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Role of Electronic Text-Based Collections with Multimedia Content

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Abstract

This paper attempts to study how **multimedia and e-learning content** description impacts standards interoperability within a digital library environment integrated in a virtual campus**.** Multimedia is a combination of text, graphics, and animation, audio and video, converted from different formats into a uniform at digital media and hypertext is non-sequential writing or reading. Multimedia prepared in hypertext environment is called Hypermedia. In any virtual e-learning environment, a complex scenario which usually includes a digital library or, at least, a repository of learning resources, die rent levels of description are needed for all the elements: learning resources, multimedia content, activities, roles, etc. These elements can be described using library, e-learning and multimedia standards, depending on the specic needs of each particular scenario of use, but this might lead to an undesirable duplication of metadata, and to ine-cient content queries and maintenance. Furthermore, there is a lack of semantic descriptions which makes all these contents merely become digital objects in the digital library, without exploiting all the possibilities in a e-learning virtual environment. Due to its edibility and completeness, we propose to use the MPEG-7 standard for describing all the learning resources in the digital library, combined with the use of an ontology for a formal description of the learning process. The equivalences of Dublin Core, LOM and MPEG-7 standards are outlined, and the requirements of a proposal for a MPEG-7 based representation for all the contents in the digital library and the virtual classroom are described. The intellectual property policies for content sharing both within and among organizations are also addressed. With such proposal, it would be possible to build complex multimedia courses from a repository of learning objects using the digital library as the core repository.

Today, libraries fulfil very many technical, social and educational roles. Indeed, for many people ‘the library’ provides the only source of educational resource after conventional formal education has ceased. This paper discusses the basic functions of library systems and the roles that they must undertake within modern societies. The potential of new technologies and media reform within library systems is then discussed and, depending upon the extent of uptake of these new technologies, four future types of library system are identified: polymedia, electronic, digital and virtual. Each of these types of library system is described, their distinguishing features identified and the implications of such systems

Keywords: e-learning, digital library, standards integration, metadata, MPEG-7, LOM, Dublin Core

Introduction

The primary functions of a library are to collect, organise, preserve and deliver information to the users. With the passage of time, several techniques and technologies have emerged for handling the information more speedily and effectively. Invention of printing in the second half of the 15th century started a revolution in spreading thought and scholarship. Later, still pictures (microfilm, 1839; negative film, 1841), moving pictures (cine film, 1870; video tape and W, 1908)' sound recordings discs, (1 877); sound tapes, (1 899), microcomputers and view data (1045) and optical storage systems (1 985) were introduced in the commercial market which had an everlasting impact on publishing.

Slowly all these recording media, used for storing In '940s, efforts were made by Dr Vannevar Bush to integrate all these forms and he designed a mechanical device, called em ex', for storing, organisirig and retrieving information received in various forms. Those days librarians used to collect non-book material and call them as multimedia collection. However, there was no single platform on which all the forms of information could be stored and retrieved. During the late 1980s, computer specialists succeeded in integrating the text, graphics, animation, audio, and video information on a computer after converting them into digital media (homogeneous media) called multimedia for publicity purposes. This is a major achievement in the field of publishing, which directly influenced both librarians and users. Distance education in virtual e-learning environments (such a virtual campus, for example) permits an intensive use of new technologies, especially in the eld of design, creation and management of multimedia contents. The use of multimedia resources, either as learning tools in virtual environments or as basic pieces of multimedia repositories, allows us an improvement in the process of learning contents of audiovisual nature. In this sense, teaching contents with a clear multimedia structure, such as several subjects in Information and Communication Studies, for example, requires learning tools with two desired characteristics: rst, each course follows an activity oriented structure using a temporal framework and, second, content personalization capabilities are needed to create adaptive courses but also to minimize course obsolescence. Therefore, content reusability within a course is an important issue related to course quality and management. This paper addresses the integration between documents according to standards for multimedia content distribution such as MPEG-7, and other learning resources designed using e-learning standards such as LOM, within the context of a virtual e-learning environment that includes a digital library, which uses the Dublin Core standard for metadata. The need for metadata integration across multimedia, e-learning and library standards becomes a key factor for ensuring a proper content management and retrieval by teachers, researchers and students, the users of the digital library. All the resources in the digital library can be browsed and searched as a large repository of multimedia contents which uses structured metadata for the syntactic and semantic description of all the resources. The use of standards for content description based on XML ensures the possibility of describing thoroughly all the elements in the virtual campus.

