Managing memory institutions portals: from HTML to CMS and towards applications in XML for multi-platforms

Pere Báscones*
C/Francesc Ribas 72,
4 2ª, 08400 Granollers, Spain
E-mail: pere@bascones.com
*Corresponding author

Cèsar Carreras
Dept. Humanities,
Universitat Oberta de Catalunya,
Avda. Tibidabo, 39-43,
08035 Barcelona, Spain
E-mail: ccarreras@uoc.edu

Abstract: Our research group, called Òliba (http://oliba.uoc.edu), has been carrying out different projects for museum portals in the past years. There has been evolution in the cultural operators demands, from static HTML in which they did not want any direct involvement to Content Management Systems (CMSs) for direct administration. Actually, dynamic contents such as agenda, activities or exhibitions have brought about such trends towards a more direct management of the website. It was decided to adapt some free software CMS such PhPNuke or Joomla! in order to avoid the enormous effort that is required for every single new development.

Keywords: museum; portal; CMS; Òliba; Content Management System; CMS; exhibitions; memory institutions; culture; cultural tourism; heritage; ICT.


Biographical notes: Pere Báscones is a Graduate in Arts from the University of Barcelona, and a Postgraduate in Design and Usability in internet from Escola Elisava (Barcelona). He is member of the group Òliba (UOC) and is currently pursuing a PhD on New art creation in internet.

César Carreras has been a Junior Lecturer in the Department of Humanities of the Universitat Oberta de Catalunya (UOC, Spain) since 1997. He holds a PhD in Ancient History (1995) from the University of Barcelona (Spain), another PhD in Archaeology (1994) from the University of Southampton (UK) and a MSc in Archaeological Computing (1991) from the University of Southampton (UK). Currently, he is lecturing in Computer Applications in Humanities and Ancient History at the University. He is coordinating and taking part in different European projects such as COINE (Cultural Objects in Networked Environments), SEE Arch-Web (an interactive web-based...
1 Introduction

In recent years, there has been a major change in the creation and maintenance of memory institution portals (museums, archaeological parks, archives) on the internet. Initially, memory institutions placed orders for such functions on external technological firms, which were responsible for designing their site and maintaining the contents, without any personal involvement. Nowadays, museum staff and curators prefer to directly manage all the website contents and update them regularly.

Our research group, called Oliba (http://oliba.uoc.edu) have been carrying out different projects of museum portals in the last years. It has been realised the evolution in the cultural operators demands, from static HTML in which they did not want any direct involvement to Content Management Systems (CMSs) for direct administration. Actually, dynamic contents such as agenda, activities or exhibitions have brought about such trends towards a more direct management of the website. The initial CMS projects of the group Oliba were matched with individual museum requirements; however, such requests were changing over time.

Then, it was decided to adapt some free software CMS such PhPNuke or Joomla! In order to avoid the enormous effort that required every single new development. Success of such applications rather depends on how such new tools are integrated into cultural operators’ every day’s work. We have tested different experiences with CMS with regular success in which small institutions have taken the lead. Using CMS has allowed them to have a powerful communication media to those small-size centres.

The next stage is the convergence of media. The idea is to generate CMS with information tagged in XML with some systems to transform such contents to be used by multi-platforms. In other words, similar content employed in some sections of the website can become contents in a DVD, a paper catalogue, text in an interactive TV programme, content in a permanent kiosk or itineraries of PDAs. Some prototypes were created for didactic university materials (project Myway – http://www.uoc.edu/in3/myway/), and we are currently adapting them to be used in memory institutions.

2 Museum portals: dynamic spaces reflecting museums activity

In the year 1994, the internet was born and, immediately, the first museum with portal applications was the Exploratorium of San Francisco, the first pioneer institution to disseminate museum content through the internet. After more than ten years, most museums have been incorporating their content on the internet as a natural phenomenon. According to some authors, such as Bertuglia et al. (1999), presence on the internet will become necessary for the survival of small and medium-sized centres that will otherwise be invisible to the general public.

Without agreeing with such an extreme assessment, it is clear that the internet has brought new possibilities to centres of minor size, since the general public can
become aware of them with a single search. In a period in which cultural tourism seems
to make travel agencies redundant and the internet has become a means to book
accommodation, transport and itineraries, it appears that presence in internet is
imperative (Mills and Law, 2004).

