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E- Learning

Trends of CMS and The Role of Digital Libraries

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Abstract

Internet and a broad spectrum of web based applications have added a new dimension to the technologies and techniques employed for Content Management System (CMS) in e-learning. E-learning refers to the creation, delivery, and management of training in electronic environment. The convergence of e-learning and digital libraries creates challenge to be solved not only at technical level but also at the institutional level. The handling of e-Learning systems in conjunction with other prominent web applications and the perfectly smooth integration of content creation, search, access, updating etc., in terms of the different technologies is still inconclusive and remains as a open ended issue. This paper will try to discuss about the trends of CMS and evolution (a tool based database oriented approach) of such a unified CMS for e-learning in the context of digital libraries.

1 Introduction

As we close the door on the 20th century and uncork the millennium, we have entered the e-decade. With the advent of the Internet into each facet of our lives, the vowel “e” has permeated all activities of the professional lives, or at least is threatening to. An area that is being impacted (or promises to be) is training and development. This is being done by a phantom called e-learning. In the first few months of the new millennium, e-learning looms large. Is e-learning just a marketing device? Or is this a new word to describe a new reality? What does it mean to add an ‘e’ to the word learning? Let’s see what it is. The core conception is like that the term e-learning groups together education, training and structured information delivered by computers, through the Internet, or the Web, or from the hard drives of the computer or an organization’s network.

In the present scenario, computer systems are used for handling of ever increasing volume of digital content. In addition, the exponential reduction in the cost of hardware has necessitated the deployment of appropriate content management systems.

2 What is content, content management and content management system?

Content is not a single piece of information, but a conglomeration of pieces of information put together to form a cohesive whole. Due to the exponential growth of information, the task of finding information has become like taking a dip in the ocean to find a pearl. So it is clear, content is the fuel for any organization, driving virtually every interaction that occurs across the entire range of organizational activity.

Content management allows content to be stored, retrieved, edited, updated, controlled, then put out in a variety of ways that the incremental cost of each update cycle and output production shrinks dramatically over time. There are a number of challenges and issues concerned with CM.

In the IT context, Content Management System (CMS) is a system that facilitates the creation, retrieval and editing of information/knowledge in digital fashion including raw,

semi-processed or fully processed content like images/graphics/animation, audio/video, etc., in real time or otherwise as needed. Therefore, CMS is simply a system to manage content. CMS range from very basic databases to sophisticated tailor-made applications. These more complex systems can be integrated with the eventual digital resources in order to enable access to digital assets and to allow regular updating.

In the e-learning context, the requirements are typically different from other areas, which include:

FOR EDUCATION

- Courseware creation, retrieval, updating.
- Handling research or patent related information.
- Interactive retrieval, real time content exchange, multimedia provisioning, etc.
- Extensive search mechanism for document handling.
- Transform the content for presentation over different devices including hand-held and other portable or mobile communication devices.
- On-line publishing.

FOR CORPORATE LEVEL

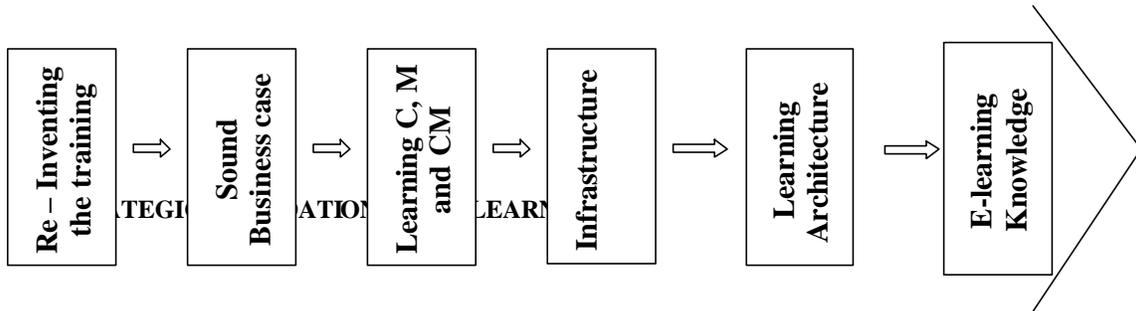
- Same as above for training.
- Corporate data including financial, production and administrative related matters, annual reports, etc.
- Raw / processed data for MIS/EIS purposes.
- Technology and marketing related information for closed user groups / public access.