Integration of standards for content tagging and indexation from different approaches (from the pedagogic field such as LOM, or the multimedia field such as MPEG-7) is a first step to ensure coherence and the reuse of such contents in the future. In this paper we describe a proposal for promoting the integration of such standards in order to improve the indexation, classification and searching and browsing capabilities of multimedia and e-learning contents, therefore enhancing the retrieval of both such contents. This is accomplished by means of metadata standardization, which allows us to create a hierarchy of multimedia learning objects ranging from single text, audio or video clips to complex

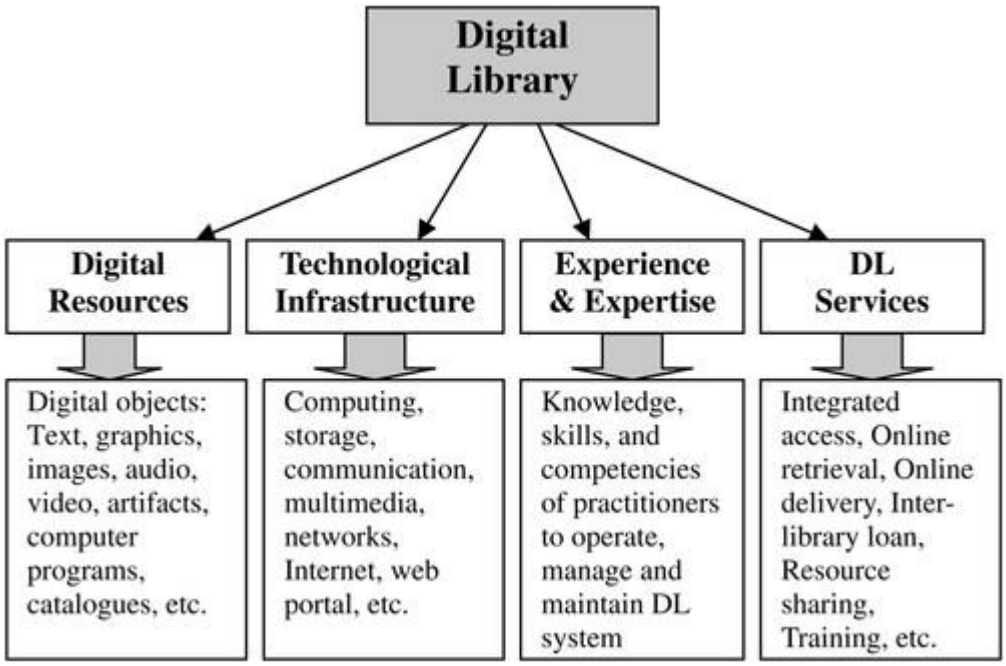
multimedia courses. The basic services of an e-learning environment, the different kinds of resources used in the learning process and the particular case of the virtual campus. to a computer professional, a digital library is simply a distributed text-based information system, a collection of distributed information service, etc. A digital library is a library of digital documents, artifacts and records. The advantage of having library material in digital form are:(i) the content occupies less space and can be replicated and used electronically, (ii) the content can be made available on networks, (iii) the search for content can be automated.

