leidner (2002) have divided knowledge management into human-oriented or technology-oriented views, and identify three dominant perspectives from the practitioner point of view (see Table I).

Lougee (2002) reports that "rather than being defined by collections or the services of libraries that support them, the libraries can become a diffusing agent within the scholarly community". With the incorporation of distributed technologies and more open models, the university libraries have the potential to become more involved at all stages, and in all contexts, of knowledge creation, dissemination, and use.

Digital knowledge banks in university libraries
Digitization becomes an essential practice, if one is to extrapolate to the binary codes environment, the information coming from traditional techniques in a paper environment. It makes it possible that existing materials in analogical formats such as microfilmed documents, pieces of audio, video, books, magazines, parchments, medieval manuscripts, and thesis, among others can today be supported in digital version. Even it can end up being a viable solution in cases where time has acted as agent of deterioration.

In the construction of digital collections digitization intervenes, provided that the information does not exist in any other format but print or in a deteriorated form. To digitize the materials brings implications and diverse complications. Although the costs of equipment represent a restrictive element, they reflect the quality of the process starting from the acquired technology. Equally, temporary analogical means

Information-based	Technology-based	Culture-based
Actionable information	Data mining	Collective learning
Categorization of data	Data warehousing	Continuous learning
Corporate yellow pages	Executive information Systems	Intellectual property Cultivation
Filtered information	Expert systems	Learning organization
Free text and concepts	Intelligent agents	
People information archive	Intranet	
Readily accessible information	Multimedia	
	Search engines	
	Smart systems	

Source: (Alavi and Leidner, 2002, p. 22)

Table I.
Practitioner view of
knowledge management
orientations

as audio and video are still considered challenges for the digitization process (NISO Framework Advisory Group, 2004) (Figure 2).

With the implementation of Web Based KM System, the library would be able to create "Digital knowledge banks" at any place, which would include:

· *Online published material*: e-books, e-journals, government documents, handbooks.

· *Online reference tools*: catalogs, indexes, dictionaries, encyclopedias, directories.

· *Online information services*: scholar's portal, alumni portal, chat reference, online tutorials, e-reserves, e-course packs, technology help centers, etc.

· *Electronic records management*: faculty research directory, user record, collection record, annual report, stock verification report, library budget, etc.

· *Digital publishing assistance*: pre-print services, e-books, e-journal support, web site development and maintenance.

· *Digital institutional repository*: digital special collections, rich media (multimedia), data sets and files, theses/dissertations, faculty publications, pre-publications, working papers, educational materials, learning objects, course web sites, etc.

· *Research/development in digital information services*: user needs studies, applying best practices, assistance with technology transfer.
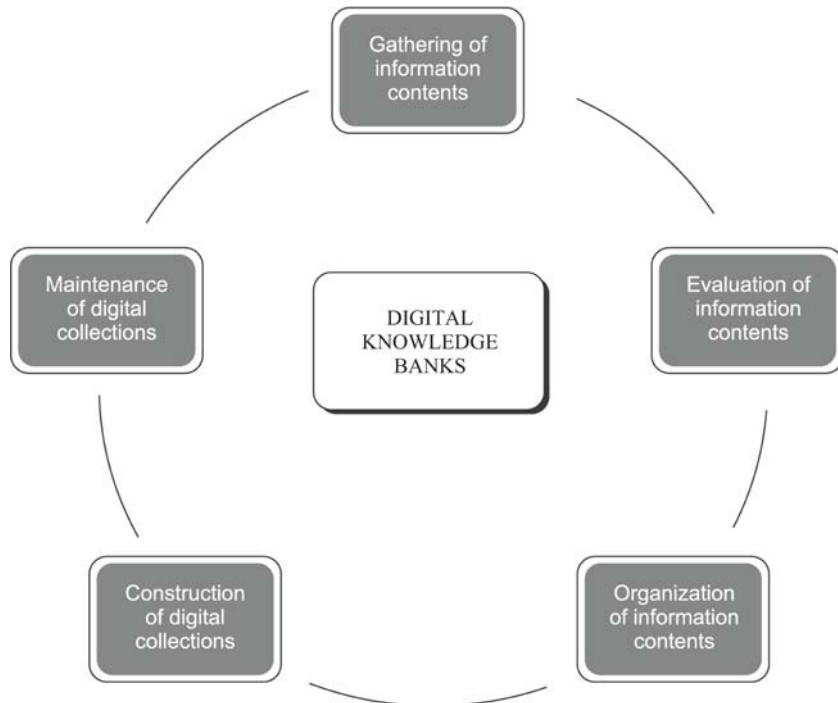

