Importance of a content management tool inside a Learning Management System (LMS)

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Abstract. Over the past 25 years, Learning Management Systems have evolved tremendously. Use of eLearning systems in education is becoming more eminent every day. These tools may base on content management (CMS), learning management (LMS) or even a composition of the above (LCMS). However, none of these systems offer the possibility to users to assembly different contents under a single representation. Spiral Connect, the LMS created by University Lyon 1, fills this need providing a content management tool (CMS), called “Website”, inside its learning management context. This paper examines the importance of having a CMS inside a LMS, using the example of Spiral Connect. Data from all Websites created on Spiral Connect platform has been gathered and analyzed in order to show the role and the impact of such a tool in an eLearning system. These data were also used to analyze user preferences.

1 Introduction

Use of technology as a mean to enrich and evolve education process is not new. In the early 1920s, the first teaching machine was created by Sydney Pressey, a psychology professor at Ohio State University. It was a device that could be used to practice drills and administer multiple choice quizzes. Almost 40 years later, on 1961, PLATO (Programmed Logic for Automated Teaching Operations), the world's first computer assisted instruction program was introduced by the University of Illinois [6]. Since then, e-Learning systems have evolved to cover more than 60 percent of today's education. What started as a computer-based training (CBT) and computer-based instruction (CBI) gave its place to distance education, after the introduction of World Wide Web in the '90s, to become what today is described with terms such as web-based training (WBT), online education, virtual learning, m-learning, digital education etc. Introduction and evolution of Content Management Systems (CMS), of Learning Management Systems (LMS) but also of Learning Content Management Systems (LCMS), are undoubtedly main factors of this progress [9].

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University Claude Bernard Lyon 1, in an effort to participate actively in this evolution, launched on 2003 its own LMS, called “Spiral Classic”. Spiral Connected succeeded Spiral Classic as a response to continuous technology evolution and new eLearning challenges. Spiral Connect is a content delivery and management platform providing access to the entire training catalog of University Lyon 1, as well as to a large amount of educational resources. Spiral Connect being a LMS focuses on delivering online courses or training to learners, managing students but also keeping track of their progress and performance across different types of training activities. Nonetheless, Spiral Connect goes beyond that offering possibilities that fit the description of a Content (or Course) Management System such as placement and management of learning material online, associating students or student groups with courses, storing student submissions, mediating communication between students and instructors. However, Spiral Connect cannot be considered as a Learning Content Management System (LCMS) since its primary target users are training managers and instructors but also because a great part of the platform focuses on classroom management and instructor-led training [1;8].

Whether it comes to LMS, CMS or even LCMS, despite their impressive growth, all three of them have yet to implement a tool for the common presentation of a collection of different learning objects. They provide tools for visualizing and managing learning contents, but, be that as it may none of these tools can group and display different contents under one common layer [3]. Spiral Connect fills this gap providing a tool called “Website” giving users the possibility to group different learning objects (wikis, blogs, forums, courses etc.) and diffuse them dynamically under a common presentation layer. Figure 1 shows a visual representation of Website tool concept.

Figure 1. LMS with CMS layer (Spiral Connect)

The importance and the impact of having a content management tool inside a learning management system is examined, analyzed and measured throughout this paper using the example of Spiral Connect's “Website” tool. The second section of this paper describes the different functionalities of the website tool while in the third section we use the “Websites” created in Spiral Connect platform as a data set to measure the significance of such a tool in an eLearning environment.

2 Website tool functionalities

As its name indicates, Website tool can be used by teachers or students to build a website inside Spiral Connect platform. As such, it provides functionalities that allow structuring as well as personalizing the website.

2.1 Structure

When a new Website object is created, it is empty, thus it has no pages or content. Structure options allow user to create pages and fill them with the desired content. By creating a new page, a user has three options: he either creates a blank page, either embeds an already existing platform object page or creates a link to an external page.

In the case of a blank page, user creates a page providing a title and a content using a WYSIWYG editor. That way, content can contain plain text, hyperlinks as well as media (images, videos, sounds).

In the case of a platform object page, user creates a page by linking it to an already existing learning object inside the platform. There are multiple options here as a page can be linked to a wiki, a blog, a course, a forum, an assessment/quiz etc. This results to a dynamic presentation of the linked object inside the website as any changes made to the original object (e.g. new post in blog) are instantly available to the web page and vice versa. The above is very important as it allows user to assembly different content in order to create a complete and generalized object that he can later use as a training showcase website, a personal website etc.

Lastly a user can create an external page using a URL (Uniform Resource Locator), linking that way the external resource to his website page. Besides the creation of new pages, a user can also rearrange already created pages, edit them, delete them, publish/hide them as well as define which page will serve as home page.

2.2 Personalization

In personalization section of the Website tool one can customize the display of the website. Options are divided in the following eight categories:

- Layout: Including menu orientation (vertical, horizontal) as well as content presentation (column, floating frame, full screen)
- Background: Options such as background color, pattern, image etc.
- Banner: Background color, pattern, image etc.
- Footer: Background color, pattern, image etc.
- Menu: Font, color, hover and active color, text color etc.
- Advanced: Copyright, link with analytics account, advanced css rules
- Size: Website width, height and margin, banner and footer height etc.
- Templates: Predefined themes

Through these options a user can give the style he desires to website and by extend to any linked/embedded learning resource.

