MULTIMEDIA APPLICATIONS IN DIGITAL ENVIRONEMENTS OF COLLEGE LIBRARIES

V. Vanankamudi
College Librarian, Arulmigu Palaniandavar, College of Arts and Culture, Palani - 624601

Dr. P. Padma
Assistant Professor, Department of Library and Information Science,
Madurai Kamaraj University, Madurai - 625021

Abstract

Multimedia is a combination of text, graphics, audio, animation and video, converted from different formats into a single digital media and hypertext is non-sequential writing or reading. Library is heart of any educational institutions. College libraries are traditionally holding with printed and hand written manuscripts, their collections are books, journals and periodical etc. Now, most of the college libraries has digital environment and also provide their services are reached all types of their users. They provide personalized assistance to library users in accessing suitable information resources to meet their needs. This paper gives a vivid picture about how the multimedia applications are help to develop and manage digital environment of college libraries. This paper also concludes that how the multimedia technology uses to build the best Digital Library and closes with some current trends and open research issues in Digital Library technology.
Keywords: Text, Multimedia, Digital Library technology, books, journals, periodical

Introduction

Academic libraries are facing increasing competition from a global digital environment and ongoing change in user needs and expectations of information services. Academic libraries refer to libraries attached to universities, colleges, schools and other educational institutions. College libraries are serving the teaching, learning and research needs of the students and staff. Traditionally, the quality of college libraries has been described in terms of its collection and measured by the size of the library's holding and various counts of its use (Nitecki, 1996). Today, the quality is measured in terms of digital collections, e-resources, networking component, Information and Communication Technology tools etc., available in the libraries. Information are floating in all directions and moving in the air around us. Recently, college libraries are evolving into the digital environment services. Traditionally, the librarian's function was to assist in the collection development, acquisition, cataloguing, classification, circulation, provision of reference services, preservation and conservation of their collections with manual operations. As the libraries evolve into the digital environment, librarians have been considering how to adjust digital information services to the new environment and new information needs. The digital

environment in college libraries includes library automation, developing and managing digital library and other digital form of services.

Multimedia includes a combination of text, audio, still images, animation, video, and interactivity content forms. Multimedia applications are used to make different types of multimedia objects and make it use to develop and deliver various articles which can be used in academic libraries. The latest development of digital environment oriented libraries needs the multimedia applications to manage their digital collections.

Multimedia

Multimedia is media and content that uses a combination of different content forms. The term can be used as a noun or as an adjective describing a medium as having multiple content forms. The term is used in contrast to media which only use traditional forms of printed or hand-produced material. Multimedia is usually recorded and played, displayed or accessed by information content processing devices, such as computerized and electronic devices, but can also be part of a live performance.

Definition

Multimedia is the media that uses multiple forms of information content and information processing (e.g. text, audio, graphics, animation, and video interactivity) to inform or entertain the user. Multimedia also refers to the use of electronic media to store and experience multimedia content. Multimedia is similar to traditional mixed media in fine art, but with a broader scope. The term "rich media" is synonymous for interactive multimedia.

The main elements of the multimedia are:

* Text: information about an object/ event, etc; notes, captions, subtitles, contents, indexes, dictionaries, and help facilities.
* Data: tables, charts, graphs, spreadsheets, statistics, and raw data.
* Graphics: both traditional and computer generated such as drawings, prints, maps, etc.
* Photographic images: negatives, slides, prints
* Animation: including both computers generated video, etc.
* Audio: including speech and music digitized from cassettes, tapes, CDs, etc.
* Video: either converted from analogue film or entirely created within a computer.

Examples of content combined in multimedia:		
Aperture, in Geometry, is the Inclination of Lines which meet in a Point. *Aperture in Opticks, is the Hole next to the Object Glass of a Telescope, thro' which the Light and Image of the Object comes into the Tube, and thence it is carried to the Eye.*		
Text	Audio	Still Images
Animation	Video Footage	Interactivity

A multimedia system records, processes, stores and delivers all types of information in binary code the same way as a computer does. This is quite different from the traditional analogue technology of radio, TV, A-V tapes, gramophone records, or the combination of digital audio and analogue video in interactive video discs. The main advantage of a digital format is the flexibility in combining, transmitting, manipulating and customizing the elements of the multimedia according to the needs of the user.