Objective:

This paper intends to explore and analyze role of electronic text-based collections with multimedia content; **multimedia digital contents indexed** and stored in databases for appropriate retrieval operations and the retrieval mechanisms which are optimized and applied to object domains of those databases

Library and electronic multimedia content

Today people are living in the age of information Explosion. A lager amount of information is being generated every movement. The ability to collect, store and disseminate this large amount of Information needs application of new technologies. Thanks to the advance Electronic media which could even rearrange select, marshal, and transform enormous qualities of information at phenomenal speed are at the human disposal. Electronic media is applied widely in all human activities these days. Libraries are not an exception to this. Hence the effect of electronic media is immensely felt on the Library and information centers. As a matter of fact libraries and information centers being part and parcel of communication system, are more impacted by the electronic media. Ever since the information sources are accessible online through the Internet, the behavior of the library users in terms of their information seeking, and use has drastically changed. In fact this could be perceived as the very first and foremost, conspicuous impact of electronic media on the libraries. Libraries are now introducing new services by converting existing services innovatively using latest Information and communication technology. Using of electronic media to deliver services in libraries innovatively is explored to reach a larger audience anytime, and geographically located anywhere. Reading habits of library users is declining due to various electronic media. People are more interested to check out games in computer or chat on mobile devices, or watch various programs on television. Internet is now a panacea to all problems. Visits to the library are on the decline. Librarians since time immemorial have adapted changed with times and have always catered to changing needs of user. From being mere custodians they have now evolved into providers, disseminators and moderators in the electronic era. Librarians are using their prowess to innovatively use their skills combined with latest technologies to attract and sustain library use base. Electronic media has a tremendous impact on the society at large and has brought about information revolution. Electronic media are used for storage, processing, access and dissemination resulting in a paradigm shift in library administration and management. Electronic media is assisting libraries by increasing their effciency and effectiveness by providing information in all its dimensions. With developments like electronic publishing, Internet, Web publishing, online journals and books have brought the benefits of implementing electronic media in libraries, as well as problems and prospects of concern to librarian.



The intensive use of Information and Communication Technologies such as Internet, for example, increases the possibilities for both content searching and delivery but also for interface design and implementation has completely changed the visions in the open distance education field. E-learning is one of the most promising and growing issues in the information society nowadays. The growth of the Internet is bringing online education to people in corporations, institutes of higher education, the government and other sectors.1 The growing need of continuous education and the inclusion of new multimedia technologies become crucial factors for this expansion.

UOC virtual campus

The Universitat Oberta de Catalunya2 (UOC∗ , in English known as Open University of Catalonia) is a completely virtual campus which offers 19 o-cial degrees, several graduate programs and post-graduate studies, and a doctoral degree, with more than 35000 students and more than 1500 people including instructional designers, teachers, tutors, academic and technical staff. The UOC virtual campus is an integrated e-learning environment which allows users to communicate with other users using a mail system, and includes an agenda, a news service, virtual classrooms, a digital library and other e-learning related tools. Although the use of classical text printed books is still massive, there is also a growing use of web based e-books and other online learning resources, so the introduction of new e-learning standards and application proles such as SCORM3 and IMS-LD4 is becoming a necessity for maintaining the constant evolution of the virtual campus. The increasing amount of multimedia content and standard based learning resources is revealing the need of new functionalities and capabilities provided by the digital library.

The virtual classroom

Each subject has a classroom with all the needed elements for the development of the learning/teaching process: e-mails, access to documentation, the activity based teaching planning model, access to evaluation results, access to the teacher board, forums, debates, etc. The classrooms at the virtual campus are the meeting points of the learning activities. Every subject has its own group of virtual classrooms with a maximum of eighty students and one consultant professor per classroom (although depending on the subject these figures may be very different). From the very beginning, students

receive support from their tutoring counsellor, who guides them through the complete process of enrolment, learning and being part of the UOC community.

On the other hand, the teaching counsellor others academic advice on all matters related to the fulfillment of educational challenges, the process of integration within the university community and professional orientation on completion of a student's studies. The virtual classroom has four access zones where all the activities related to the learning process are performed, namely Planning, Communication, Information resources and Evaluation: • Planning: shows a calendar with all the activities of the learning process, and also the teaching curriculum for the subject. • Communication: provides access to the public e-mail system of the classroom, the list of the classmates from where anyone can e-mail the other students or chat with them, and access to the tutoring and teaching counsellor e-mails. • Resources: shows a list of all the educational material, information sources and resources related with the subject.

