Middle-East Journal of Scientific Research 11 (1): 117-127, 2012
ISSN 1990-9233

Performance Evaluation Process of the Content Management System: Case Study of Kau Marz System

Khalid S. Husain

Information Technology Deanship, King Abdulaziz University, Jeddah, Kingdom of Saudi Arabia

Abstract: The selection and implementation process of a content management system (CMS) represents one of the largest information technology (IT) projects tackled by many organizations specially the academic institutions that have a huge volume of data needed to be managed well. A content management system can be defined as software that is used to support the creating, updating, publishing, translating archiving and retiring of digital information. A traditional software evaluation process involves approximately seven steps: requirements gathering, literature and industry research review, candidate selection and request for proposal, vendor demonstration, formal evaluation and software selection. Evaluating content management systems can be an overwhelming task because there are tons of them to choose from. However, with a structured approach to our evaluation, things can be much easier and less intimidating. So, the goal of the evaluation process is to determine which software can be used to support which website goals. The main interest of this paper is to use some trend data from research organizations to form evaluation criteria that can be used for analyzing the performance of the CMS that is developed in King Abdul-Aziz University (KAU) named MARZ. Also, we check whether these criteria are sufficient and adopted for evaluation process or need further enhancement and modifications.

Key words: IT · CMS · WCM · KAU · SSMM · MARZ · RLO · ECM · HTML · FTP and DAM

INTRODUCTION

Content management is defined as a collection of policies and technologies that guide and enable corporations to contribute, manage and share their structured and/or unstructured information. So, Content management systems (CMS) can be viewed as data repositories that may also contain authoring, sequencing and content aggregation tools, with an objective to "simplify the creation and administration of online content. Originally developed and used by the newspaper industry and adapted in the mid-1990s to manage large volumes of content required for robust websites, CMS incorporate a workflow process and manage information based on search and retrieval criteria. CMS can support content being created once (content components or RLO) and used many times [1]. An example is the image that is used in several different newspaper articles targeted at different audiences or an organization chart used throughout the corporation and housed in the CMS so it need only to be updated at one location. CMS manage small, interconnected units of information where each unit is defined by its location on a site. CMS are focused primarily for web-page creation and editing with cross-linkages between pages. The CMS provide tight integration between authoring and the repository (i.e. a database that stores and manages pieces of information or learning) along with a powerful publishing engine [2].

CMS stores and distributes the right content to the right learner at the right time. Also, CMS provides centralized storage for small information chunks for easy retrieval, revision and distribution. The most important part of a CMS is the content itself. A sampling of the types of content that can be stored and distributed via a CMS includes: Simple pages; Complex pages, with specific layout and presentation; Dynamic information sourced from databases, etc; Training materials; Online manuals; General business documents; Thousands of pages in total and Extensive linking between page. Content Management Systems (CMS) have evolved into more than just publishing content, but managing our workflow as well. CMS's nowadays allow us to easily conceive, edit, index and publish content, while giving designers and developers more flexibility in customizing

Corresponding Author: Khalid S. Husain, Information Technology Deanship, King Abdulaziz University, Jeddah, Kingdom of Saudi Arabia.

their look and functionality. CMS are used to perform web administrative functions, manage assets, provide personalization and localization features and much more. There are many subcategories of CMS. A Web Content Management (WCM) system has additional features specifically tailored to manage web site content. A Digital Asset Management (DAM) system has additional features to support the ingesting, cataloguing, storing, retrieving and annotating of digital material. An Enterprise Content Management (ECM) system is usually comprised of a WCM and DAM and provides additional knowledge management and document management features as well. Sometimes Content Management Systems (CMS) have evolved from existing systems like one that is developed in KAU named MARZ. Therefore each system has-depending on its predecessors-a certain focal point regarding technology and functionality. Possible predecessors are document management systems, editorial process management systems, workflow management systems or database management systems. Current systems therefore have different focal points and differ in type and complexity of the functions they offer. On the other hand, there are characteristic features all CMS have in common [3].

