

ROLES AND FUNCTIONS OF INFORMATION PROFESSIONALS IN DIGITAL LIBRARIES

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Abstract: It is not an easy task to become an information professional. One must not only have a strong educational background but also have a wide experience in the library profession. Their roles, functions and contributions towards the success of a digital library are discussed in this article.

Abstrak: Bukan mudah untuk menjadi seorang Profesional Maklumat. Beliau bukan sahaja perlu mempunyai latar belakang pendidikan yang baik, malahan juga pengalaman kerja yang luas terutamanya dalam bidang kepustakawanan. Peranan dan fungsi seorang Profesional Maklumat serta penyumbangan dalam kejayaan sebuah perpustakaan digital dibincangkan dengan terperinci dalam artikel ini.

Introduction

A digital library is an organization that provides digital information, specialized and professional staff, to select, structure and offer intellectual access of digital computing, storage, and communications machinery together with the content and software needed to reproduce, emulate, and extend the services provided by conventional libraries based on paper and other material means of collecting, cataloguing, finding, and disseminating information. Services provided by a digital library must accomplish all essential services of traditional libraries and also exploit the well-known advantages of digital storage, searching, and communication in which intended to help users in finding specific information.

The fundamental reason for building digital libraries is a belief that they will provide better delivery of information than was possible in the past. Information once available only to the professional is now directly available to all. From a personal computer, the user is able to consult materials that are stored on computers around the world. According to Schatz (1997) "A digital library enables users to interact effectively with information distributed across a network". According to Arms (1995), A digital library can be defined as a "distributed information system ensuring reliable storage and effective use of heterogeneous collections of electronic documents (text, graphics, audio, video, etc.) via global data transfer networks in a way convenient for the end user".

The Importance of a Digital Library

As we move towards knowledge society era, it is very important to provide services that are identified as a process of profound social change. Digital Library brings the library to the user's desk, either at home or at work as long as they have a personal computer and network connection. From a personal computer, the user is able to consult materials that are stored on computers around the world. In developing a digital library, computer power is very important especially in searching and browsing purposes. This is because computers systems are much better than manual methods in finding information and particularly useful for reference work that involves repeated leaps from one source of information to another.

Digital information on network makes it available to everybody at anytime without need to travel to the location where it is stored. All Information is easier to keep current and can be updated continually. Therefore, many libraries maintain online versions of directories, encyclopedias and other reference works. The door of a digital library never closes and information is always available to everybody. The technology of digital libraries is closely related to the technology used in electronic mail and teleconferencing. A database may be the best way to store census data so that it can be analysed by the computer. Through this new technology, new forms of information become available to everybody and electronic storage is becoming cheaper than paper and digital library may save money since less paper and space involved in data storage

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Characteristics of a Digital Library

a) *Ubiquity*

Services provided must be accessible at any time from any physical location, although the level of service may vary by location.

b) *Transparency*

The internal functioning of infrastructure components and interactions must be invisible to users. Users must be able to access services using their user interface of choice. Services must satisfy user requirements rather than users satisfying requirements of the services.

c) *Robustness and Scalability*

The infrastructure must be powerful enough to withstand a wide range of potential risks and continue to function without disruption to users and service providers. These risks include environmental dangers such as floods and intentional or accidental physical or technological attacks. The infrastructure must also anticipate and support growth to include millions of service and information providers with billions of offerings.

d) *Security and Confidentiality*

The infrastructure must include mechanisms, which ensure that parties to any transaction can reliably be identified to each other, any goods and services which are exchanged conform to expectations and standards, that confidentiality of the parties and the transaction can be assured where appropriate, and that the system cannot be easily compromised.

e) *Billing, Payment and Contracting*

The infrastructure must support both financial transactions in payment for goods and services, and the delivery and utilization of electronically generated and managed tokens (e.g. digital payment). These transactions must be secure and low cost. In addition, the infrastructure must provide for rapid, secure, verifiable low cost electronic contracting (e.g. agreements to transmit a particular digital work at a specified price).

f) *Searching and Discovery*

The infrastructure must provide wide range of resource identification strategies, from highly specific searches to general browsing. It then must support user's need and satisfies them in terms of services provided, speed of access, cost and many more.