The first museum portals on the internet were a mere digitisation of basic
documentation that provided informative leaflets of any institution, with timetables,
addresses and contact telephones. The potential of internet was unknown at that time,
and it was simply employed as a marketing space for any institution. The first visitor
studies of museums on the internet by Teather and Willhem (1999) revealed that users
were disappointed by such portals, which only included leaflet information.

If a classification was made of different levels of museum portals, three general types
could be distinguished that could correspond to evolution phases of portals over time:

- **Electronic leaflet.** This category includes portals that show minimal information to
make any presentation visits to institutions easy. Therefore, they only provide details
on timetables, accesses and minimal documentation about contents. In some way
they reproduce the contents of a museum leaflet, and they have as their main aim a
minimal presence on the internet (Carreras, 2004; Redondo and Carreras, 2005;
Carreras and Redondo, 2006).²

- **Informative space.** This second category of portals is defined by a great amount of
information about a museum, its activities and sections. It is designed in relation to
that segment of the public to whom the contents of the institution may be of interest.
These could be either those that will be able to visit it or those who will only know it
virtually.

- **Interactive space.** This third category consists of portals that, apart from containing
a great volume of information, are designed with the aim to satisfy learning or
experimenting with the virtual public. It takes advantage of the media,
in this case the internet, to develop a presentation of contents in a different
way (i.e., cypermuseography), complementing what can be offered as presentation.

Nowadays, most museums have already their own portal on the internet. For instance,
81% of museums in Catalonia (Spain) in 2006 had a presence on the internet, though
there are some provinces such as Girona or Lleida that go beyond 90% (Carreras
and Redondo, 2006). However, only 35% of them are managed by the own museums,
while most of them are subcontracted to firms in the sector.

Of course, most portals are still simple electronic booklets that pretend to give
a minimum visibility to any institution. The institutions can take full advantage of the
media only after they create informative and interactive spaces, which compel museum
staff to put in extra efforts.

The initial projects of group Òliba looked for some degree of involvement with
cultural operators with the aim of allowing them some kind of content updating
(Carreras and Munilla, 2005). At that time, it was possible to foresee some dynamic
spaces, such as agenda or activities, which required the update of HTML templates.
At the beginning, this task was reserved for museum staff, though the experiences were
not as good as we expected them to be.

Therefore, if the internet is perceived as a new means of communication, the
ideal scheme for its application in the museum would be as follows (Carreras, 2005)
(Figure 1):
One of the first portal projects undertaken by group Òliba was the portal of the Barcelona Botanic Gardens (http://oliba.uoc.edu/jardi_botanic) (Figure 2). The portal played with Botanic gardens maps that identified different Mediterranean climates in the world and the species that lived there. Besides, there was a section for games for kids, and other sections that combined art with flowers (Carreras and Munilla, 2005, pp.240–253).

The web structure was designed keeping in mind stable contents, but including from time to time new files of plants and cultural sections. Initially, we realised that such a portal facilitated communication with different groups of people interested in its services (students, friends of the Garden, visitors …), so more dynamic spaces were required to update timetables, news, agenda or activities. Working on the possibility of updating such sections, a series of HTML templates were created for the Botanic Gardens staff, so they could change content by sending new files to the server by FTP. The first HTML templates were designed more from the web designer’s point of view than the users’ point of view, in this case the Botanic Gardens staff. A high level of graphic design in pages based on frames could complicate the update if one wanted to respect styles sheet.

Unfortunately, such updates never took place due to staff problems with the HTML edition and sending files by FTP. Therefore, a second version of the portal was needed from the start in 2001. Finally, the Barcelona City Council, to which the Gardens belong, wished to manage the second version directly.

In the same period, a new portal project began. It was the Boi valley portal (http://oliba.uoc.edu/boi/portal) (Carreras and Berni, 2003), in which many different
institutions worked together in a model called a galaxy. In this model, every institution provided contents and managed their own sections that could be also located in their own server.

