Networked Libraries Promoting Lifelong Learning

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Abstract

Lifelong Learning may be provided by schools, institutions, professional bodies, private learning companies, community projects or training departments within businesses. Not only will learners be able to match the availability of courses with their requirements, but record their achievements, perhaps building an online portfolio of their experience. To achieve this, many different organisations with varying methods of storing learner details will have to interact with one another. After a period of time, intelligent services may seek out the most appropriate courses based on the learner's profile, requirements and information available from the multitude of learning providers and brokers. Our research uses the description of the content using metadata and presents a framework supporting the delivery of learning content to distribute and categorize academic content and to provide content catalogues and specific educational content to the target groups.

Keywords

Lifelong Learning, Networked Libraries, Distributed Learning Environments, E-Learning

Introduction

If higher education is to become more widespread, as people learn at home, at work or in local learning centres, university libraries will no longer be able to deliver their services in a secure, familiar, physical building but will need to be wherever learning is taking place. Library services to support adult and lifelong learning have developed in response to changes in the higher education system (distance learning, part-time study, franchising of courses), with developments in adult and further education and open learning, and in response to demands from independent learners. In further and higher education, evidence from surveys of non-traditional students indicates the importance of library and information services to such students in supporting formal courses of study, whatever their mode of delivery.

The basic operation of an e-educational organization is to provide e-lectures, e-labs, supporting contents and e–libraries (acquisition, cataloguing, circulation and serials control) (Cholin, 2005). In the case of e-libraries the vast information sources, are not only the items held by or owned by the library, but also include remote information sources (Hughes and Kamat, 2005). Providing access to remote sources is a challenge for modern educational systems. The suggested environment helps the learners to focus on the knowledge and skills necessary for the fulfillment of work-based objectives and involves a more in-depth assessment of particular areas of professional knowledge. The environment under discussion can be used for library automation activities, thus libraries can increase buying power and access to sources, through qualitative resource sharing.

Some institutions have developed sophisticated levels of services facilitated by the development of new technologies, including electronic information networks. Those students based in remote locations will be able to obtain tutor support through the Networks via high bandwidth computer links thus widening the scope for continuous learning. As well as providing electronic library and information management systems, several projects aim to provide each campus with networked learning resource centres to support research, learning and information provision.

Libraries-Research Issues

The new role of Libraries is how to provide not only information but also real knowledge. It is interesting to see how Libraries and Open Academic Institutions can be real e-educators by making alterations to their structure, service systems and functions. Libraries need extra support to respond to the challenges that are broadly associated with information technology, which affects the nature of information resources.

The high costs of higher education have also stimulated alternate models for education and training. New models pose challenges to traditional modes of providing access to higher education, to the structures through which universities are organised and governed, to the relative stature of teaching and research within each institution, in terms of accreditation and standards. The changing nature and quantity of scholarly resources now at hand force us to confront new kinds of material. Cooperation among libraries is essential. New alliances also have to be forged with other kinds of cultural institutions and repositories.

Academic Libraries must adjust to current trends:
1. When, where and to what extent should academic libraries take on a research and development role in providing new services?
2. What will the academic library become in these new types of Open and Distance Learning Universities?
3. Interdependency of academic libraries cannot mean self-reliance. Modern demands formulate the sharing of not only resources but also the functions and roles inside a well-organized framework, respecting the particularities of each.

National Libraries will have to change their roles from ´gatekeepers´ to ´gateways´ of knowledge and in this way they should perform such tasks as information mapping, information audits, training in information literacy, and information of best practices and help their users to navigate the world of information more meaningfully.

There is also a link between promoting library services and raising the profile of similar cultural organizations. Because of their heterogeneous market, satisfying the customers' needs regarding of libraries, museums and archives can be very challenging.

As a result, statistics can be gathered and attention should be given to the following parameters:
1. Understanding Customer's Needs
2. Community Profiling

And as a consequence designing should be geared to:
1. Market Segmentation
2. Marketing Plan
3. Marketing Audit
4. Objectives

It is clear that cultural institutions such as libraries, share similar goals and, in some cases, working together can result in improved services, increased communications and mutual respect. An effective marketing plan could by its implementation promote communication, as well as the sharing of resources and collaboration.