Figure 2.
Process of development of digital knowledge banks

Source: NISO Framework Advisory Group (2004)

The advanced technology has made possible to extrapolate knowledge and moving collection development from a traditional environment to a digital one. The cycle for the development of digital knowledge banks include all the valid stages for creation and maintenance of digital collections in a digital library. The increase in digital information resources forces organizations to implement new forms to handle the user's knowledge by the use of tools which allow them to select and store only that information which is necessary to their requirements (Figure 3).

Web based knowledge management softwares
Web based knowledge management softwares are developed to support and enhance the organizational processes of knowledge creation, storage, retrieval, transfer, and application. Some of the important web based KM solutions are:

- *InfoRapid Knowledge Map 2005e*: InfoRapid Knowledge Map can be used to draw knowledge maps; organizational charts; decision trees and work breakdown structures, taking down your ideas when brainstorming, or generating structure diagrams from XML files. Knowledge maps can be published on the Web, it can be added to WinWord, Excel and PowerPoint documents, and can be printed in almost any size you choose.

- *PowerKNOW 2.21*: powerKNOW is a web-based knowledge management solution (Qarchive, n.d.) to save and share knowledge. With this software the library can create its own knowledge base or document management system. It is very effective in managing different forms of existing knowledge or creating new know-how. Critical and valuable knowledge of an organization can be saved, structured, shared and transferred back into the business processes. Retrieval of knowledge and Information can be significantly speeded up.
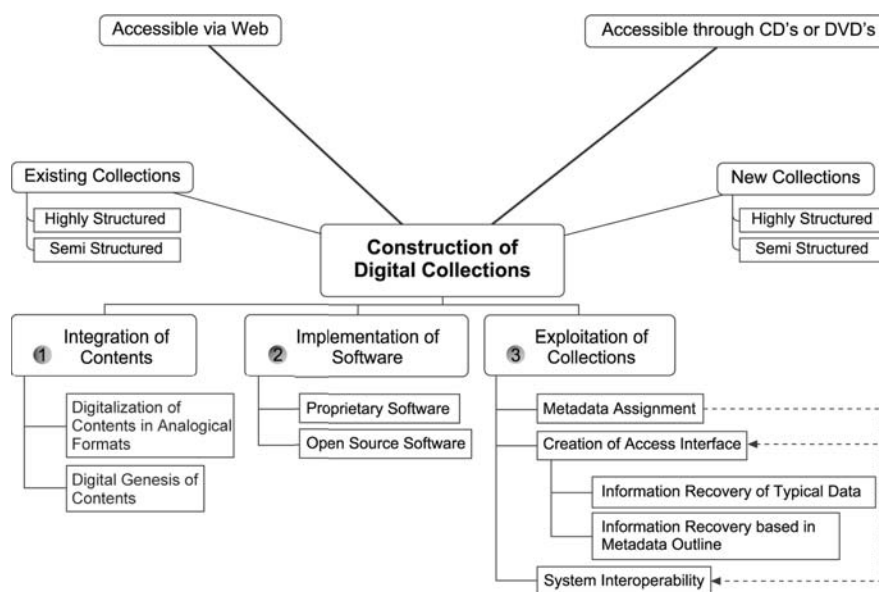
Source: Framework Advisory Group (2004)

Figure 3.
Stages of digital
collection/banks
construction

- *PowerDOCUMENTS 2.2*: powerDOCUMENTS is a complete knowledge management solution for the small and medium size companies/libraries as well as for a single person to keep valuable knowledge available to them. Build knowledge bases to document, manage, and retrieve valuable information.
- *General knowledge base 2.4.2*: General knowledge base is innovative knowledge management software allowing an easy and effective management of all types of knowledge bases. It is an optimal tool for categorizing and finding articles, documents or data. It allows user to keep documents systemized, to add notes and attachments, capture and store web pages from the web. Easy access to a library knowledge base either on LAN, WAN or internet is also provided.
- *AIOCP (All in One Control Panel) 1.4.001*: AIOCP (all in one control panel) is a free open source content management system (CMS), a professional all-inclusive solution to completely manage a website or portal through a user friendly web-interface (WMS-web site management system). AIOCP is also a framework for web application development and includes e-commerce and e-business modules.