Digital Environment

A Digital Environment is a created world within a computer, or a group of computers. The operational definition of digital environment is, that includes all of the resources and scenario that characterizes the digital or electronic information management, communication as well as information deliver services especially as found dominant in the twenty first century.

In college library, digital environment may includes library automation, digitalization, Internet, Consortia, RFID technology, Web portal for libraries, E-resources, creation of Institutional Repository, Learning resources and Information literacy programmes.

The skills required for the management of digital information are vast, in-exhaustive and range from the generalized basic computer appreciation to the more advanced and library services related ones. Igun (2006) opined that skills needed in digital library services include among others those relating to:

- Selection, acquisition, preservation, organization and management of digital collection.
- Design of technical architecture of digital library.

- Planning, implementation and support of digital services; such as information navigation; consultation and transmission of services.
- Protection of digital intellectual property etc.

In more specific terms, Tennant (1999) enumerated some skill requirements of digital librarians viz imaging technologies, optical character recognition, markup languages (HTML for web pages and SGML/XML for text), Cataloguing and metadata, indexing and database technologies, user interface design, programming web technologies as well as project management.

In addition, the submissions of Chiware (2007) on "Training librarians for the digital age in African University Libraries" enumerated further that trainees must learn about open source software such as Dspace, Greenstone and the concept of creative commons which include expertise in down-loading, installation, management and updating the softwares. Chiware (2007) further reiterated that "knowledge of web servers management, web publishing, web access and information retrieval, database management, networking, storage technologies and network processor are equally important".

Fadehan (2009), using the recommendations of Abel et al. (2003) on a general note identified management of information resources in all formats (including electronic formats) as well as application of information tools and technologies as important requirements of 21st century librarianship.

Multimedia Applications in College Libraries

College performs an important function in the educational process. College education provides a totally different environment for students whom go for higher studies. Usually the classes comprise a large number of students and unlike school education, the college students get less individual attention from the teachers. The students therefore have to depend much more on the self-learning. Therefore the college library is the ultimate place for the students to supplement their class room teaching. The main objective of college library is to become instrument of instruction. Therefore library must become the integral part of teaching programme. Recent trends in education students are very interest to learn their subjects and other general awareness are in digital forms, so college libraries should make their services through digital environment.

Multimedia knowledge resources as document surrogates and as significant knowledge sources in a library need no emphasis. In the present college libraries are setting the educational videos, instructional visual aids and audio learning resources form a significant collection. Time is fast catching up the world over that the traditional forms of collection development techniques and collection maintenance strategies need replacements with the upcoming trends in the profession. Libraries therefore are now

forced to be friendly and familiarized themselves with all relevant and current popular multimedia formats.

Predominantly multimedia collection of a library comprises video resources, audio recordings, computer-based training materials (CBTs), Web-Based Training materials (WBTs), illustrations, photographs, etc. Depending on the nature of the parent institution's goals, academic focus, research thrust, and above all, its resource allocations and financial capabilities, their collection strength may considerably vary.

In most cases, the collection-building process of the multimedia resources may follow the normal traditional mode. In the case of e-Resources the purchase may be restricted to licensing and only online access to the product may be available to the library. Publishers usually enforce stringent copyright and IPR restrictions to multimedia resources.

Multimedia collection, especially the analogue knowledge resources, poses a variety of practical and operational constraints to libraries. One of the major limitations is their sole dependency on a host of gadgets such as media players, viewers, etc. They also suffer from reach and visibility limitations as they can be viewed or listened to by a single or fewer numbers of viewers/listeners simultaneously. Furthermore, there are shortcomings with respect to resource discovery possibilities other than the basic indexing offered by their catalogues (traditional as well as digital). Collection maintenance and long-term preservation of these special collections are always a concern for librarians. The collection comprises multiple digital formats such as HTML, XML, PDF, PS, RTF, JPG, CIF, MPEG, etc.

Hypermedia not only helps the users in providing information from different media (print, microforms, audio and video) on one platform (integrated) but also saves on space, money, maintenance, operational inconveniences, etc.
The other advantages of multimedia in libraries are:

- It can help satisfying different information needs such as reference, enrichment, entertainment, leisure, etc.
- It can help meeting various types of information preferences of the users, such as scholarly, scientific, vocational, artistic, recreational, etc.
- Text Books
- Display board

Limitations of Multimedia Applications

Even though Multimedia applications have many advantages introducing such systems into offices, schools, colleges, universities, and homes is not easy task. The problems or limitations of multimedia technology are in two areas:

Multimedia Technology

Multimedia Technology encompasses interactive computer-based applications that allow people to communicate ideas and information with digital and print elements. Multimedia Technology includes both hardware systems and software programs used to develop and run these systems.