In collaboration with diverse institutions our proposed environment demonstrates how access to innovative technological resources could enhance educational programs. Librarians may be motivated to accept the idea because it will provide them with the impetus to do a number of things that they considered were institutional priorities but often had been un-funded mandates.
The proposed environment would provide museums, libraries and archives with a basis for identifying common ground among their collections, experimenting with formats, developing best practices, and determining new ways in which they would provide digital access to their materials. Services, partnerships, management and marketing plans in our digital world utilise not only the dissemination of information but mainly the dissemination of culture and real knowledge.

The objective is to ensure that local cultural institutions throughout Europe benefit from the proposed environment and contribute in an enabling 'anywhere, anytime', natural access to IST services for all through the provision of advanced systems which improve access to Europe's knowledge and educational resources and generate new forms of cultural and learning experience, helping establish a stable European infrastructure for distributed repositories of digital content and community memory within near future.

Joint Education and Industry Initiatives

A number of programmes have been developed which have allowed universities to link education to the workplace, and thus give students the chance to acquire skills which could be useful in their working lives. Examples are:
PROLIX project. The objective of PROLIX is to align learning with business processes in order to enable organisations to rapidly improve the competencies of their employees according to the continuous changes in business requirements. PROLIX will couple business processes with learning processes in corporate environments. The vision of PROLIX is a system that allows for business process driven learning in the workplace, taking into account the single learner and their needs as well as corporate requirements. In addition, the learner will be able to initialize a learning task himself enabling self-guided learning in corporate environments. To reach this goal, PROLIX has developed an open, integrated reference architecture for process-oriented learning and information exchange (PROLIX, 2008). PROLIX is a 48 months research and development integrated project run by the European Commission under the Sixth Framework Programme, Priority 2 "Information Society Technologies" started on 1st December 2005.

CAEL (Council for the Advancement of Experimental Learning) Programs- US model, works on the theory of "learning by doing". CAEL is uniquely positioned to provide higher education institutions, industry and the public sector with the tools they need to implement practical, cost-saving and effective lifelong learning solutions (CAEL, 2007).

CLEO (Compact for Lifelong Educational Opportunities) - US model provides career information and inventories, lifelong learning experiences, degree information (SAGE, 1983). SAGE Journals Online is the delivery platform that provides online access to the full text of individual SAGE journals. SAGE Publications publishes over 485 journals in Business, Humanities, Social Sciences, and Science, Technology and Medicine.
The SAGE Full-Text Collections, SAGE's award-winning, discipline-specific research databases, are also available on SAGE Journals Online.

Lifelong Learning

The essence of lifelong learning is that each individual will be undertaking learning of some kind throughout life. This provides an opportunity for universities to transform the relationships they develop with their students. Instead of the classic route of a three or four year undergraduate degree course, followed at best by a remote relationship through an alumni society, institutions will have the opportunity to persuade students to return again and again. It is a truism of marketing that it is far easier to sell another product to an existing customer than to recruit a new customer, and universities will need to grasp the opportunities this presents by developing lifelong relationships.

The academic library could have an important role to play in these relationships, perhaps by transforming current `external reader' membership arrangements into a new type of university membership which includes access to courses as well as to university facilities. Bearing in mind the large numbers of adult learners and scholars who are currently outside institutions, it may be that universities could use access to library services as a means of bringing such people into their communities in a much more active fashion than occurs at present. No consideration of lifelong learning would be complete without reference to the enormous impact which Information and Communications Technologies (ICTs) are making and have the potential to make. In a very short period of time it has become possible to deliver interactive learning materials and a supporting infrastructure to most locations using the Internet. The World Wide Web has become an everyday tool for many millions of people in only a few short years. Suddenly the technical infrastructure which will enable those seeking to deliver and support lifelong learning to reach those

seeking to access and use its opportunities is in place. Some see this as the key ingredient which will enable lifelong learning to become a reality:
"the information technology revolution is creating a new form of electronic, interactive education that should blossom into a lifelong learning system that allows almost anyone to learn almost anything from anywhere at any time" .It is almost impossible to predict the full impact of the information and communications revolution on education.

Content Exchange between Higher Education Institutions and Corporations

There are three models relevant to online Higher Education:

- Online teaching makes use of electronic resources to deliver learning materials and to facilitate class discourse.
- External programmes, by which a university delivers courses to non-campus, based part-time students.
- Virtual universities, institutions created to deliver their course programme exclusively online.

And three key design principles for distance learning:

- The principle of collaboration, which may be the single most important concept for online networked learning.
- The principle of access.
- The principle of constructivism(Myroni. and Pombortsis , 2007a)

The "Instructional Management Systems Global Learning Consortium" (IMS, 2004) facilitates on line distributed learning, such as how to find and use educational content, exchange student records between systems, trace the progress and report on the performance and the experiences of students in administrative and management systems.

