AN ADVANCED *"E-LEARNING COMMUNITY"* PROPOSAL USING *MS SHAREPOINT™* PORTAL SERVER

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Abstract: In order to implement e-learning, quite often simple Internet technologies are used, usually without any clear pedagogical approach. Unfortunately this is not quite effective, it restricts learners' exchanges, while influence the quality of resulted knowledge construction. More sophisticated environments are needed when we vision e-learning as taken place in a rich and flexible *Learning Community context*, for young students or even for adults and professionals. Our proposal consists of an *Electronic Learning Community* (*eLC*) that can be nested in a Web-based system using *MS Sharepoint™* Portal Server advanced features. Such a solution could provide several means in order to overcome problems and difficulties that inevitably occur in a system as complex and sophisticated as that.

Key Words: E-Learning, Learning Community, Portal Server

1. Introduction

Information and Communication Technologies (*ICT*) have become part of our lives. Lately great efforts have been made in order to achieve effective e-learning, mainly by using simple internet technologies such as Web pages, synchronous and asynchronous communication, ftp, etc. These technologies are powerful, flexible and let the user have the control but unfortunately their use has certain drawbacks. Such as time consuming maintenance of Web pages, no knowledge management, no content management, difficulties in supporting higher level or complex services, no clear pedagogic orientation, no security, etc. Sophisticated environments, such as an *Electronic Learning Community*, are required in order to overcome problems that are encountered.

2. Electronic Learning Communities

Current e-learning systems rather focus on content delivery and assurance of some traditional educational management functions. Thus, they restrict more complex learning exchanges, and they don't allow flexible and open-ended learning activities. Subsequently, the educational value, the quality of learning and the resulted knowledge construction is reduced. Nowadays, there is an increasing effort to design educational systems over the web based on currently established theory and research in human learning. Recent theories derived from the socio-constructivism paradigm, such as ***Distributed Cognition*** theory [1], or ***Activity theory*** [2] have started to influence requirements on such systems. In fact, there is a paradigm shift from teacher directed instruction to learner management learning, from subject-centered design to learning-centered design, from individualistic learning to learning in a social context. Most importantly, there is a shift from a vision of students as more or less passive learners to students as apprentice knowledge workers [3]. There is a tendency for such environments to nest Mason's ***Integrated Model*** [4], [5]. According to this model, e-learning can be accomplished through numerous online collaboration activities, given the appropriate educational resources and communication services. The content of each lesson can be dynamically and radically changed according to the students' needs and the progress of the activities assigned. During each lesson there is a contribution to the mutual knowledge base from every party (teachers, students, even guests). More over, we have to take into account that while a part of our knowledge comes indeed from formally planned learning scenarios, people learn a lot from informal exchange with fellow learners, professors, or experts. This consideration, concerns exchanges within tightly or loosely

defined communities. We can define *communities* as networks, made up of individuals as well as public and private institutions with a social organisation, within which a certain amount of practices, common goals and language are shared. When we vision e-learning as taken place in a rich and flexible ***Learning Community context*** [6]**,** for young students or for adults and professionals, the technology must not be just a means to deliver information/knowledge but an aid to the production of knowledge objects, as well as a support of flexible social exchanges.
In order to support this vision, we must focus on the design of ***Electronic Learning Communities (eLCs)*** that could be embodied in Web systems such as a *Portal* (enriched with extra services), or community portals such as *C3MS* (*Community, Content and Collaboration Management Systems* [7]) An *eLC* is a *Virtual Environment* functioning within Web-based systems, with build-in modules and providing services that are organized in a way that none of the previously mentioned drawbacks are noticed. Except for some basic build-in modules and services (basic internet services, basic administration of users and services, search capabilities) that exist in a common educational system over the web, in an *eLC* some more specialized services can also be encountered, in order to implement the above mentioned theories and models. Such services are ***Moderation*** of communication among users and dissemination of the acquired, within the system, *Knowledge (**Knowledge Management**), **Advanced Administration*** of users and resources, ***Advanced Security Features, System logging and monitoring,*** easy to handle ***Automated Processes*** for every service provided, (for example to be able to automatically link a document to a discussion or to trigger a meeting or a discussion based on a received email), other ***Advanced Services*** such as the existence of *Collaborative Hypertexts* (also known as *wikis* [7]), *Virtual Space* provided for picture galleries, *Multi-Authoring Mechanisms* or keeping *Versions* of documents.