A perfect CMS should offer the following: Division of Content, Structure and Presentation, So-called "SSMM"-principle (Single Source - Multiple Media), Management of assets, Management of workflow, Managing users an their roles, Ability to import and export content, Content Syndication, Individualize the presented content, Being extensible by scripts or modules, Version-Management regarding content and assets, Archiving content, Publication and, Supporting the editorial process. The content in CMS is parted into the physically displayable raw content and its - separately stored - layout. The layout itself consists of two parts. On the one hand there is general information like the requested document type. This information is called structure. On the other hand more detailed information like fonts, colors, borders etc. is needed. This is called the display format and is usually stored in templates or style sheets. The necessity for publishing content in several different media types, e.g. a printed Brochure and small Website leads to the so-called SSMM-principle (Single Source - Multiple Media). It is important to notice that no only the separation of content and layout (as stated above), but also storage of content in a media-independent format is needed to fulfill the request of the SSMM-principle. When using a CMS, the content itself is divided into so called assets. Typical examples for assets are headlines and pictures. Assets enable the use of templates and therefore grant a high degree of flexibility. Assets have to be managed separately to keep up with their versions and grant their reusability. Because the predecessors of some content management systems are editorial process management systems, the integration of workflow management components is necessary. Such components control all of the system's processes. Being able to do that, the management of users and their roles is inevitable. Import and export of content is usually done with an interface that converts content to XML and vice versa. When exchanging content, the division of (raw) content and layout (as described above) has to be preserved. Exchanging content automatically via a defined interface is called "Content Syndication". Popular examples for Content Syndication are ICE ("Information and Content Exchange Protocol"), OCS ("Open Content Syndication") and RSS ("RDF Site Summary"). Individualization of the presented content is done by observing the users actions, creating an appropriate profile of him and selecting adequate content based on this profile. The process can be divided into four steps: Profiling is used to collect personal data of the user; Tracking means the process of observing the users actions and derive his likes and dislikes from this observations; Matchmaking is the process of comparing the created profile with the available content and ; The presentation of matching content finally is called channeling [4].

When engaging in the CMS selection process, higher education institutions must focus on the before and after, evaluating the current processes for managing web content, whether for the internet, intranet or extranet, determining what is working and what is failing and outlining a picture for how they see content being handled after the CMS is implemented [30]. These institutions must also identify who the primary users and managers of the web content are, such as faculty, staff, administration and students and encourage a collaborative effort among them all to successfully draw those conclusions. Higher education institutions must outline their internal processes for managing the lifecycle of information. The lifecycle of managing information, represented by creating, editing, publishing and archiving content, is central to any CMS implementation. Institutions need to outline and define what type of information is regularly created, the necessary approvers for the information, where the information is published and when the information should be archived. Common information regularly published online by institutions is the following [30]:

- Semester/quarter school calendars
- Employment listings (student/faculty)
- Sports calendars
- Housing listings
- Announcements
- Campus directories
- Press releases
- Academic department/organization Information

A comprehensive list of content regularly published needs to be developed, including the appropriate workflow (approval) process for each item. With these information management methodologies outlined in a formal document, the designated CMS vendors must show a realistic example in action presenting the technology component. In order to best choose an appropriate CMS, an institution should first understand and analyze how content is currently managed in their organization. The suggested steps of selecting best commercial CMS [30] are:-

- Identify key users/managers of web content
- Collectively discuss the goals for moving to a CMS (Will it make the management of our content run smoother? Is it cost effective? Will it be easy to implement it? How will we get everyone accustomed to using it as opposed to our former methods? Do we want everyone in the office to be able to use the system or will our key people be the sole users?)
- Collectively discuss the current web content (Is the information pertinent? Is it effectively organized? What changes should we make? What should remain the same?)
- Collectively discuss the current state of how content is managed (What works? What fails to meet our needs? What features should we keep? Which can be eliminated? What features should be added?
- Collectively devise accurate pictures for our vendor candidates of where the institution is currently and where it would like to be after the CMS is implemented
- Keep lines of communication open among all those involved in the selection process. Be sure that everyone's needs/concerns are taken into consideration. Use vendor need assessment questionnaires to help gather this information.