IMS project concentrates on the specification of the description of the meta-data and on the description of the content itself to be exchanged. Therefore not establishing a protocol makes their interoperability viable. With a view to the interoperability of educational contents, the investigated environment is based on the LRMS and uses the description of meta-data proposed in the IMS project to permit the search and exchange of educational content spread out among various content servers. From now on, when the IMS standard is mentioned, this standard shall refer to the description of meta-data.
Examples of interesting Virtual Learning Environments include the JISC framework (JISC, 2006), the SLIDESTAR (EDUXCHANGE, 2005) and ARIADNE (ARIADNE, 2006).
The Frameworks and Tools of e-Learning Programmes are exploring the possibility of developing a more flexible service oriented approach to technical infrastructures for e-learning. The paper also proposes an environment for learning on the web and supports an educational content search based on meta-data, which is distributed across the search server and content servers, while the IServer, Intermediator Server, sends the search server *(Content Search* module) the information supplied by the *Content Server* (Myroni. and Pombortsis, 2007b) as depicted in Figure 1.

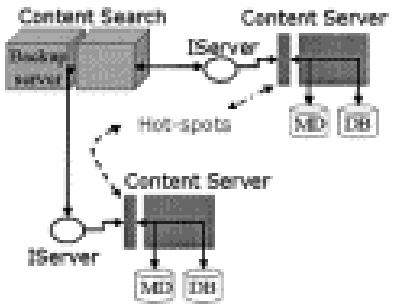

Fig. 1 Information about the metadata of content,

from the Content Search to the Content Server via the Iserver and vice versa.

A new world of Web-based information where information will be machine understandable, as well as machine readable, enabling intelligent agents to draw sophisticated inferences from the metadata attached to Web-based information is created. Finding quality content on the Web is a difficult task. In order to find content on the network, it is necessary to know how to give a good description of the desired content, and just as important, to know where to look for it.

The content servers must be known and they must use the same standard for describing content. The Semantic Web requires *relational metadata*, i.e., metadata that describe how resource descriptions instantiate class definitions and how they are semantically interlinked by properties. Several case studies have been carried through that build on this idea of the Semantic Web, in order to provide intelligent applications to make knowledge about researchers, about companies and markets, and about research papers accessible by semantic means. An important architecture is the discussed framework that the Semantic Web is built on. In order to generate an instance of the framework on any IMS standard content server, it is necessary that when generating the instance, classes are implemented with the IServer module that makes the interface between the instance of the framework and the content server.

The purpose of the IMS Digital Repositories Interoperability specification is to provide recommendations for the interoperation of the most common repository functions This specification is intended to utilize schemas already defined (e.g., IMS Meta-Data and Content Packaging), rather than attempt to introduce any new schema. Repositories may hold actual assets or the meta-data that describe assets. The assets and their meta-data do not need to be held in the same repository. This specification defines digital repositories as being any collection of resources that are accessible via a network without prior knowledge of the structure of the collection.

The Benefits of Networked Learning for the Users

The paper suggests the concept of learning through networks as a challenging concept for addressing user-driven technologies that support creative learning processes.
The concept of *"learning through networks"* also corresponds well to the current development towards an interaction society (Wiberg, 2004) in which IT plays an important role since these new interaction technologies enable people to communicate and interact "anytime, anywhere". In this way, modern interaction technologies enable social networks to stay connected over distances. In an interactive society, the focus is not directed towards one-way information flows or information processing. Rather, the focus is on the technology enabled interplay between the members of the interactive society, their social networks, their innovations of new interaction technologies, and the new channels they invent for their own social learning processes. Today, we can see new computer-related behaviours arising e.g. community building activities and innovative linkages of different interaction technologies. There is a wide range of literature today that point in the direction of user-driven, innovative and creative processes in which modern IT plays an important role as an enabling platform, and support engine for interaction. For example the book *"Connections – New ways of working in the networked organization"* (Sproull & Kiesler, 1998) illustrates the highly intertwined role of modern IT as a mediating channel for social interaction.

During past few years we have been able to witness a shift in the development of learning technologies. While traditional learning technologies were focused on teacher-centered learning processes (Hiltz & Goldman 2005) and specific learning objects we can now see how technology has developed in a new direction. Now, the technologies are characterized as being open to everybody, general in terms of content, and built upon a model of user-centered production of content instead of centralized or teacher-centred production of content. Further on, the architecture is flat, and typically peer-to-peer to facilitate direct people-to-people interaction, collaboration, and learning.