3. Problems usually encountered within Electronic Learning Communities

Electronic Learning Communities, as above described, are expected to overcome the drawbacks that come along by the use of simple Internet technologies. Yet, any environment as complex and sophisticated as that is usually expected to encounter problems (of a higher level of course) during its operation. Such problems, deriving mostly from the technical inefficiency of the systems that the environment is based on, can be categorized according to their relation to several matters as shown below:

3.1 Administration and Manageability

Administration and management quite often can be complicated and time-consuming because the administrative tasks are *non-transparent* and considerably *complex*. System configuration usually requires technical knowledge or constant cooperation with experts. This can also be caused due to the lack of solid user management policies regarding access rights, user grouping and account managing and inefficient system security policies.

3.2 Knowledge Management & Moderation

Poor or no knowledge management is often an issue. The generated knowledge, such as the results of the educational activities is not managed well; therefore it can not be easily reused. Communication synchronization problems are also often encountered. These problems can make the sophisticated process of *moderating educational activities* hard to accomplish and problematic.

3.3 Usability

Often a certain lack of provision for integration between applications exists. Such integration is essential in order to implement more complex learning scenarios. Usually there is no common interface for every service provided, due to the fact that most of the platforms use proprietary technical solutions. Thus the appearance of every module may be different from each other and most importantly their functionality might differ as well. Proprietary solution building leads to inefficient embodiment of any new or innovative Web-oriented facility (an implemented service

or technology) in such systems. Even so, embodiment may occur relatively unhurriedly. There are practically no native fully automated procedures or processes within such systems.

3.4 Advanced Capabilities (Automated Processes, Multi-authoring, Searching)

As mentioned above most systems lack fully automated processes. This results into complicated and inefficient document exchange mechanisms and document management as well as inadequate communication coordination. It may not be trivial to link a document to a discussion or to trigger a meeting or a discussion based on a received email. *Multi-authoring mechanisms* or keeping versions of documents might not be feasible. Also, most systems have integrated search engines, which crawl within the system's web area, implementing criteria matching search methods. Moreover they have links to broader web search engines or lists of selected web sites for further content browsing. Although such search capabilities are common in *eLCs*, they are on the whole mostly inefficient, usually leaving it up to the end user to trace the desired information without any automated processes in existence. Finally, implementing *Collaborative Hypertext Services* could be impractical even if available due to complexity and the existence of security holes.

4. Our proposal: An *eLC* based on *MS Sharepoint™* Portal Server

4.1 System Architecture

We propose the building of a *Electronic Learning Community* based upon a Web-system which is implemented using *MS Sharepoint™* Portal Server (*SPS*). Such a solution could provide several means in order to overcome some of the previously mentioned problems and difficulties. These are materialized by linking many different content sources to the user allowing the accomplishment of sophisticated tasks such as *Advanced Administration* of users and resources, effective *Moderation* of educational activities, *Synchronization of user communication*, efficient *Security*, *Knowledge Management*. According to Microsoft [8], *SharePoint™ Portal Server 2001 extends the capabilities of Microsoft Windows and Microsoft Office by offering knowledge workers a powerful new way to organize, find, and share information. For system architects and developers, SharePoint Portal Server is a solution that delivers dramatic new value by combining the ability to easily create corporate Web portals with document management, enterprise content indexing, and team collaboration features*. It consists of three operational modules. ***Document Management Services*** and ***Search Services*** modules are used for accessing information drawn from a wide variety of content sources while maintaining the security of the documents. The ***Digital Dashboard*** and ***Web Part Run-time*** module is used to present the portal content to a user through a web browser (or other office applications - clients) by using internet communication protocols (TCP/IP). The availability of such functionality, can lead us to the effective implementation of any desired learning model, even Mason's *Integrated Model* [4], and any desired pedagogical approach. Our consideration regards a flexible system which concerns not only secondary or higher education students, but *learners* in general.