3 Why CMS becomes essential?

In general, it is essential because

1. Amount of content, which includes • A lot of content • A large number of content types
2. Amount of change

3. Ball- parking complexity etc.



Side by side as we look back at the typical strategic foundation for e-learning, it indicates the activities such as evolution of a learning architecture in terms of change management and re-inventing the conventional training organization apart from other issues. It can be noted that the transition from old to new framework of learning includes:

From	To
Learning Classroom Training Paper Cycle time Physical facilities Training management Education results	Performance Anytime, Anywhere Interactivity On-line Real time Network facilities Knowledge-management Business result

The change mentioned here results in a workflow integrated and automated environment that necessitates the establishment of different levels of knowledge management.

Further, a brief look at the economics arising out of the deployment of e-learning environment as against the conventional classroom approach, and a via media technical-cum-classroom approach shows significant improvement in the time spent.

As for example, the typical costing in the US environment indicates a saving of 4.3 M USD over three years for training 1000 candidates as per the key facts and assumptions. The order of savings expected out of e-learning methodology apart from other factors of real time, anytime – anywhere kind of concepts are sufficient motivating factors for paying serious attention for a better CMS in the near future.

4 Methodology

In CMS, the technology infrastructure depends on organizational infrastructure. So the technology infrastructure is the image of the organizational objectives to compete in the electronic environment. The general requirements and methodology of CMS and the functionality expected include the formulation of the following –

1. Scope of the system (As for example metadata recording, process management, online publishing, integration with other systems).
2. Data structure (including the ability to record your required metadata, to hold links to digital assets and to hold text which can be edited and published).
3. Templates (including design, layout and accessibility for different types of pages; also your ability to update templates).
4. Security and access (including access rights for different types of users, e.g. retrieval only, for editors, for publishers, for web managers, administrators etc.).
5. Workflow management and process control.
6. Ability to generate navigation and links between pages automatically and consistently.
7. Ability to inter-operate with existing systems and to comply with prevalent data standards.
8. Ability to run on your existing technical infrastructure.
9. Ability of database to search across metadata and narrative text content.
10. Ability to manage metadata across the database, e.g. update or assign values globally or across a selection.
11. Ability to archive data, and to output reports in digital and printed form.

Side by side, we have to take care of the future proofing of CMS. There are a number of issues, which all are necessary to be considered in this context:

- i. Will it deal with existing standards for data and do the suppliers take a pro-active approach to keeping their products up-to-date?
- ii. Does the system use a standard, open operating environment and hardware?
- iii. Is the system able to import and export data in formats understood by other systems?
- iv. Does it allow data to be archived in standard formats?

- v. Is the database extensible?
- vi. The range of metadata you record.
- vii. Are the specialist skills necessary to maintain the application and the underlying technology, both readily available and affordable?
- viii. Is the system in widespread use in similar projects?
- ix. Does the underlying technology fit with your organization's strategy?
- x. Maintenance Strategy.

5 Evolution of techniques and technology

Excepting for a few document management systems the implementation of CMS was carried out in a non-unified manner before the 90s. Those times, in most of the cases the CMS was primarily handled through a range of tools and utilities as follows:

OS TOOLS

- Text editors
- Cross-reference generators

UTILITIES

- Cross-reference generators
- Image editors
- Source Code and Version Control Systems

DATABASE TOOLS

- Querying and Search Facilities
- Schema and Record Creation, Edit facilities
- Reporting Systems

AI TOOLS

- Knowledge Implementation Systems
- Knowledge Retrieval Systems

Nowadays these techniques have been changing due to tremendous growth of technology, and the more recent CMS implementations are based largely on

- GUI based presentation
- HTML Content for Web hosting
- Java based content creation for Web hosting
- Recently XML standard documentation for business as well as education
- Data retrieval and presentation, particularly for corporate level.
- X.500 based DAP (Directory Access Protocol) based net distributed databases / Information access
- More recently LDAP 2(Light weight and Later versions)
- In short, for improving the facilities and performance of different operations, an integrated CMS should be in conjunction with other Web or Net based applications.

In future, we have also to take care of

- Very large distributed database environment
- Knowledge management / BI / Workflow needs
- EIS/MIS/DSS/Expert System requirements
- ASP/Web Applications and
- E-learning Systems

In all the cases we require advanced Database Architecture on a typically object-oriented preferably unconventional approach, similar to the erstwhile C database of C-DAC for language processing or that of CEDAR/Buffalo for US Mail Delivery Automation.