Thereby, the Tourism information of Boí valley was responsible of updating addresses and references, and fees for accommodation in the valley. Updating of content was carried out by editing some HTML templates and sending them to the local server located in Tremp. Other dynamic sections were a digital journal, to be edited by secondary school students from IES of Pont de Suert, again by updating HTML templates and sending them by FTP. This proposal did not work, neither did the second one that was based on a formula related to a MySQL database with attached files. This experience was the first attempt to create a personalised CMS and became a first breakthrough for other future applications in the cultural heritage of group Òliba.

3 Sorting out complexity: new requirements

As soon as cultural operators became aware of the potential of the internet as a communication medium to explain contents and disseminate the existence of their institution, their demands became more complex. Most new demands were related to the creation of dynamic spaces that could be managed directly by them. Such demands looked to be quite reasonable, though the problem arose when adapting spaces and tools to make the management of their requirements easy and flexible.

Thereby, group Òliba has developed, since 2003, a series of tools to directly manage those dynamic sections of any of the portals in which the group was involved. This is what is known as content manager or CMS. In fact, they are tools used to manage and create web content in a simple way (Cuesta and Minguillón, 2004). Content management is carried out by the cultural operators themselves through access to the reserved area by user id and password (see Figure 3).

Figure 3 Image of the structure of the group Òliba Content Management System (OCMS) (see online version for colours)
This CMS scalable created in PHP with databases in MySQL, had a series of tools that solved some of the standard problems detected in cultural centres.

So, what were these requirements? The following relation appears to answer this question:

- **Access statistics to website.** From the beginning, group Òliba was evaluating visitors' response to portals through website statistics (logins), as well as visitors’ itineraries. Two programmes were in place, Webalizer (prog. 1) y Awstats (progr.2), with complementary models such as GEO-IP to identify visitors’ origin. These kinds of data have become interesting for cultural operators, who can consult them interactively.

- **Visitors’ questionnaires.** Another source of information to evaluate the success of portals is visitors’ questionnaires. It is a tool that allows us to easily generate any kind of questionnaire as well as download results for further analysis.

- **News/activities/agenda.** Every centre has some kind of information that it wishes to disseminate to the community of visitors with ideas for presentations or even the media. Such sections are organised as formulae with a little text and possibilities of adding images and attached files (.pdf or .doc).

- **Month’s object.** A common demand is the possibility to highlight one object every month, including a short description file. This section is also solved with a simple formula that allows its corresponding image.

- **Recommended links.** Recommended links to other similar institutions, whose contents are comparable to the current institution.

- **Newsletter.** The need for a more constant communication to virtual visitors facilitates the creation of this service. Every virtual visitor may subscribe or unsubscribe to a database in which he/she will only provide his or her e-mail. From a standard e-mail editor, cultural operators can send news and attached files to all the subscribed members of the institution database.

- **Guestbook.** Tool that allows departing visitors to express their opinions about the website or other issues. It may generate problems associated with spam (marketing messages).

- **Forums.** Tools have been adapted to generate virtual forums, though they have not been used so far.

Of course, there are many other new tools such as the ones that allow creating virtual communities (as in the case of Educathyssen – http://www.educathyssen.org/), blogs or wikis that have not been included so far in this CMS.

The first applications of this suited CMS began with the Boí valley’s own portal, as well as two new projects such as the Catalan Immigration History Museum portal (http://www.mhic.net) and the Lleida Museum portal (http://www.museudelleida.net) created during 2004 and 2005. All these projects detected fixed and dynamic sections; the later ones were adapted with the CMS.

In the case of the Catalan Immigration History Museum portal, the initial version came from a European project called COINE (http://www.uoc.edu/in3/coine/eng/index.html). The project aimed to create a virtual archive in which any
visitor could include his or her personal story as well as tag it for a later search (i.e., thesaurus, ontologies). In fact, the virtual archive became part of the collection of memories of the museum. The application developed in the COINE project never managed to work since the interface was extremely complex for a virtual visitor without technological background. Therefore, it had a low degree of usability for old people, who were supposed to be the main users, including their life stories. Any living stories (work conditions, rural world, immigration, war experiences) were suitable.