By implementing the above KM softwares, documents can be published in the internet or intranet portals of the organization. Many libraries have this system where authors can post their best practices, learn lessons, research papers, etc. to web based content or document management solution. The author can publish the document for evaluation by the subject expert and after evaluation or clearance by the experts the document can be accessed by other members of the library. Others can post their comments, ratings, feedbacks on the document. Author can publish different versions of the document to the system based on the requirement. Documents are to be published on different categories or areas for easy classification. A powerful search engine is required to search the database of all the published documents based on different criteria and conditions. Some of the features like what new, hot topic, document of the month, best read, hot discussions, etc. can be created by the system for easy use by the members. Such a system must have a good member authentication, member management, site admin, site uses monitoring, etc. for better control of the portal. The details on the above tools can also be located at Microsoft web site at www. microsoft.com. If library is looking for an open source solution then best choice is to get a tool developed in PHP and MySQL. The library can get many tools on the web in this combination. They can check knowledge management solution in php, mysql at www. plus2net.com. However some of the tools can be developed in house also with local requirements and many organizations do this and integrate them within their intranet.

The web based KM system induced paradigm shift in libraries as:

- Traditional libraries to digital libraries.
- Print on paper to digital information.
- Card catalogs to web OPACs.
- Chains to RFID tags.
- Print journals to online or electronic journals.
- Ownership to access.
- In library access to remote and desktop access.
- Information availability from libraries 9-5 or 7 to 24 × 7.

- Photocopies to digital copies.
- Document delivery Services (DDS) being provided through e-mail instead of post/fax or through electronic document delivery services (EDDS).
- Standalone libraries to Information networks.
- Real to virtual libraries.

Conclusion

Some years ago, we saw the convergence of the human-readable web with increased connectivity. Now we are seeing communicating applications and more pervasive, broadband connectivity. The world is flatter because computing and communications is more pervasive of our working and learning lives: we create, share and use digital content and services. An incredible fast progress in information and communication technologies (ICT's) are transforming the information handling and seeking habits of both librarians and users. For those who manage well, there is a bright and prosperous future. For those who are managed, the future – certainly is brighter. Web based knowledge management tools and techniques can facilitate the process of generating, managing and sharing knowledge through the use of information technology. Developing a knowledge management practice requires a well-balanced approach. Web based knowledge management can be deployed in any library. Libraries can also develop a knowledge management system using the internet with login access to all its members located at different places just like a mobile work force can login to the KM (knowledge management) Portal from any where by connecting to internet. Many such initiatives in the past have given good results to the organizations. Such systems help strategically the organizations when their branches are located in different geographical locations and this gives a platform to the members/employees to share best practices, problems, customer interactions, etc. and prevent reinvention of wheel. No matter all the university libraries globally have not yet implemented KM to its fullest but a number of institutions have tested waters with this dynamic force that can develop a positive turnout in terms of the services, the libraries provide. But the situation is having a strong base in European nations. Web based knowledge management systems have turned on the services in a digital manner to the fingertips of the users and the framework of the university libraries implementing WBKMS has changed drastically giving the information and knowledge a new dimension, i.e. possession to utilization. Furthermore, the gap between the knowledge and the seeker of knowledge is getting narrower due to the implementation of new WBKMS especially the tools of Web 2.0, which have given the knowledge a two way dimension.

So, every university library should lay a solid platform for the development of a WBKMS that will be user friendly and try to act as a cushion especially for the users in terms of the services rendered to the patrons associated with university libraries. Specialisation with every section of WBKMS is the need of the hour in order to keep alive the third law of Library Science propounded by Dr S.R. Ranganathan, i.e. save the time of the user. However, WBKMS has come up with a glorious future especially for the university libraries because it is a place where the cream of the society is produced and to polish the skills of the knowledge seekers associated with the highest seat of learning, knowledge in a managed way will lead their skills and ability to a proper direction.

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