Features, Various Characteristics, Process and Pre-Built CSM: Because CMS evolved from document management systems, another feature was nearly "inherited": The ability to store different versions of documents and assets, as well is nowadays considered to be a standard feature of CM-systems. This enables the systems to show older pages, follow the changes on them and to create an archive of old documents. This is among other things important, because in most countries, publishers are forced by law to keep copies of published content. Although actual CMS offer the possibilities to publish content cross-media, as we have stated above while illustrating the SSMM-principle, today most CMS are used to publish content on websites. Technically, there are two different types of interaction: Staging-Servers and Live-Servers. Staging Servers store static pages, which are created by the CMS. This is a fast, although really inflexible solution. Live-Servers, on the other hand, create pages on demand. This means they have to process every single user request separately and search the appropriate data in their database. That makes them highly dynamic, flexible and actual (there is no delay between content creation and publication), but such servers are really slow, especially when serving numerousness users. Because both possibilities have advantages and disadvantages, today a mixture of both principles are used in daily business [5].

One of the important features of CMS is quasi inherited, too supporting the editorial process. While editorial process management systems implement a more

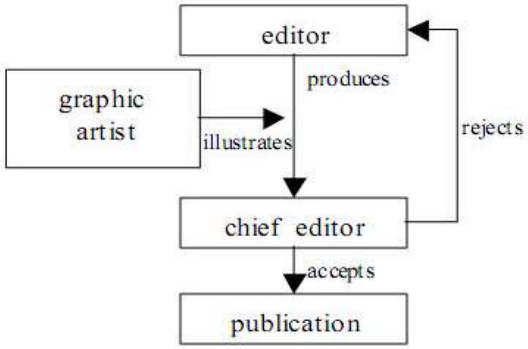

Fig. 1: Classical editorial process

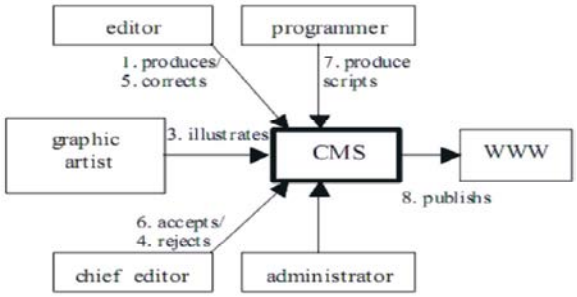

Fig. 2: CMS editorial process

classical editorial process consisting of chief editor, editor and graphic artist (Figure 1), actual WCMS support a more complex process (Figure 2). This process takes programmers and administrators into account and integrates them into the workflow management of the CMS. Notifications are generated, when an asset has changed, which allow the full process to run. The process is finished, when every step of the process is completed. After that the content is ready to be published. Depending on the type of content that has to be published, the steps of this process are not always the same. Weekly updated documents e.g. do not need all steps, because templates do already exist. The reuse of existing assets on the other hand does not require an orthographic check. Not every system implements the complete introduced functionality [6], but systems with some of the features stated above could be very effective when it comes to managing content. The process oriented point of view grants high quality content, while individualization of documents based on statistics seems to do its job, at least from an economic point of view.

- There is a wide range of content will be published using the CMS [5]. These contents should be characterised with the following:

- Simple pages
- Complex pages, with specific layout and presentation
- Dynamic information sourced from databases, etc
- Training materials
- Online manuals (policy & procedures, HR, etc)
- General business documents
- Thousands of pages in total
- Extensive linking between pages.

In recent years, numerous pre-built open-source CMS have emerged as viable alternatives to costly proprietary products or custom-built solutions. Cost savings are not the only reason why open-source CMS are gaining in popularity [26]. Unlike proprietary products, the source code for open-source CMS is freely available; so it is possible to customize the CMS to match project's requirements. Customized versions also can be redistributed according to the terms of their licenses. In addition, the benefit of free technical support provided by the Open Source community cannot be discounted. Development and long-term maintenance costs of a custom-built CMS can be high. Keeping up with new requirements or security issues can take a lot of time and effort. Open-source CMS combine the advantages of the proprietary and custom-built approaches--a pre-built CMS that is ready to use but can be customized if needed.

