

## Implementing a Web Content Management System for an Educational Institution

Alexandru SIRETEANU, Dinu AIRINEI, Ioan ANDONE, Daniel HOMOCIANU  
Faculty of Economics and Business Administration,  
"Alexandru Ioan Cuza" University of Iași, România

*Web content management (WCM) systems, as a branch of content management (CM) gained importance during the Web explosion in the mid-1990s. More and more Web administrators came to the same conclusion: the Web content needs to be managed all over the content life cycle, static HTML pages are time consuming to maintain, and a lot of Web content from our faculty website can be recreated effectively. Content management solutions try to make web content more usable to the user community of the Faculty of Economics and Business Administration Iași, thereby simplify the process of creation and publication of personal Web pages along with reducing the time and cost of content management. The critical objective of publishing Web content through the use of this WCM system is to automate the entire process of writing and publishing content. This can be done by integrating easy-to-use Web authoring tools with a large database of information resources, while ensuring that users receive well-managed and current information with a consistent look and feel.*

*Content management can be defined as the process of collecting, organizing, categorizing, and structuring information resources of any type and format so that they can be saved, retrieved, published and updated in any manner required [Warren, 2001]. Content management covers a broad spectrum of areas such as document management (DM), knowledge management (KM), records management (RM), electronic content management (ECM), financial content management (FCM), and Web content management (WCM). Web content management is one of the branches of content management.*

**Keywords:** *web content management system, document management, electronic content management), financial content management.*

### **B**uilding an web content management system

Developing a WCM system requires specification and design, project management, technical leadership, database and server administration, development programming, documentation, user acceptance, quality assurance, and user training.

#### *Choosing the technology*

CMS interface will be based on a web browser and this gives the quickest and easiest route to CMS creation and deployment. CMS needs to be written in an environment that is web-focused and able to integrate with databases and file systems. There are a large number of approaches available for web content management, they are mainly based on different platforms and technologies and the most important are briefly described below [Suh., P., Addey, D., 2003].

ASP - Any machine running IIS (Internet In-

formation Server) on Windows comes with ASP installed, making it an easy choice for companies to use for their web systems. There are ASP engines for other platforms, but they are not as reliable or as fast as the cross-platform alternatives such as PHP and Java.

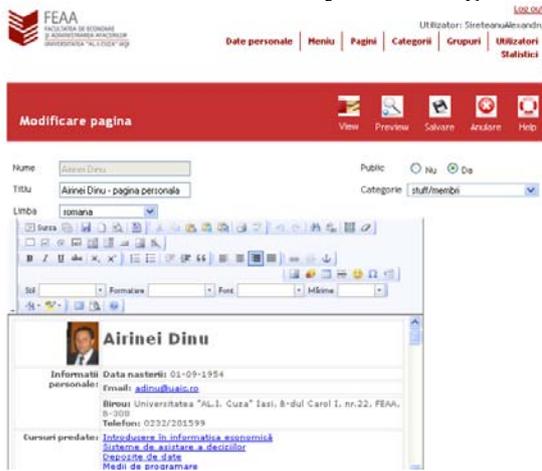
Java - Java is well-supported and may be the right choice. Choosing Java will give us access to a variety of existing open source content management tools. Although this has benefits for large projects, it can be complicated for web system development.

PHP - PHP is a widely used general-purpose scripting language and it can be embedded into HTML pages. PHP is free, cross-platform and it has many useful features built in by default (like functions list). PHP fits most naturally in conjunction with the Apache web server, as well as other web servers such as IIS and it is well-supported

on Unix, Linux and Windows. Its open source nature means that new web features are quickly integrated into PHP, and most add-ons are free; for this reason we use PHP for developing Faculty of Economics and Business Administration Iași WCM system.

*Engineering Interface*

An important aspect to be considered when developing a WCM system is to keep the interface usability all the time. Providing a WYSIWYG (what you see is what you get) editor may be the most familiar interface for your users, but it is recommended to not give authors too much flexibility over design.



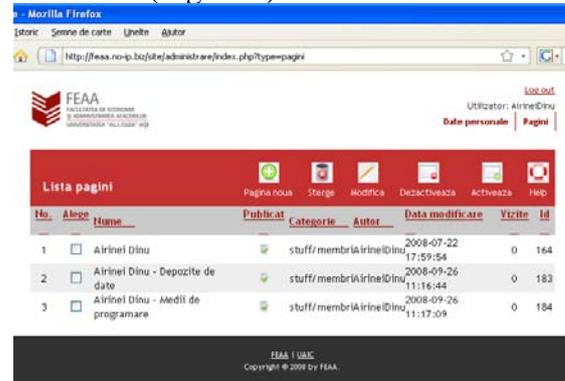
**Fig.1.** WYSIWYG editor for the academic content of FEAA

It is much better to allow authors to assign named styles (such as "Subheading" or "Section title") to their text rather than to give them complete control over how their text will look (Figure 1). WYSIWYG editor used in this case is FCKeditor, available at <http://www.fckeditor.net/>. Authors need to be able to add metadata to the page. This will include information such as the page title, page description, and keywords. For this reason we use in our WCM system the text fields "Nume" and "Titlu" (Figure 1).