**Figure 4** Catalan immigration history museum portal (see online version for colours)

![Image of the Catalan Immigration History Museum portal]

Apart from the virtual archive (Figure 4), the Catalan Immigration History Museum portal included, from the beginning, a series of dynamic sections updated by the museum’s cultural operators. Amongst other things, they manage a section with recommended links, agenda and newsletters. Furthermore, they could visualise all information related to access statistics (logins), and even create their own questionnaires to virtual visitors.

Despite the fact that the experience was positive as an excellent means of dissemination and communication with a widespread public, cultural operators wish to become autonomous in managing their website. They aim to convert all the static sections in dynamic ones and helping with suggestions to improve some functions to make them more flexible than they are now. For instance, they wish to distinguish the museum’s own agenda (every term) from other particular activities and, even, the activities of other centres. Besides, they wish to have full control over when news should appear and disappear. In this sense, the portal attempts to find a balance between sections of information that can be run by museum staff, and fixed ones that disseminate contents of either objects in collection or exhibitions. These fixed sections use sometimes flash animations that make contents more visual and attractive for the public.
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Similar to this experience is the Lleida Museum portal (http://www.museudelleida.net) (Figure 5), which had an initial design with only fixed sections that had general museum information, as well as collections and exhibitions. Meanwhile, there were sections such as agenda, recommended links or newsletters, which were managed by the museum’s own staff.

Figure 5  Lleida museum portal (see online version for colours)

After finishing a first version of the portal, the group Òliba is constructing a new version that moves from static to dynamic sections. Sections that will be changed include the month’s object, museum services, educative resources and a journal. As soon as cultural operators become more comfortable with technology, they want to get more actively involved in content creation, and also adjust them to technological changes and their own institution.

The last project with Òliba’s CMS is a graphic archive portal, ‘Images of Traiguera’ (http://oliba.uoc.edu/traiguera) (Figure 6), which describes everyday life in the little town of Maestrazgo (province of Teruel, NE Spain) through graphic memories obtained from a local magazine. In this case, archive contents as well as photograph texts and contextual narratives are organised in a database. Besides, the website includes its own newsletters, guestbook, questionnaires etc. So far the project has changed in the last two years since those services fulfil the responsible requirements.

In this sense, it is becoming more difficult and expensive to personalise our CMS to cultural operators. Therefore, the most effective solution consists of adapting content management programmes to museums’ demands. This is the present phase on which we are focusing as a research group.
Towards adoption of standard Content Management Systems (CMSs): the option of open source

More often, CMSs are adopted by users and small institutions. Thanks to these standard CMSs, they can access friendly and very complete tools to generate their own websites and disseminate contents on the internet without much trouble. In our case, the group Òliba has a Debian web server based on Linux; it uses MySQL databases and program languages such as PHP and PERL. That is why it was decided to employ open source CMSs.

Today, there are many open source CMS in the market and Internet with different applications and features. Cuerda and Minguillón (2004) provided a first comparison of products at the end of 2004. Amongst those products, they include OpenCMS, PHPNuke, Mambo, Joomla!, Type3 or Moddle.5

The CMSs generated according to the open source philosophy allow access to a free accessible product for which no license is required. On the one hand, the philosophy of such kind of software searches for a widespread distribution, and in the cultural context represents advantageous solutions that only require adapting them to each project.

These types of applications are the result of volunteer programmers who develop diverse projects from all over the world. In this way, their products can compete with specialised software brands. However, they have neither the guarantees nor the technical support that a standard manufacturer can offer.
In some of the mentioned CMSs the number of people involved not only makes versions improve but also increases the number of sub-programs created for them. Most of those portals are based on a root program, to which different modules or components are applied. Thereby, they enhance the potential and specialisation capacity of each project.

From the group Òliba we are experimenting with different CMSs in an attempt to find the best tool for adapting to the requirements of projects related to museums or cultural centres. The CMS allows project personalisation, since it contains a series of functionalities to be used in a modular way.

Before the beginning of CMS, portal projects were undertaken on purpose, so it is a waste of time since it requires programming from scratch (this is the Boí valley’s portal). Therefore, the works consist of adapting the graphic design to each new project, and taking advantage of system potential, which becomes a remarkable headway in terms of time and resources.