(a) The requisite hardware and software to setup a multimedia content creating facility is still very expensive and requires large investments.

(b) A wide range of multimedia software is not available to integrate, control, coordinate, manage and adapt different media for the latest human computer interfaces.

(c) There is a lack of support software facilitating the authoring, composition and production of multimedia content.

(d) Lack of proper search and pattern recognition capability for locating information from multimedia databases.

(e) Converting all the multimedia resources into digital multimedia and storing is difficult.

Digital Environment Library

Many Libraries traditionally have been repositories of local information and heritage documents such as manuscripts, rare books, maps, photographs and paintings etc. Archives or record management is also part of Library and Information Science function, particularly in business and research organizations. In other cases such as university libraries, documents generated in-house such as dissertation and theses, research reports etc represent the intellectual strength of the institution. Libraries are developing digital repositories of such resources, and providing Internet or intranet access to these. Large public and academic libraries also provide up to date local information via internet. Digital library is a part of digital environment of the libraries. Digital libraries are a natural progression from electronic document sharing. The main benefit of digital library is the ability to provide 24-hour, remote access to high-demand or restricted materials for multiple concurrent users. Setting up a digital library can either be done using 'off-the-shelf' digital library products, document management products or library management products capable of digital library management; or in-house system development using open archives software.

Digital Libraries are the electronic counterparts of traditional paper libraries, where the digital medium opens new opportunities, especially in the area of improved access support, increased content availability, powerful content interlinking, and reduced costs, but also imposes new challenges like long-term preservation in the context of fast

changing storage technologies. Further important challenges are issues of copyright and digital rights management and the cost of digitization for not digitally-born content.

Multimedia Library

Multimedia Libraries are Digital Libraries, where the managed content is not restricted to the usually mainly textual documents. Such libraries contain, next to the "textual" contents, media types like music, videos, images, maps, and mixtures of different content types (multimedia objects) as they are, for example used in e-Learning or in the documentation of history. Multimedia libraries may also contain content types that were not supported in traditional libraries at all like 3D objects, executable software (e.g. computer games) or callable services. One of the main challenges for a multimedia library is to provide effective access to these types of context (based on adequate indexing) and to provide support for the "real-time" integration of different content types. Some challenges of multimedia libraries are closely related to those of museums and archives that make multimedia representations of their artifacts available online.

This paper starts with a discussion of how the traditional library services are differ from the services of digital environment libraries, and multimedia applications and technologies are handled to build the Digital Libraries in mediating between the individual information needs of the members of a community and the vast amount of globally available content. In this context the services provided by a library play a central role. Therefore, search services and further value adding services also available in a Digital environment of the library with a focus on the special requirements of multimedia content.

Role of Libraries in Digital Environment

A Digital Library mediates between the information needs of its user community and the globally available content. Contributions in four task areas are essential for supporting this mediation

Content pre-selection: The library selects high-quality content potentially relevant for the members of its user community;

Content structuring: The library structures the content according to the predominant domain understanding of its user community;

Content enrichment: The library enriches content objects with descriptive and value-adding metadata provided by domain experts, librarians, and community members;

Library services: Support for content retrieval, access, annotation, etc. enable the identification of relevant material and facilitate access of content and its use by community members as a group or as individuals;

These contributions allow a Digital Library to reduce the gap that exists between the wide variety and large amount of globally available content and specific information needs of individuals and small group within its community. Ideally, many of these

contributions should be achieved without or with little human inference. However, for technological reasons, but also for reasons of quality control and trust, human involvement and especially involvement of representatives from the library now and in the future will be essential for these tasks.

Current Trends in Digital Libraries and Multimedia Digital Libraries

The first generation of Digital Libraries has been built from scratch in an experimental fashion. After a certain understanding has been established about the core functionality of a typical Digital Library, so-called Digital Library management systems like DSpace or Greenstone have been developed that offer basic, out-of the box functionality for managing a Digital Library. Such systems are now available and used in various Digital Library projects. The latest trend in Digital Library technology is a more decentralized, service-oriented approach for Digital Library architectures. The overall goal here is to systematically make Digital Library functionality available to a broader audience, reduce the cost of entry for this technology, to improve flexibility and adaptability and to foster shared and synergetic use of content, metadata, services and other resources. In this context current technological developments like Grid Computing, Web and Grid Services and the Peer-to-Peer computing paradigm are exploited. The works on building a Grid-based Digital Library infrastructure that enables the on-demand creation of tailored Digital Libraries, so called Virtual Digital Libraries on top of the generic infrastructure. In general, Digital Libraries migrate from centralized systems to dynamic federations of services.