*Site Structure*

There are several different approaches to site structure management to consider. The approach we choose will define how to store and structure pages within WCM system. The simplest approach to site structure management is to split the site into several predefined sections. Thus, each section will allow

the author to build a list of pages, and decide how those pages should be ordered in a one-level index (Figure 2).



**Fig.2.** List of pages for an author

*Link Management*

The authors will need to add links to their pages. A better solution that we use is to present the author a list of pages in the site and ask them to select a page to link to. This link is stored as a reference to the page's unique identification number, rather than its current URL (Figure 3).

In this way, when a page is moved to a new location, the link can be regenerated based on the page's new location.



**Fig.3.** Link management

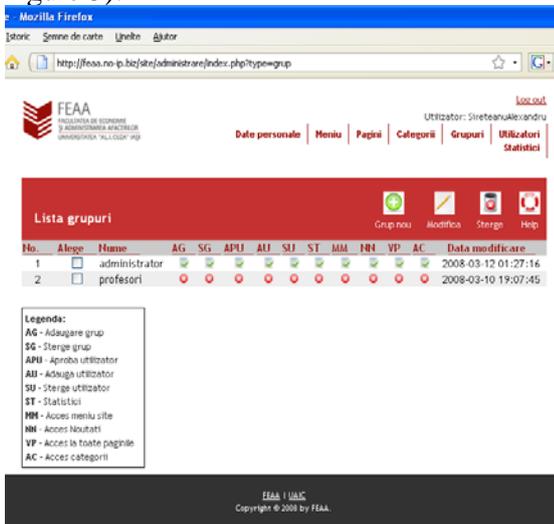
*Site Search*

Searching is an essential feature when users want to find a particular content. The most important form of searching is searching the content that authors have added to the WCM system. If authors added <meta> tags to their pages then the search can include these fields as well as the content on the page. All of these elements to be searched are simply text,

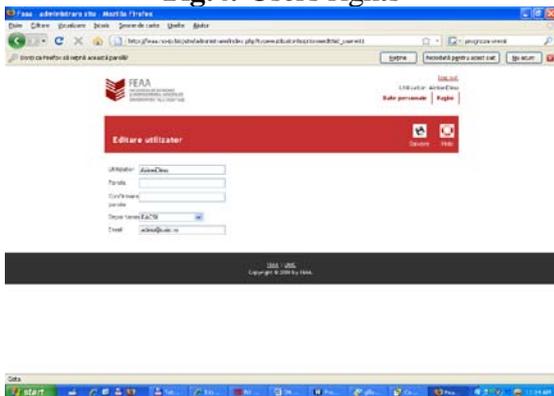
stored in the content repository. On FEAA WCM textual content is stored in an SQL database you can use an SQL SELECT statement to search for keywords within the content.

*Users and Their Rights*

For user's rights we use a session-based system to track an author's identity. Access rights are assigned to a variety of roles. This gives a much more flexible approach to user access management (Figure 4). The WCM system store a user's e-mail address with their details; if e-mail addresses change, user's unique identifier will remain unchanged (Figure 5).



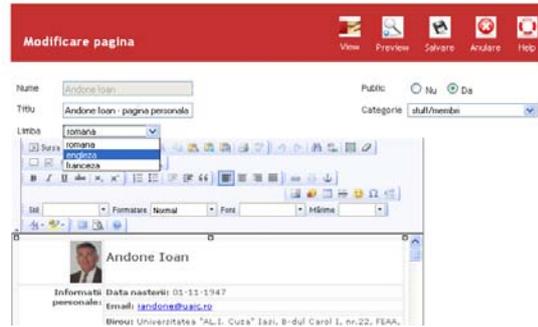
**Fig.4.** Users rights



**Fig.5.** Users details

*Multilingual Content*

The content must be managed in several languages. If international text and character sets are used, we must consider Unicode (<http://www.unicode.org>) as the best choice. WCM system store copies of a page in multiple languages as we can see in the next figure (Figure 6).