The Information Professional

Traditionally, librarians have performed a number of functions in the maintenance and the intellectual access to information. These traditional roles will become even more important in the maturation of the digital library. In the era of Digital Library, the librarian is no longer associated with library buildings, instead their new roles are more towards giving services to society such as: acquiring, organizing and preserving collections of information. Now, with the establishment of digital libraries, librarians will have the opportunity to break away from the stereotypes of the past and define themselves in the information environments and services of the future. As we realize now, Internet has become significant in the information world. Librarian too, slowly has become a predominantly online worker, supporting the citizen/worker by selling services. Finding relevant information will be faster than before, faster than a non-information-worker can find it, and surviving on the basis of superior knowledge of the networks and digital information resources available through them. Working in an online, network and digital environment, librarians can now refer to themselves as information professionals. Sreenivasulu (1998) also came up with other nomenclatures to suit librarians' new roles such as *digital librarian*, *digital information professional*, *cybrarian* and *information broker*.

Roles and Functions of Information Professionals (IP)

The Information Professional will also have to play a multi-faceted role unlike the traditional librarian who concentrates on the core activities of the library such as acquiring, organizing and preserving collections of information and providing services

The Information Professional as Researcher

It has become necessary for the Information Professional to be involved in the R&D by facilitating access to information, such as finding, delivering and summarizing information. Librarians are highly skilled in the research process and possess a unique knowledge of the breadth and depth of information resources in various subject specialties. It is believed that librarians will increasingly become members of research and development teams and playing more role in the information creation process

The Information Professional as Organizer and Publisher

The Information Professional has to play important roles such as organizers, reviewers and guardians of intellectual property in the digital libraries of the future. Participation in the formation of new copyright law and application of the law in the digital library is critical. In the digital library environment, the traditional roles of publishers as information packagers and information distribution facilitators and the traditional role of libraries as storehouses of information will be re-emphasized. As universities, regional research centers, laboratories, corporations and professional societies develop their own depositories of information and make them available to the world's networks, they take over the publisher's and the library's traditional roles. These entities, in this function, have the potential of diminishing the role of traditional libraries and commercial publishers if:

- i. faculty tenure guidelines more solidly support publications through these entities in electronic format returning intellectual ownership of research output to their faculty members
- ii. university and scholarly presses become activists in the electronic publishing revolution
- iii. everything possible is done to support fairly-priced democratic access to information while supporting intellectual copyright; and most importantly
- iv. information access and delivery systems are designed to meet the consumers' needs. In this case, digital library systems must be dependable, reasonably priced, must be powerful, easy-to-use, intelligent search engines, must have buying and must allow access from and delivery to the consumer's workstation.

Editors, faculties and librarians will have important roles as organizers, reviewers and guardians of intellectual property in the digital libraries of the future.

The Information Professional as a Member of the Digital Library Design Team

The Information Professional must be involved in the design and application of information technology initiatives in collaboration with computer and information scientists to design,

organize, develop and maintain digital library repositories, interfaces and networks. Librarians must be active participants in this process because they are experts at accessing the world's information resources today. Their areas of expertise are different than the computer and information scientists. The librarian's knowledge of the world's information resources and their knowledge and experience in directing users to information will be essential in the development and maintenance of the digital library's information access and delivery systems. The librarians can contribute to information selection, acquisition and organization as well as the design of the search engine and user interface.

The Information Professional as Teacher and Consultant

The Information Professional must guide users in information gathering, information skills and tools, organizing information resources, research strategies, basic reference works, accessing information and many more. Technology is far ahead of information literacy education. Few users of today's libraries are effective and efficient users, and no matter how advanced and sophisticated interfaces and search engines become in future information access systems, people will still need to be educated regarding their use. Systems of information production and distribution also need to be taught. They must understand how to define and refine a research topic, how to analyze and information need, and how to critically interpret and evaluate information resulting from research. The librarian, therefore, has a critical role in the digital library of the future as educator and consultant (Mark England, 2000).