These new web-based technologies enable people to come together in new ways to share ideas, opinions, content, humor or ideals and as such, these technologies enable new forms of creativity, socialization, and learning. As described by Jenkins and colleagues (2006) these new social network services enable and scaffold new "participatory cultures" including; 1) affiliations (memberships, formal and informal, in online communities centered around various forms of media), 2) expressions (producing new creative

forms, such as digital sampling, skinning and modding, fan fiction writing), and finally, 3) collaborative problem solving (including working together in teams, formal and informal, to complete tasks and develop new knowledge).

Knowledge-Intensive Organizations

When an employee leaves, the organization uses an exit procedure:
The personal network and key documents are stored. The Knowledge Management objective of the organization is to store human knowledge in databases so that it can be used also after the people are gone. Many employees move to new positions, people often stay only 2-3 years in one position, leave the company, or retire. Human tacit knowledge is thus typically constructed over a period of three years. To preserve this tacit knowledge, at least some part of it must therefore be transformed into explicit knowledge, distinguishing between:

- Knowledge on personal networks (informal and formal).An example is the worldwide 'who-is-who in EP' system.

EP is the division Exploration and Production of a large company in the oil industry with branches in 40 countries worldwide. EP has 15.000 employees. Core activities of EP are 'searching for oil fields', 'investigation of oil fields', and 'producing oil'. Oil companies recognize exploration as a key source of competitive advantage because drilling is such an expensive undertaking (Kankanhalli, 2003). Specific knowledge regarding oil locations and drilling is limited to many professionals and experts in many different locations around the world. Other knowledge is explicit and available in many databases and portals, based on a variety of technologies to support knowledge creation and use in various groups, teams, and communities.

- Knowledge on procedures and working processes, stored in a global document system , covering many EP documents, including geographical maps, and various links with internal and external libraries and information providers. The data resources are centralized in the libraries and made accessible through a portal. Given the massive amounts of data available, it is impossible to manually index the collections. A key to making the libraries accessible is the thesaurus, which acts as a kind of ontology. Thus, measurement efforts are focused on thesaurus completeness and accuracy, and use. Indicators of knowledge resources and development are the numbers of queries, query refinements, index links to particular thesaurus terms, changes in thesaurus, thesaurus terms unused, jumps between libraries, the most popular items in employee portal instances, and the types of customizations of portal defaults Human resources are key. The focus is not so much on individual but on joint performance. The contact networks of employees are strategic resources. Collaboration in the project teams and the communities of practice is essential for the success of the corporation. These communities are self-organizing. Indicators of knowledge resources and development are the employee contact maps and the results of social network analysis (defining properties such as who are central nodes, linking pins, specialists in networks etc).

Conclusion

Lifelong learning is high on the agenda in Europe. Bringing e-learning closer to lifelong learning is very relevant today. Lifelong learning obviously implies intensive interaction between the world of work and the different educational sectors. Adult and lifelong learning represent an increasingly essential part of the portfolio of traditional educational institutions. Higher education is specially positioned for producing, and disseminating knowledge, but also for acting as an important negotiating partner in raising awareness, and promoting the culture of learning. Improving e-learning services and products permit institutions to elaborate and implement well-founded strategies and new partnerships with the corporate sector.

Practically the aim is to:
1) build strong national consortia
2) advocate the development of local digital resources
3) provide a strong business relationship with content providers
4) be an advocate for the adoption and advancement of effective information distribution models

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5) Develop model partnerships with global funding agencies, foundations, consortial groups, and content providers.

Libraries and archives bridge the gap between the information rich and the information poor by delivering services free or nearly free of charge. The free-of-charge principle is a decisive instrument in the development of an information society in Europe that delivers services to all its citizens.
Evaluations can be in the form of official measurement systems including financial accounting, computerized usage tracking, user satisfaction surveys, or the less structured methods of verbal or written feedback from users.

The proposed environment is composed of reusable software components with open and clearly identified interfaces. Due to the compatibility of the Course servers with other servers that use the same concept of meta-data proposed in the IMS standards, it is possible to create a knowledge community centered on educational content that could be greatly appreciated in the case of institutions of higher education. Furthermore, in case the investigated environment is used by brokers, it will also offer benefits to content providers, because it will offer support for marketing, customer service and content delivery.

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