**Fig.6.** Multilingual content

*Versioning*

Simple page versioning can be added to WCM system by storing a new copy of an edited page in content repository each time an edit is made. It is not required to store a new version of a page each time the page moves to a different stage of a work or a version number with each new copy; it is imperative to store the full date and time of the edit.

*Performance*

WCM system may require a lot of page generation, which may in turn generate a lot of load on server. There are several ways to reduce the impact of this factor and improve the performance of your system. One of the simplest ways to make the system faster is to caching of pages. Caching is a way of improving a web page performance by saving the executed version of a page as a static file. This allows the server to handle multiple requests for the same page with only one execution of the PHP script. Caching can be applied to any type of content provided to the browser by the server but it is very useful to use it with template pages. FEAA WCM system uses this kind of caching aided by Smarty (<http://www.smarty.net/>).

**Implementation**

Another major improvement of the FEAA's web page is that, in tandem with the novel graphical, content features and modules, the site administration of the web site has been conceived having as target the educational component.

*Teachers Module*

The FEAA's WCM allows registered users to create new web pages, modify the existing ones as well as to modify one or multiple

pages at a time. All pages will have optional choices such as published/unpublished (when the web page is temporarily under construc-

tion or the administrator doesn't not show it), as well as possibility to modify pages by individual users or user groups (Figure 7).

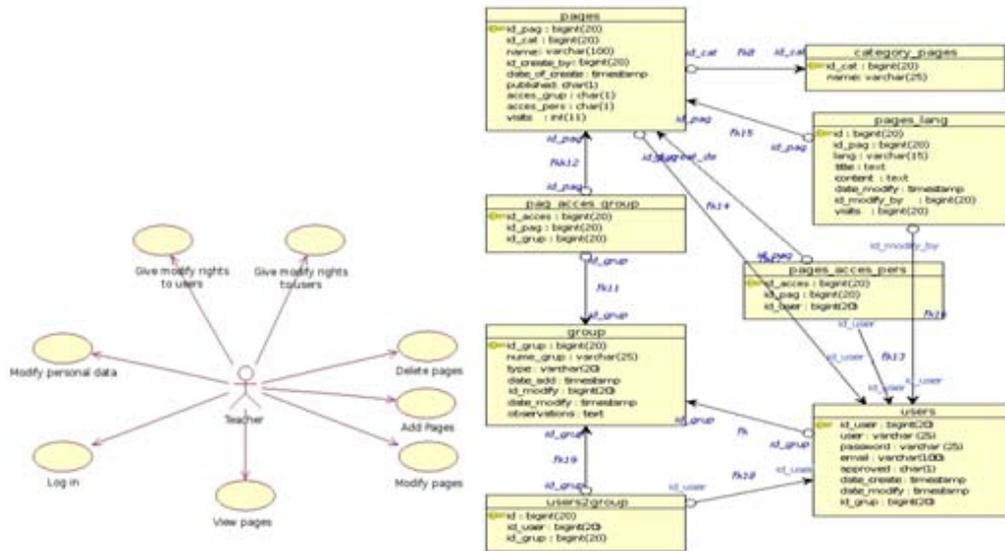


Fig.7. Use case diagram and database schema for Teachers

Another major improvement of the existing design which is targeted in the near future is the practice module for students. Students need to practice their theoretical knowledge and need jobs where they can develop their skills and accumulate expertise. At the other end of the spectrum, companies scrutinize continuously the existing students trying to recruit those whose experience fits the company's need and hire them after graduation. By designing this new module, we will enable both students and companies to be in contact, where companies can present their job offers (full time, part time jobs or summer programs, etc.) and students can present their educational and professional competence which will enable them to eventually land a job in these companies.

**Conclusions**

A growing number of non-media or organizations deal with the problem of how to manage their content. Educational institutions are using documents and audiovisual lecture material that has to be managed. Museums, towns, and cities have to manage a growing volume of content that needs to be conserved. To move into this space, they have to manage the media and information they want

to offer.

Content management is no longer a viable option, given the complexity of information access and retrieval. To meet the above mentioned needs, content must be organized in a content management system or application to ensure that it is managed effectively, retrieved easily and delivered in different formats.

**Bibliography**

- Andone, I., Sireteanu, A., *Strategies for Technology-Based Learning in Higher Education*, [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1078829](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1078829), 2007
- Sireteanu, A., Bedrule-Grigoruta, M.V., *Perspectives of Knowledge Management in Universities*, [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1029990](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1029990), 2007
- Suh, P., Addey, D., *Content Management Systems*, Glasshaus, 2003
- Warren, R., *Information architects and their central role in content management*. Bulletin of the American Society for Information Science and Technology, 28(1), 2001