The Information Professional as a Guardian of Information Superhighway

The Information Professional has to ensure that the information superhighway working smoothly and to avoid any disturbance to the services. The information superhighway is a vision or a metaphor. It envisions a fusion of the two-way wired and wireless capabilities of telephones and networked computers with a television cable capacity to transmit hundreds of programs. Services would be delivered by telecommunications networks, television cable networks and the Internet and mobile communications (William et.al., 1995). Infrastructure that provides bandwidth-on-demand and information-on-demand services is called information superhighway. The digital librarians will make sure that the information superhighway

is working smoothly. Their task is to observe the smoothness of the information superhighway, so that it will not disturb the services provided by digital libraries.

The Information Professional is also responsible for the various functions involved in extracting, processing and disseminating information. The functions include :

The Global Digital Library

The Information Professional is fully responsible for the digital library operations. The digital library is really a transitory phase towards the universal digital library, a vast distributed information and active repository accessible from anywhere with increasing improved indexing, extraction and summarization techniques. The digital librarians will be fully responsible on the digital library operations. They will give their services, support and help whenever the users need their assistance.

Symbiotic Human-Machine Guru

The Information Professional and computers depend on each other for processing and dissemination of digital information and both are inter-related. A digital librarian acts as an intermediary in the task of massive digitization of information, its storage, dissemination, managing the archive and making available digitized networked information to the end users. Digital librarians and computers depend on each other for processing and disseminating digital information and both are inter-related.

Knowledge and Data Mining

The digital librarian will require knowledge of data mining and discovery of knowledge from digital libraries to extract unmet information needs for users. For this purpose, unsupervised learning techniques such as clustering and composite term discovery techniques, etc. are very useful.

Search and Retrieval Co-Ordination

The Information Professional can achieve the goal of creating information queries by using retrieval engines and indexing structures. It requires comprehensive knowledge of the retrieval engines and indexing structure so that the digital librarian can achieve the goal of creating information queries with respect to the search system.

Navigation, Browsing and Filtering Expert

The Information Professional is an expert in navigation, browsing and filtering, digital reference services and electronic information services from the digital information sources. The navigation of the future would tend to integrate with the human-assisted information retrieval from the networked universe and would support rapid information navigation and precision retrieval

Digital Libraries Access Tools, Pools and Sources of Information for the Digital Librarian:

These tools assist and facilitate in accessing, searching, browsing, navigating, retrieving, indexing, storing, organizing and dissemination of digitized information. The significant ones are listed below:

- a. Online Public Access Catalogues (OPACs): meta-databases (describe, provide link to other databases/digital information sources) Online databases (examples: OCLC, MEDLINE, EbscoHost, Infotrac, Proquest).
- b. Internet-based tools such as: e-mail networks, mailing lists, electronic conferences, World Wide Web, Website Home Page, Wide Area Information Services (WAIS), Web Browsers, Gopher Systems, and Veronica Archie, FTP, Telnet, Usenet, and Newsgroups.
- c. Digital Networks/Networking such as: BLAISE, MEDLINE, NICNET, DELNET, AGRIS, INIS and many more.
- d. Hypertext/Hypermedia
- e. Multimedia (high bandwidth computer networks)
- f. Multimedia Networking Protocols
- g. Cellular and Pager networks
- h. Electronic Publishing Tools
- i. Net-Dwelling Software Agents
- j. Electronically Fax/Commercial Vendors
- k. Telephone and Television

Educational Background for Information Professionals

For more than 25 years, Schools of Information Studies all around the world have been adapting their curricula and teaching activities to the new era of information technologies. According to Deschatelets (1997), the new digital information system has created a major shift in the paradigm of the information transfer process. Digital Library education is still considered behind in sense of funding and practice. Currently, there is little systematic support for developing Digital Library