3 Usage Analysis

Having described the different functionalities of the Website tool it becomes clear that it can be used to create different types of websites such as:

- Layout: Including menu orientation (vertical, horizontal) as well as content presentation (column, floating frame, full screen)
- Showcase/portal websites, either personal (portfolios) or training/course websites but also event websites (conferences, congresses, presentations, BarCamps etc.)
- Informational websites
- Evaluation / Survey websites (for a training, a course, an instructor etc.)
- Media (photo, video etc.) sharing websites
- Communication / Discussion websites (blogging websites)
- Project websites (exposing a project application to students/users e.g. oscilloscope simulator)
- etc.

Spiral Connect users have created over 870 such websites of which 257 are public and available to all users. The rest of the websites are either test websites or websites that are still under construction.

3.1 Website classification

These 257 public websites have been analyzed and classified by type (showcase, informational etc.), context (training, course, research, event etc.) and discipline (biology, medicine, sports etc.) to answer some important questions such as who uses the tool, for what purpose, what is the object of the website etc.

The vast majority of the Websites, as Figure 2 shows, are used as a communication portal, a showcase, a portfolio. Some of them are used to expose a project to users in order to simulate functionality (e.g. oscilloscope, anatomy, electric circuits etc.). Others have an educational or informational character while only few are used for survey or media sharing. These results show that the Website tool is an indispensable tool for the instructors/teachers that need to communicate information publicly (either for a training, a project, a course etc.) gathering multiple content on a single object.

Figure 2. Website classification by type

According to results seen in Figure 3, almost half of websites serve as to promote a training (43,6%) or a course (12,1%); therefore, they are used to diffuse information to public about training's or course's object of study, schedule, courses, instructors, future career etc. One fifth of them are used for personal purposes (teacher or student portfolios) while the rest are used to communicate about a project, a research, an event or even an association (internal or external to the University Lyon 1).

Figure 3. Website classification by context

Examining website classification by discipline, shown in Figure 4, one quickly notices that Education, Medicine and Biology are the 3 dominating disciplines, a quite logical fact as these disciplines are the primary axes of University Lyon 1. The rest of websites are distributed to other disciplines such as earth science, sports science, mathematics, informatics etc.

Figure 4. Website classification by discipline

3.2 Traffic analysis

To understand the impact of these Websites on users (both teacher and students), we measured the daily traffic to Websites for year 2014 and display it in Figure 5. Following the traffic trend line, a slight fall in visits is noticed during winter (December), spring (March) and summer (July, August) breaks while visits increase considerably during exam periods (May, January) with a sharp rise in visits during the beginning of the academic year on September. The above analysis shows how important is for students the presence of platform Websites as they return to these websites every time they need important information on a course, training, project etc.

Figure 5. Websites visits (2014)

The Websites traffic trend line for year 2014 was compared to the equivalent one for the Spiral Connect platform website, as well as to the one for the University's website. The comparison showed that approximately one-third of the platform's traffic comes from Websites while there are periods that Websites are visited almost as much as the University's website.

Figure 6. Spiral Connect visits (2014)

Figure 7. University Lyon 1 website visits (2014)

3.3 User preferences analysis

The collected data were additionally used to study user preferences in Website customization and structure. Results in Figure 8, show that almost $\frac{3}{4}$ of Websites use a vertical menu over the rest $\frac{1}{4}$ that prefer the horizontal one. Only one out of ten Websites uses external analytics (google analytics, xiti) to track Website traffic on top of internal platform analytics. More than half of Websites use box layout, one-third use column layout while the rest 15% are full-screen Websites.

Figure 8. Menu, analytics and layout options

The scatter plot in Figure 9 classifies the number of websites by the number of pages they contain. It is shown that most Websites have between 5-15 pages and only a few have more than 25 pages or less than 5. For Websites that have more than 5 pages, a vertical menu is a more convenient solution than a horizontal one. Thus, it is no coincidence that almost 75% of Websites have adopted this solution.

Figure 9. Number of websites per number of pages distribution

Studying indicators like the ones mentioned above proved really useful as they reveal where to give emphasis to future development but also where to lay stress upon during user training classes. For example we know that in future developments we need to improve vertical menu interface, during future user training we need to underline the role and use of analytics etc.

4 Future work

Following the recent progress and evolution in e-Learning, Spiral Connect is fused with Claroline platform to create a new innovative eLearning environment implementing new concepts such as Massive Open Online Courses (MOOC), social media etc. Future

research can potentially examine the evolution of a Website tool and its usage inside this new environment.

5 Conclusions

LMSs, CMSs and LCMSs are structured environments specifically designed to compress the time required to develop and manage learning content and users. However, despite tremendous evolution of these tools during the past 20 years, all three of them fail to provide a layer that assembles multiple and different learning contents under a common representation.

Spiral Connect, the LMS created by Claude Bernard University Lyon 1, tries to address this need through its Website tool. The large range of offered functionalities combined with the variety of possible applications prove the necessity of the tool. The number of existing Website objects and the high use rates confirm beyond doubt the importance and the benefits of a CMS for the users of a LMS. Not forgetting the useful indicators that can be extracted from user preferences in order to point out the possibilities of improvement and evolution.

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