4.2 Basic Characteristics of MS Sharepoint™ Portal Server

The following features of *SPS* could be used in order to implement several complex services [8]: ***Virtual workspace***. This is an organized collection of documents, content sources, management folders, categories, document profiles, subscriptions, and discussions. It provides a central location to organize, manage, and publish content. ***Web Storage***. These are built-in services providing a virtual storage area accessed via the Web as if it was a local disk, which is also used for building Web-based collaborative applications. ***Dashboard site.*** This is a specialized Web site that is created automatically at the same time as the associated workspace. The dashboard site provides a Web view of the workspace and enables users assigned to appropriate roles to search for, view, and manage documents in the workspace and to search for and view content from other sources. The dashboard site contains a number of pages, or *Digital Dashboards*, and includes customisation pages. ***Advanced Document Management and Publishing Services Built-in Integration*** with common office applications and Web Application Building Protocols (*ASP*,

CDO, ADO, XML, CSS, WebDAV). ***Advanced Security Options***. These features provide us with the ability to develop distance learning courses which can comply with any pedagogy desired. Moreover they supply us with easily automated procedures, making the system more functional and operable.

4.3 Process implementation - Technical Analysis

Except for the basic built-in functionality that all Web-based educational systems provide, some more sophisticated processes can be implemented within a system based on *SPS* due to its advanced features, as shown below:

- Advanced Security and user administration

In existing Web-based systems security is often implemented on the *IIS* level. Due to the opacity of content placement, file-level permission settings are not easily applicable (if they are at all). *SPS* complies with the *IIS Security* model but also extends permission planning by taking advantage of the *Distributed Security* model supported by Windows 2000 (based on *User, Group* and *Computer Access Control Lists* stored with every file or folder), while simplifying content management, introducing a *Role-based Security* model. According to this model, a fixed set of three roles is used in order to offer a flexible and secure method for controlling user access to content. Permissions associated with a specific role cannot be modified. Roles both at the individual folder level and on the workspace node, which is the top level of the workspace, can be assigned. In addition, access to a specific document can be completely denied to a user (or users). Role-based security is used to control access to content, regardless of whether the user is accessing content using a Web browser, Web folders, or Office. The three discrete roles are: *Reader, Author*, and *Coordinator*. Their rights vary from read-only access of published documents only, to full management of the workspace layout. *SPS* honours all the various types of authentication by accepting the appropriate access token based on a *SID* (User System Identifier number). It allows coordinators to control the access to a document for both reading and viewing. Someone who does not have access to a document or folder cannot discover its existence by any means (through search or folder browsing).

- Advanced Resource Administration

Speaking of content management, the advanced search capabilities of the proposed system should be mentioned. To begin with, an index of the workspace content *is* created by *SPS*. In addition, *SPS* can crawl and create indexes for content stored outside the workspace. Access to this content is accomplished by using content sources that the coordinator creates. A content source represents a location, indicated by a URL, where such content is stored. This content is accessed through the content source in order to be included in an index. The important technical aspect is that this content can be located in a different workspace or even in a different computer system anywhere across the Internet. The information (coming from each content source) is included in an index to allow quick searches from the dashboard site. Moreover search efficiency is improved by enabling a user to search across multiple information sources at the same time, regardless of their location. A reader can use the dashboard site in order to: conduct *Search Queries*, access content sources, perform *Full-Text Search Queries*, find information based on *Document Profiles*, browse *Categories*, browse the *Document Library*, create *Subscriptions*. *Document Profile* based queries are applied on basic document properties (keywords, author, etc), web discussions related to a document or even document content itself. These features allow the *SPS* coordinator (*eLC moderator*) to direct users to the most appropriate method for finding information based on their knowledge and skill level. Also *SPS Document Management* features are worth mentioning. Within typical systems, large and complex information sources, such as a collection of file shares, can be difficult to use and navigate in, because there is little or no organizational framework to direct users. File shares, for instance, provide only a hierarchical directory structure as a means of organizing content (due to ftp protocol usage). There is only one navigation path to any given document, and users must know the name of the server that the document is stored on, in addition to the directory structure of folders on the server. It may be