- Extensive Deployment of Web enabled Directory Architecture (e.g. LDAP enhance versions)
- Basic content as per XML / eb XML Conceptualization.
- Security and access with high degree of control
- Better and more efficient search/querying/reporting facilities on the databases. Tools such as TOAD, which are GUI based, like SQL*Plus which are GUI based and directly interacting at database level are needed for search and retrieval/reporting.
- New generation of Content Conversion tools such as HTML to WML conversion (parser based with full graphics transformation capabilities) for mobile deployment

- New generation of faster Internet access over wireless such as iDEN (64 kbps), 3G Cellular (144 kbps upwards), HDR-CDMA (2.4 Mbps / WAP applications, enhanced WAP browsers etc.)

6 Is e - learning possible in Digital libraries?

We cannot imagine a good educational institute without a library. The main function of a library is the dissemination of information to the different kinds of users where, librarians are acting as the consultants of the information. So it is very easy to take the best of these traditional and core library competencies with us to head towards the digital age. The advent of latest developments (technological and changing forms of information resources) made the libraries to adapt accordingly to enhance the learning process. Interest in digital libraries has grown rapidly throughout the 1990's. As worldwide activities in the area of digital libraries expand, the key point of focus should be on education. Digital libraries containing resources that are helpful to learners will reduce costs and promote mutual understanding, as well as speed up the transfer of knowledge and encourage international collaboration in the educational field. Educational institutions must become more efficient, and also must improve the quality of the learning experience. These two objectives seem at odds, but new technology has the potential of helping us meet both simultaneously. In particular, we can argue that:

- Learning will be enhanced if we can provide interactive hypermedia courseware, and
- If we have powerful digital libraries to work with, then both learning and courseware development will be more efficient.

This integration of the e learning and digital library resources requires collaboration, and co-operation. So the modern libraries have to act as the

- Provider of information technology facilities,
- Clearing houses and
- Facilitators of e- learning.

Nowadays, digital libraries in most of UK universities and colleges currently offer their catalogues online and also offer an increasing number of subscriptions of e-journals and

online information resources. The library thus becomes the entry point to the collection both physical and virtual, of the institution. But the prime barriers continue to be located within individual institutions and their approach and attitudes to integration. However there is a general consensus that improved collaboration and communication of all professional levels with adequate training and staff development could answer to many of these problems.

7 Can the librarian play the role of Content manager?

Yes, why not? He/she can act as a content manager. In e-learning environment, s/he will ensure that the latest, most relevant material is in the repository for use by instructors, instructional designers, and students. In this way, the learning materials are constantly updated and made available, as part of an effective knowledge management system. Librarians are knowledge organizers also. They can organize information not only by topics or information types but also for different user groups. This gives them the opportunity to become a visible and integrated part of the course. These advantages develop the library which becomes a more dynamic and ever changing provider of support for users, meeting them where their information needs are. The great contribution of Internet is to provide the possibility of a more dynamic structure and strong contextual linking facilities — where links are made directly to supplementary literature and web-sites. At this stage the librarian's core competencies of structuring and presentation are very useful. Together with the teachers' professional skills they make a strong combination, especially when it comes to designing the courses. Teachers' close cooperation is highly required in the designing of the user interface and the Web page of the course should reflect the teachers' ideas of learning goals and objectives.

Other responsibilities of libraries are to play the role of clearinghouse and handle the copyright clearing process. Incorporation of the electronic conference environment and other interaction methods like e-mail, chat list-servers, etc. enhance the possibility of interaction with users which help them in having better communication. The electronic library and librarian are essential partners for teachers, both as information supplier and as tool supplier for design of interfaces, access of subject portals on the Web, development of user support facilities, etc. The task of selecting the professional information resources, pack the digital

services, and present the educational content of the packages in cooperation with the teachers are essential new aspects of today's research libraries.

8 Conclusion

It is really true that without content we would be nothing. CMS and its services are important because it follows the professional's main motto to provide the right content for the right user at the right time in the right presentation format. Side by side it is assumed that virtual learning may not replace the existing traditional learning rather it can be used as a support to it. There may not be a need for an e-learning program by using a learning management software. They can be assimilated in to existing digital library initiatives. Rather than making it a digital archive, a digital library should act as a complete learning system. And in case of CMS a broad range of existing and disjointed tools, protocols and methodologies need to be integrated and the librarian should have to acquire new skills by further training and supplementary education.

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