Choosing a pre-built CMS from the large number of alternatives can be an overwhelming task. They come in several shapes and sizes, employing different platforms, programming languages and content management approaches. Complicating the decision-making process, open-source CMS projects are at varying stages of development, from stable and reliable applications to cutting-edge experiments. How do we decide which one is right for us? The CMS Matrix is a community-maintained list of over 300 CMS [26], both proprietary and open source. This list may not be comprehensive, but it is a good place to start. This Web site makes it easy to review CMS details such as system requirements, availability of technical support, ease of use, performance, security, interoperability, flexibility and commerce. It also features a convenient matrix to conduct a side-by-side comparison of up to 10 CMS at a time. But we still need to decide which ones to compare and evaluate. Normally the following seven criteria are used to evaluate potential CMS [26]:

- Web application platform
- Software license
- Stability and development activity
- User community
- Documentation and source code
- Web standards, accessibility
- Suitability and usability

As was defined previously content management system is a computer software system for organizing and facilitating collaborative creation of documents and other content. Many organizations have turned to CMS to publish data with the speed and freedom provided by the Web [27]. Many of modern applications have been developed by CMS. For example, the software for the website Wikipedia is based on a wiki, which is a particular type of content management system [28]. Wiki systems such as wikipedia.org are similar to blogs in principle as they are based on user participation to add content [29]. Typically, a CMS consists of two elements: the content management application (CMA) and the content delivery application (CDA). The CMA element allows the content manager or author, who may not know Hypertext Markup Language (HTML), to manage the creation, modification and removal of content from a Web site without needing the expertise of a Webmaster. The CDA element uses and compiles that information to update the Web site. In the simplest case, there are three components designed in a CMS. In addition to the host computer where everything

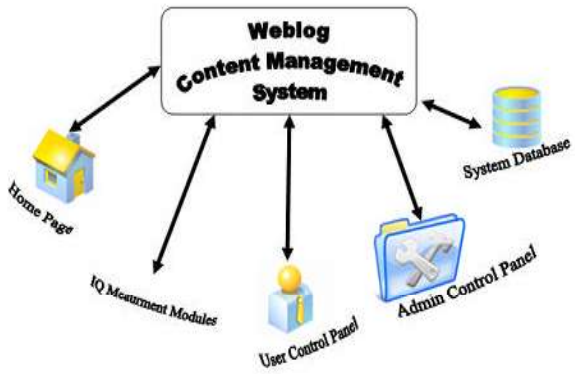

Fig. 3: Blog Content Management System Architecture

is stored: a database to organize the information; a script language to provide an interface to the information; and a web server to present the information as an HTML file for a web browser.

The current Blog management system includes several technologies commonly used in the modern web applications. The system was developed by PHP, MySQL, HTML, CSS, JavaScript and Ajax. Figure 3 shows Blog content management system architecture.

The Blog management system contains four major components; Administrator control panel, user control panel, IQ modules, system database. Administrator control panel is an interface for system's administrator to control, manage and monitor the Blog management system. User control panel is an interface designed for users to produce and manage contents of their Blogs. This panel provides features which user needs to manage a Blog such as links management, edit and create template, add new article, manage comments and configuration of Blog. IQ modules measure information quality for each Blog based on considered IQ criteria. System database records users' activities on the Blogs. Administrator control panel is an interface that was designed for administrator to control, manage and monitor the Blog management system. This panel comprises two major panels. A panel manages content structure of the website. So this panel, controls contents of homepage and other pages that are linked to the homepage. Menu management, publish new subject, subjects management, news and announcement management and page management are the most important features in this panel. Another panel controls and monitors user activities on the Blogs by accessing to the system database and log files. In the panel, administrator can observe and monitor many activities that are performed by Blog owners. Whenever a user logs in to the system, administrator can observe details of the login in the panel. As soon as user posts an article, the panel enables the administrator to control details of the posted article. Overall status, observation of members and entries, edition of templates and HTML, observation of log files, configuration of specifications and registration are the most important features in this panel. In sum, administrator control panel facilitated content management for administrator; provide an interface for monitoring the Blog system. The panel makes easier extension and maintenance of the Blog management system because it is designed according to properties of a content management system. User control panel is an interface designed for users to produce and manage contents of their Blogs. A user is able to publish and manage his/her Blog by logging to the user control panel. This panel provide features which user needs for managing a Blog. Links management, adding new article, observing posted article, template selection and edition, general configuration of Blog, comments configuration, friends' management and sending files are the principle features of the user control system.

Overview of Content Management System: The term "content management" has several different meanings in today's marketplace. A content management system is one that stores digital content for search, browsing, access and retrieval by users in a workgroup or enterprise [5]. The most prevalent types of content management systems are:

- Enterprise Content Management (ECM): systems that facilitate management of corporate documents and other types of information for use internally as well as externally with a company's business partners, customers, regulators and the general public.
- Digital Asset Management (DAM): systems that manage rich media assets, often including digital audio and video clips, for retrieval and repurposing in media production environments. These systems are sometimes also called Media Asset Management (MAM).
- Web Content Management (WCM): tools that provide page template design, editorial workflow and publishing environments specifically for Web sites and other forms of Internet content delivery.