Although most educational material is available in form of printed books, this area also includes access to the web and the PDF versions for printing, and other kinds of resources such as reading materials, study cases, etc. This kind of resource is mandatory for all subjects. While this area is a more permanent content, which undergoes a publishing plan and an editing process, at the Information Sourcesarea there is the content which is easier to change, under a dynamic management process, which allows content modication each semester under the particular needs of each subject. Under Information sources, at the moment the sources being used are: full text articles scanned from paper publications or with direct link to the electronic version; recommended bibliography with direct access to the online circulation service; academic and professional databases that the library subscribes for the UOC community; encyclopedias and dictionaries also exclusive to UOC users; law content and standards; and a selection of free web sites coming from the bookmarks of the teachers. This kind of resource is also mandatory.

Tools and support elements

comprises those features that give support to the students for their homework.

It provides tools such as software, exams and exercises from other semesters that can be used as samples of the evaluation process, etc., all them related with the methodology, but not directly with the basic course content.

Finally, there is also the option of providing access to a Shared Server, a public space available to all the users of the virtual classroom which is used for updating information and adding new contents in an easy manner. It is worth to remark that most of the information resources come from the digital library integrated in the virtual campus, which uses an ad hoc database with Dublin Core, IMS and SCORM standards and application proles for managing the electronic resources, and a commercial OPAC with MARC 21 for the recommended bibliography. For visualizing these resources at the virtual classroom, at the digital library or elsewhere at the virtual campus, both XML and a set of XSL transformations are used, in order to separate both content and presentation. When using these tools, teachers have an easy manner to maintain and update the resources, and it is also possible to work with dierent languages (Catalan, Spanish and English). This also increases reutilization because the same resource can be accessible from dierent virtual classrooms without need to maintaining several copies into the resource manager.

Libraries use Modern Electronic technology to reach out to users who are busier with other informational and entertainment avenues. Electronic devices and electronic media assist librarians to extend innovative services to library users. The role of librarian has undergone a huge change from custodian to being a 21st century librarian who is not bound by any local, regional, national or international boundaries and navigates the global resources and acts as a facilitator, promoter, instructor, trainer, consultant, researcher, supporter, moderator etc using the latest Web technologies and electronic applications to reach out to those users who have various limitations on their time and movement. Librarians have always strived to overcome all those limitations expressed by the users to visit the library or use the resources. Most economically poor people cannot afford these electronic devices as they are expensive. Librarians should strive to include the latest electronic devices and electronic media to extend services to users. Financial support from the Management is most required to acquire these electronic media if librarian wants to make a difference. Librarian also bene□ ts immensely as he/she connected personally and professionally with librarians all over the world.

Conclusion

Electronic media/Resources are being increasingly used for various purposes in our day to day life activities. Right know almost libraries are using variety of electronic media in their libraries to reach out to users need. If libraries do not change with time by harnessing new technologies to offer services in innovative ways to meet the changing needs of their patrons, they will become obsolete. Large e-learning environments such as the UOC virtual campus, for example, usually include the use of content repositories where very different kinds of learning resources can be found, ranging from printed books to multimedia contents. These resources are used by students as the basic educational materials for each subject they are enrolled to, following a predefined teaching plan and a scheduling.

Currently now, this information and learning resources are stored in the digital library as isolated documents, without any structuring. In this paper a proposal for standards integration has been presented. The use of the MPEG-7 standard capabilities for describing all the metadata needed by the learning resources used in the virtual classroom seems to be the most e-cient option, integrating all the knowledge managed from three different points of view: the digital library, e-learning resources and multimedia content.

Finally, prototype is selected subject in order to validate the MPEG-7 standard as the basic language for multimedia and e-learning content description in a digital library. The work presented in this paper is still in the first stage of the proposal, although several aspects related to the second stage are currently under development. The main lines of present and future research in this project cover the study of the forthcoming MPEG-21 standard, still under development, which includes aspects related to contract and distribution services, or author rights management.

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