The most complex task involves knowing the tool with all its advantages and weaknesses. It can be adapted to special requirements, or even improved in specific cases. From this viewpoint, the programmed code is less than the one involved when programming from scratch. Besides, the modules or applications developed are offered free to the users’ community following the same philosophy of open source movement. Therefore, it contributes to improvement of the final product.

5 The most common options of CMS

Portals are generated from a framework, or support structures on which a software project is developed sharing libraries, databases, and organisation structures. There are multiple options that offer any CMS. Some are quite specific, to which can be added the ones developed by the community of programmers who take part in different projects. Nevertheless, focusing on the most popular ones, the following options stand out:6

- **Users manager and resources permission manager**
  - It is a system to register users with permission to access to a portal. The basic data are name (login) and password (password), together with e-mail and full name. Administrators could establish groups of users with different content editing permissions. In Joomla! profiles go from registered user, author, editor and publisher in the public part, and manager, administrator and super administrator in the administration section. Users’ systems can be increased with personal data in agenda format. This register may help to create real communities, if it allows searching for specific data, especially when they are complemented with systems of internal mail. Normally, users are registered in the home page, including name and password. This allows them to access to the users’ menu, which includes the functions of sending and editing contents.

- **Web design templates manager**
  - Basically, this consists of a manager of different templates of HTML pages and CSS style-sheets. This function can become public, allowing registered users to see the webpage according to the graphic design that they prefer from a list of preinstalled templates.
Languages manager

- It consists of a portal languages manager. A language that appears in the portal from the pre-installed languages can be selected. It is a translation of all the fixed parts of a portal and not of the dynamic contents. That is why a CMS requires spaces to put contents in different languages.

Files and documents manager

- This is a complementary module that allows sending and classifying files for users’ download. Some of these managers may limit document access according to the privileges of each user group or provide free access. Normally, they can limit the type of documents available, depending on their size.

Image manager, including the possibility to create galleries

- This option is similar to the previous one, but it is a module for sending digital images and classifies them in galleries. It allows not only providing a name for an image but also tagging it with keywords. The most sophisticated ones include slideshows and personalised lists by users. The system generates small reference formats (thumbnails) that appear in the list. Some image managers allow creating real communities of users and some follow the examples of popular image managers such as Yahoo, flickr, which allows sharing galleries and images.

Published text manager with confirmation systems according to types of users (like blogs) and classification according to categories, publication dates, visit numbers or votes

- Content managers follow a blog pattern. Basically, it consists of sending texts as news, to which images can be added. News is automatically classified by publication date, categories and type of section. As a complement, news can be commented upon, once published, by readers, and their comments are added at the end. Normally, news can be voted for or against, and the numbers of accesses and votes can be visualised. These tools for voting and comments establish excellent mechanisms for community participation. Finally, some managers have options of printing or sending news by e-mail or becoming automatically electronic documents, such as Adobe Acrobat pdfs.

Blogs and blog manager

- It consist of a type of system that, apart from publishing news, as the previous function, generates a blog for a user who wants one. In this way, the system becomes a kind of newsletters manager.

Agenda manager

- Agenda helps to administer a series of public and private events, which become visible from a calendar or list. There are different types, from complex ones that imitate software such as Outlook or Notes to the simpler ones.
• **Help systems**
  - Help system offers support to users from a series of frequently asked questions (FAQs) and these are related to the way the system works, with a postbox for e-mails.

• **Backup systems**
  - They allow generating backup copies of the database with all the portal contents. It is a very useful tool for exporting information.

• **Internal search engines**
  - It consists of an internal search engine that looks for a key word or words and returns a list of documents and texts with them. Some offer different alternatives of searching any of the words, all the words or exact sentence, or even searching with general search tools such as Google.

• **Mailing**
  - Some CMSs link users to an internal mailing system or they allow configuring e-mail pop to be accessed via the web from one’s own portal.

• **Mailing lists**
  - Mailing lists permit subscriptions to any users interested in receiving information. They only need to leave their name and e-mail. This list is used to send information, periodically, by the institution running the portal. The system allows the possibility to manage users requiring information as newsletters or agenda. Some packages allow having more information about users.