- The term Content Management System (CMS) encompass all of the above. All of those types of systems have common technology elements as well as common processes associated with their use. Some of the common technology elements are:

- Database management systems for managing metadata (information describing content) and sometimes the content itself.
- Content storage systems, including disk drives, storage area networks (SANs) and nearline/offline storage, particularly for storage-intensive assets such as high-resolution still images and digital video.
- Content indexing and search technologies, such as inverted text indexes to promote searching and browsing of content.
- Metadata creation technologies, including text categorization, entity extraction and image understanding.
- Workflow capabilities, which include check-in and check-out, version control and approval routing. Although the following is not meant to be an exhaustive list of processes that CMSs support, here are the most important ones:-
- Metadata creation: Some types of metadata (e.g. date and time of creation, image resolution) can be automatically extracted from file formats. Other types can be inferred from the content by automated tools (e.g. categorization engines that analyze text and generate keywords). Other types of metadata, such as information about asset creators or detailed descriptions, must be entered manually. Rights metadata is another important type of metadata that can be created automatically if rights information is captured upstream from the CMS.
- Asset storage: A CMS can store content in a native format, an output-neutral format (e.g. XML), or a format specific to an output medium (e.g. HTML for web pages). The term ingestion is often used to comprise metadata creation and asset storage.
- Workflow: Many CMSs provide for the identification of roles (e.g. author, editor and producer) and their association with specific privileges on an asset, which could include reading, editing, or the ability to change the asset's metadata. Users can check content out for editing and check it back in again and they can often use the CMS to send (route) content to other users, whether in an ad hoc manner or according to fixed, predefined routing schemes.
- Search and browse: CMSs have interfaces for users to enter query terms to search for assets whose metadata fit those terms. Many also have browsing interfaces, where a user can scan a collection of asset descriptions (e.g. text abstracts, image thumbnails, short audio clips) to find assets of interest.
- Distribution: the final process that most types of CMS support is making assets available through some channel(s) outside of the domain of the CMS. This could mean publishing HTML pages to a Web site, sending files to a business partner over FTP or a syndication protocol, or persistently protecting assets with a DRM packager.

- With regards to the main returned benefits from using Content Management System, we see that CMS satisfies the following:

- A CMS makes it easier for people to create, edit and publish content on a website. Historically, website publishing has required significant technical skills (HTML, programming). A good CMS allows non-technical authors and editors to easily and quickly publish their content.
- A CMS makes it easier for us to manage who creates, edits and publishes content. Because it establishes defined publishing processes, we can allocate specific publishing rights to various individuals.
- By easing technical hurdles in the publication of content, a CMS can reduce the need for training, while facilitating more people to publish. At the same time, it reduces the daily stream of calls to the IT department for changes to the website
- A CMS reduces time-to-publish, allowing us to get content published faster. This is an important issue for the modern organization. The quicker we get key content published the more value it creates.
- A CMS allows for the design of common and consistent information architecture (metadata, classification, navigation, search, layout and design). Inconsistent and poorly designed information architectures plague many websites.
- A CMS will allow for the consistent management of metadata through content template structures. Of the many benefits this delivers is a significantly improved search process. Basically, if the appropriate metadata is captured on all documents, then people can find the right content a lot more quickly .

- Security is an important issue, particularly for intranets. A CMS can facilitate better content security. It can control who is allowed to publish to the website and who is allowed to see what content.
- A CMS can allow us to more easily measure the success of our publishing efforts. We can track who is publishing what, how quickly content is getting published, whether the publication schedule is being adhered to, whether out-of-date content is being removed quickly enough, etc.
- A CMS really comes into its own when we have a lot of authors and editors, based at multiple locations, publishing substantial quantities of content on an ongoing basis. Without a CMS, such an environment can become a nightmare to manage.