(DL) courses and curricula, and no coordinated effort in library and information science (LIS) or computer science to provide DL education. At present, nobody knows about good digital library education and what knowledge is required to produce information or computer professionals to work as digital librarians, digital developers, or in other job categories, or even what the job designations or requirements will be in the future. Computer scientists may be responsible for the technical development of digital libraries, with information scientists focusing on the content, organization, users, and retrieval of information. Most of the development of information retrieval has been done by computer scientists, (such as Salton at Cornell, van Rijsbergen at Glasgow, and Croft at the University of Massachusetts were all in computer science departments) (Amanda Spink, 1999). The current shortage of librarians and information professionals with the expertise to fulfill the current technological demands of libraries will be exacerbated by the future demand for digital librarians.

The emerging demand for digital librarians and digital libraries may initiate and contribute to the restructuring of the library and information science, and the computer science curricula. The development of "digital libraries" track for information and computer science students that focuses on the technical and human aspects of the web and digital libraries seems inevitable. In the United States, several universities have reorganized existing library schools to emphasize digital information and online services. Two notable examples are at Berkeley and Michigan. The TICER summer school at Tilburg University in the Netherlands and several of OCLC's programs aim to update the skills of experienced librarians. In addition, there are numerous specialized courses, ranging from creating web sites for computer scientists to seminars on intellectual property for lawyers. Nevertheless, the number of courses that are specifically on digital libraries is surprisingly small.

Competencies and Skills of an Information Professional in the Management of Digital Libraries

The competency of a digital librarian is represented by different sets of skills, attitudes and values that enable a digital librarian to work as digital information professional or digital knowledge worker and digital knowledge communicator (Sreenivasulu, 1998).

The following are the skills and competencies

required for a digital librarian in new para management of digital information systems and digital libraries.

Information Technology Skills :

Digital Librarians must be competent in areas such as:

- Multimedia indexing, image processing and object-oriented processing;
- Interactive digital communications and visualization;
- Cataloguing and classification of digital documents and digital content;
- Searching and retrieval of text, images and other multimedia objects;
- Speech recognition and image visualization;
- Advanced processing capabilities exploiting digital medium;
- Conferencing techniques including teleconferencing and video conferencing. (Sreenivasulu, 1998)

Digital Librarians also must be capable and knowledgeable in the following fields:

- Interfacing online and off-ramps, twists and turns of digital knowledge;
- Development of digital information sources;
- Digitization of print collections;
- Competency to manage CD-ROM network stations;
- Development of online catalogue records;
- Design and development of databases;
- Design and development of software agents for digital libraries;
- Conversion of print media into digital media;

Information Retrieval Skills :

- Must be somebody who is an expert in navigation, browsing and filtering information;
- Must know the procedure of retrieving, accessing and digital document analysis;
- Must know how to operate the digital reference services and electronic information services;
- Must be able to search network databases in a number of digital sources and Web Sites;
- Must be able and know how to create home page, content conversion and downloading techniques;
- Must have web authoring and wide knowledge on web publishing as well as electronic publishing.
- Must be somebody who is expert in archiving digital documents and locating digital sources;

- Must have knowledge on digital preservation and storage;
- Must be able to operate electronic messaging and must have connectivity skills to access information;

7.0 Conclusion

The emerging digital library has reshaped the core skills needed by information professionals. No longer solely managers of paper publications, librarians now administer computers, phone lines, and video and audio resources as well as human resources. They remain the guardians and

managers of books, buildings, and bodies; but the profession has evolved so as to require a broad spectrum of professional activity from each of us. Information professionals must serve the diverse needs of a diverse world and to become an Information Professional, one should have a combination of library and information technology background. With regard of this, Information Professionals must be more aware of their roles in provision of information services with the emergence of digital library. Without Information Professionals, the development and use of digital library would not be as successful as it is intended to be.

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