• **Links manager**
  - The links manager allows administrating and classifying a list of links to be published, and relates to the portal. It recommends web pages, sometimes very useful if it includes comments or votes or classification systems according to visit numbers.

• **Visits control and statistics**
  - Visits data and statistics derived (access time, type of navigator…) vary from one CMS to another and they can be complemented with modules. An interesting option is the one that not only shows the total visits, but the ones carried out during the day. Joomla! as well as other postnuke CMSs, have a module that allows knowing the number of users connected at every moment, so it can generate a list of users connected at any time. The non-registered users normally appear quantified as visitors.

• **Rating systems**
  - This system is related to the publication of text and news manager, but can also be an independent option applied to documents, pictures etc…
• **Syndication**
  • By syndication we understand a web content redistribution system. It is normally associated with weblogs or newsletters, but it can be done with any content. Syndication systems are based on offering contents in codified system tagged in XML, which records contents to be implemented in other pages or read by a reader without connecting to a webpage (feeds reader). It works as a kind of subscription. Two main families of syndication offered by most CMSs are based on RSS and Atom.

• **Capability of implementing modules and external components**
  • The capability of implementing modules and components makes CMS a continuing improvement of add-ons. Besides, it must be borne in mind that there will be a continuous improvement of new versions.

• **Forums**
  • Creating forums allows defining spaces of discussion. If forums are integrated in the CMS, users register messages in the forum. The way the forum works depends on its degree of complexity. The more complex ones offer any kind of statistics according to the use of each debate space, last messages received, active users, etc…

• **Chat**
  • It is a kind of function which is less popular due the turning up of different messenger programs. Some portals even offer that option and any user can enter anonymously into a chat space.

• **Editors of implemented wysiwyg text**
  • They are normally an internal tool. It consists of a text editor of different fonts without worrying about HTML code. There are different options, but some of them do not use a code based in HTML standards, so it may generate problems in accessibility controls.

• **Menus manager**
  • Menu managers at internal level allow creating portal managers

• **Manager of publicity banners**
  • Another option thought for managing publicity space (optional)

• **Manager and questionnaire creator**
  • Questionnaires are other types of tools that complement the participative offers of a portal. In the case of questionnaires, these can be created and closed in a particular time, allowing access to eventual results in numeric and graphic format.

• **Manager and formulary creator**
  • It is useful for managing particular entries of data. However, this is normally an advanced tool coordinated with the CMS at the database level.
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- **E-learning modules from a test a spaces for group working**
  - These tools allow creation of spaces for group working and little dynamics for tuition based on classified contents and auto evaluation tests.

- **Wiki pages systems**
  - Wiki comes from the Hawaiian word wiki wiki (quick) and it is also the name of hypertext pages that can be visited and edited by anyone (sometimes registration is required) in a quick and simple way. It is a tool for collaborative work over documents.

- **Guestbook**
  - In fact it is a comments system.

- **Automatic map of the website**
  - It is a schema of the website based on the hierarchy of links and menus.

6 Standards and accessibility

One of the issues pending in most portals is the fact that they are not strict enough with regard to standards defined by the world wide web W3C consortium. For a long time, no one bothered about this subject; however, digital convergence of formats and multiple platforms of web access have changed the scenario. Nowadays, codes, written with conformity to standards, guarantee suitable conversion of web pages to different platforms. A good design system, scalable and enlargeable, is the first step to high degree of accessibility according to specifications of the working group WAI (Web Accessibility Initiative).

Accessibility is the second issue pending with most of those portals. Web accessibility is the access capacity to any user, despite possible handicaps. It is a subject related to usability and follows a series of specifications that allow users better access. Furthermore, this year public administrations ought to fulfil the Web Content Accessibility Guidelines (WCAG) at level A. This involves adapting the websites of many museums.

Summing up this document, the text contains 14 guidelines with design solutions. The guidelines contain also some control points. Each validation point is assigned to one of three levels of priority established by the guidelines.