A second trend that was already addressed in the article is the offering of additional services beyond search and collection management that reflects a broadened understanding of the role of a Digital Library within a community. This includes community services that support community formation, awareness of a community for trends in the domain and the role of individual within the community as well as services for fostering collaboration in the community. In addition, these are also services that enable community members to take a more active part in content provision and annotation. In summary, the idea is to support the collaborative information processes of the community in a more comprehensive and participative way, migrating from the information access support provided by Digital Libraries to the idea of tailored virtual information and knowledge environments. For research libraries this trend is reflected by current research activities in the area of e-Science.

A third trend in Digital Libraries is the use of Semantic Web technology for intelligent search services. This includes semantic annotation of content objects based on domain ontologism, the use of concepts and ontological knowledge instead of strings in search, and concept-based clustering of query results. Another area of research and development in intelligent search support is to more systematically take context into

account. On the one hand, this refers to user context. More comprehensive, ontology-based models of the user and his current situation (including user tasks and relationships a user is involved in) are used to go beyond existing personalization approach. On the other hand the context of an information object can be used to improve retrieval results like, for example, the information a content object is linked with or the annotations about a content object.

Multimedia Databases

Now-a-days a large number of photographs, artifacts, audio recordings and textual $material in various collections are available in libraries. Multimedia is helping the librarians in integrating all the information from various forms/sources subject-wise and making meaningful multimedia databases both for day-to-day use and archiving.

Mendocino County Library, Ukiah has developed a multimedia database of historical and cultural information that is relevant to the Californian Indians in that area. In addition to the historical photographs, this database is also having parts of oral histories from the state and local archives. Ultimately this library is trying to bring out a CD-ROM on 'Gathering together a Native American History'. Ancient Biblical manuscript Centre in Claremont; California has ancient texts, photographs, negatives, related to the Bible.

Multimedia Information Retrieval System

Hypermedia Information Retrieval System (HIRS) is a hypertext version of a large and comprehensive annotated bibliography of hypertext/hypermedia information. Compiled from a variety of sources including periodicals, academic journals and online informational databases, it is intended for educational and training purposes only and no warranty is made as to the suitability of anything included in this stack for any specific purpose. HIRS was created in association with Project Rivendell, at the University of Toledo (Ohio). Rivendell focuses on the application of hypertext/hypermedia research to address training and educational needs. It is an interdisciplinary centre for applied hypermedia research serving as the focal point for the collection, synthesis, evaluation, and dissemination of the most current research available for using hypermedia to solve instructional problems in a variety of learning settings.

Conclusion

Now, much inexpensive multimedia software are available in the market for personal computers and Macs. The cost of both the hardware and software are also going down considerably. However, in India, introduction of computers and latest technologies such as multimedia, CD-ROMs, DVD ROMs etc. is limited to the big and affluent digital libraries in the metropolitan cities only in some year back. It may be due to the unawareness of these technologies, insufficient funds, lack of skilled manpower, etc. The challenges of the 21st century digital environment on library and information services cannot be over emphasized.

As regards multimedia applications flexibility, variety and adaptability are the different tools for digital environment in libraries. Multimedia is a boon to the digital environment libraries, it is up to the Indian librarians how they use it in their libraries to improve the services. DESIDOC has designed a Multimedia Library Information Kiosk for its user. Since it is proven technology, it is up to Indian librarians/libraries to implement these technologies in their libraries and make optimum use to improve the user services as early as possible. In this information technology society, the future users require to access a variety of multimedia information sources in a manner that is simple, easy, and independent of time, place and subject discipline, for the purpose ranging from augmenting and refreshing memory, to learning, decision-making, and creating or uncovering new knowledge. The time is not too far in this cyber world and all these dreams will be realities in the 21st century. Now, most of the multimedia services can be easily accessed from mobile devices including different types of library services. We conclude that most of the multimedia applications very much to help to provide digital environment library services to user in any time, at any place and all available accessing modes.

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