difficult to control access to documents, and publish them within the system. Important documents can also be lost, overwritten, or hard to find. A *Electronic Learning Community* based on *SPS* features offers a number of document management options such as ***version tracking*** to record the history of documents and avoid accidental overwriting by other users. Documents are being *checked out* in order to be processed and *checked in* when finished processing. Application of identifying any document by using descriptive, searchable and customisable information (***metadata***) pertaining to the document. ***Document publishing control*** is feasible through automated approval routes for documents to be sent to reviewers, thus preventing access to semi-finished assignments by unauthorized users. Likewise a moderator can "force" all involved parties at least to take notice of important documents. ***Web discussions*** for online commenting by multiple document reviewers are also supported. Control of ***document access*** based on *Roles* as well as *Access Control Lists*.

- Advanced services

Various modules are implemented within *eLCs* in order to serve comment exchange and logged discussions between users, such as fora, chat, mail. Specifically fora are managed by an *eLC moderator* who usually initiates discussions by topic, for the users to participate. This implementation is inefficient making information illegible, as all discussions are accessed through the same web page, usually apart from the subject (e.g. document) being commented. Modification (if needed) of a discussion content is achieved through html page editing. Within *SPS* a new concept of *Web Discussion* is introduced. These are threaded discussions pertaining to the object they refer to. Thus the comments are visible with the object they relate to with no further searching needed. The moderator can modify discussion content easily (just two mouse clicks are needed), through his web browser. Likewise user activity and participation to discussions and collaborative tasks can be observed in a glance, while there could to be ways to log the user's activity while on line through the *Web Discussion* service of *SPS.*

- Process automation

Means are provided in order to fully automate certain processes, deriving from *SPS* technical features. Its integration with applications used every day by common users, such as Office applications and browsers, contributes to usability enhancement by making content accessible through these applications. So that one can use a web browser, as well as Outlook for that matter, gaining access to automated announcements services. A simple *copy-paste* action can be used so as to publish information in the form of an announcement, making it instantly viewable to everybody needed. Also an automated calendar service is applicable, ideal for making arrangements between users during a *Collaboration Task*. Appointments for online collaboration are agreed through simple email messages, with the system providing methods for specifying the best time suitable for all parties involved, even automatically launching the required application (e.g. netmeeting). Simplified procedures for publishing material (like excel tables, word documents, html pages) are substantiated, as easy as saving them to a local disc (using the *save as* or the *copy – paste* function). A discussion can be triggered about any object (file, folder, space) within the system by anyone, assuming the coordinator (*moderator*) has applied proper authorizations.

- Effective Moderation of educational activities

One of the most complicated and sophisticated tasks within an *eLC,* is the ***moderation*** of communication among users and dissemination of the acquired, within the system knowledge. Usually this is done by a *moderator* or through automated processes. Moderation might include ***Communication Management*** (management of tools such as chat, fora, whiteboards, structuring discussions, deepening the dialogue, visualizing the links between the messages, extracting intelligently the meanings of discussions, writing texts such as summaries and comments), ***Coaching Collaborations*** (following up the tasks and the work progress, helping the decision making process, following up unanswered questions), ***Content Management*** (reporting on the content and the progress of communication and collaboration, summarizing the discussions),

Knowledge Management *(*fostering the awareness of the progress by modelling the new knowledge, updating the *Knowledge Base*, disseminating the acquired knowledge), the promoting and encouragement of ***Educational Interactions***, even ***Information Maintenance***. The advanced features of the proposed system that where previously described relate to many of the moderator's tasks. As previously mentioned, an *SPS* coordinator can effectively manage many of the above mentioned sophisticated tasks by taking advantage of the advanced features provided.

5. Conclusions

Basic build-in modules and services exist in all common web-based educational systems. In an ***Electronic Learning Community*** more specialized services are needed, in order to implement more sophisticated pedagogical theories and models. Unfortunately, certain problems (of a higher level than those of common systems) are often encountered in *eLCs*. Even lately issued, modern platforms appear not to solve several of the above mentioned drawbacks or the solutions implemented are not optimum. We believe that our proposal of an *e-Learning Community* built upon a Web-system that is based on the *SPS* software platform provides us with several means that can help us cope with most of the problems encountered in such cases and effectively implement complex tasks such as the moderation of educational activities within such a learning environment.

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