- **Priority 1**: They are those points that the web developer should fulfil, because, otherwise, some groups of users could not access to the web information.
- **Priority 2**: They are those points that the web developer should fulfil, because, otherwise, some groups of users may have a difficult access to the web information.
- **Priority 3**: They are those points that the web developer should fulfil, because, otherwise, some groups of users would experiment some difficulties to access to the information on the web.
According to these validation points, a series of levels of fulfillment are defined:

- **Level of fulfillment 'A'**: All the points of validation of priority 1 are satisfied.
- **Level of fulfillment 'Double A'**: All the points of validation of priority 1 and 2 are satisfied.
- **Level of fulfillment 'Triple A'**: All the points of validation of priority 1, 2 and 3 are satisfied.\(^9\)

With doubts it is a complex issue, since there are automatic mechanisms to validate design and accessibility criteria.

### 7 Some samples of CMS

Nowadays, among the Open Source CMSs the most popular are Typo 3, one of the first with great possibilities and new improvements in the last versions. One of the most outstanding features is that its code follows WAI specifications regarding accessibility. However, though it is quite robust it has a high learning curve due to its level of complexity. On the other hand, there is the popular PHPNuke from which other CMSs derive. Despite being the most common system and containing numerous components, it does not attract because it lacks the professionalism of graphic design.

PHPNuke has been used in one of the early portal projects of group Òliba, the Boí valley portal (http://oliba.uoc.edu/boi/portal). This is the CMS employed to update all the tourist information run by the Patronat de Turisme and the firm CITA.

The next most popular CMS is Mambo, which has evolved into another CMS known as Joomla!. This is a system that keeps a balance between the two mentioned earlier (Figure 7), and it is the one currently used by group Òliba in order to experiment with it. The large number of users and developers of this project makes for easy access to several functions, from small applications to continuous updates in different languages, including Catalan, Bask and Galician.

Nowadays, the group Òliba has a new version of the Catalan History of Immigration museum portal, made completely with JOOMLA! The reason is simple, the museum curators were keen on taking full control of as many sections of the website as possible and the best solution is to implement the whole site with a CMS like JOOMLA!

The portal of the Lleida Museum is undergoing the same process, and in the near future it will be accessible in the JOOMLA! (Figure 8) version for the same reason; museum curators wished for a more active role in editing its contents. Group Òliba is planning to evaluate how the museum staff manages to run portals with these tools, and also the strengths and weaknesses of such programs.

Besides, our research group is experimenting on new portals with JOOMLA! that disseminate cultural routes such as the Romanesque architecture in the Aneu valley in the Pyrenees (http://oliba.uoc.edu/daneu) or (Figure 9) the textile colonies of the Llobregat river (http://oliba.uoc.edu/textil) (Figure 10).
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**Figure 7** Tourism section by CITA in the Boi valley portal (see online version for colours)

Source: http://oliba.uoc.edu/boi/portal

**Figure 8** The Catalan History of Immigration museum portal in JOOMLA! (see online version for colours)

Source: http://oliba.uoc.edu/mhic_joomla
Such projects are still under construction, but the basic CMS configuration is already in place and the hardest task is to didactically treat the cultural content. Therefore, this is a task that can only be carried out by cultural operators.
8 Conclusion

As a conclusion, there are a myriad possibilities to adapt a CMS to the digital heritage field. Museums are still in an uncertain time of change. It is a suitable time to analyse different solutions and specific proposals that may generate large museums and international centres, some of which are working with the same approach. However, it must be borne in mind that every centre has particular requirements and the tools should be adapted to fulfil them.

References


Notes

1Group Òliba (http://oliba.uoc.edu) is a research group created in 1999 inside the Universitat Oberta de Catalunya with the main aim of evaluating ICT applications in memory institutions such as museums, libraries and archives.

2Most museum portals in Catalonia are of this kind. They provide simple descriptions of how to access to an institution (Carreras, 2004; Redondo and Carreras, 2005; Carreras and Redondo, 2006).

3Nowadays the portal has changed and the own Garden manages it with the collaboration of the Barcelona City Council.

4The programme Urchin has also been employed and may be employed in other projects in the future.
Some recent CMS open source programs can be accessed from the following address, http://es.wikipedia.org/wiki/CMS

In this case, we have employed CMS Joomla!

http://www.flickr.com

http://www.w3c.es/

Extracted from: http://www.w3c.es/divulgacion/guiasbreves/Accesibilidad