Key Goals of Cms for Higher Education Organization: Almost all Web CMSs help an organization on higher education in achieving the following goals [7-10]:

- Streamline and automate content administration: Web content has considered of static pages/files of HTML, requiring HTML programming experience and manual updating of content and design- clearly a time- consuming and labor- intensive process. In contrast, Web CMSs significantly reduce this overhead by hiding the complexities of HTML and automating the management of content.
- Implement Web-forms-based content administration: In an ideal Web CMS, all content administration is performed through web forms using a Web browser. Proprietary software and specialized expertise (such as HTML) are not required of content managers. Users simply copy and past existing content or fill in blanks a form.
- Distribute content management and control: the web manager has often been a critical bottleneck in the timely publication and ongoing maintenance of web content. Web CMSs remove that bottleneck by distributing content management responsibilities to individuals throughout the organization. Those individuals who are responsible for content now have the authority and tools to maintain that content themselves- without any knowledge of HTML, graphic design, or Web publishing.
- Separate content from layout and design: In a Web CMS, content is stored separately from its publication format. For example, the university's mission statement could be stored in a raw, text format or XML, then formatted as needed to reflect separate graphic design for both Internet and Intranet sites and formatted to display correctly on personal digital assistant (PDA) devices. Content managers enter the content only once, but it appears in three different places, formatted using three different layouts and graphic designs. All three pages immediately reflect approved content changes.
- Create reusable content repositories: web CMSs allow for reuse of content. Objects such as templates, graphics, images and content are created and entered once and then reused as needed throughout the Web site.
- Implement central graphic design management: graphic design in a CMS becomes template- driven and centrally managed. Templates are the structures that format and display content following a request from a user for a particular Web page. Templates ensure a consistent, professional look and feel for all content on the site. They also allow for (relatively) easy and simultaneous modification of an entire site's graphic design.
- Automate workflow management: Good CMSs enable good workflow process. In the most complex workflow system, three different individuals create, approve and publish a piece of content, working separately and independently. A good workflow system expedites the timely publication of content by altering the next person in the chain when an action is required. It also ensures that content is adequately reviewed and approved before publication.
- Build sophisticated content access and security: Good CMSs allow for sophisticated control of content access, both for content managers who create and maintain content and for users who view and use it. Web managers should be able to define who has access to different types of information and what type of access each person has.
- Allow for customization and integration with legacy systems: Enterprise CMSs allow for customization of the functionality through advanced programming. They should expose the functionality of the system through an application programming interface (API). They also coexist and integrate with legacy systems.
- Include structures to collect and use metadata: Because data is stored separately from layout and design, the database also stores metadata describing and defining the data, including author, creation date, publication and expiration dates, content

descriptions and indexing information, categories information, revision history, security and access information and a range of other content- related data.

Evaluating Criteria Ofthe Standard Content Management System: Content Management Systems (CMS) have evolved into more than just publishing content, but managing our workflow as well [11, 12]. CMS's nowadays allow us to easily conceive, edit, index and publish content, while giving designers and developers more flexibility in customizing their look and functionality. Evaluating content management systems can be an overwhelming task, not because it's rocket science, but simply because there are tons of them to choose from. However, with a structured approach to our evaluation, things can be much easier and less intimidating. Let's talk about the things we should look at when deciding what CMS to use; here are eight characteristics that a good CMS should have:

- Intuitiveness: easy to understand and use: Our CMS should have a GUI (Graphical User Interface) that's easy on the eyes, doesn't have overly complicated options and offers simplicity in its administration interface. A good interface means that tasks pertaining to creating and managing our content will be quicker, saving us a lot of time and increasing our productivity. We should also look at it from an end user's perspective: if we're building a content management system for a client who's not "technology-savvy" and we choose a solution that requires a Ph. D. in computer science, it's less likely that they'll be able to use the system (thus, defeating the whole purpose of a CMS, which is to empower its users).
- Flexibility and Ease of Customization: When taking into consideration a content management system, make sure that we're not obligated to use their design templates. A large quantity of CMS solutions allows us to customize our own design without major restrictions. If our CMS forces us to choose a fixed and unalterable design template, then we're stripped of creative license and our website will look like everyone else's.
- Extensibility via Plugins and Modules: A good CMS will allow us incorporate helpful site features into our site by letting us extend the default configuration with plugins. Plugins/extensions/modules (their terminology varies between different platforms) make a difference in terms of enhancing our site's ability to provide our site users with useful options for interfacing with our site. Look for a CMS with a powerful Application Programming Interface (API) in case we need to write our own extensions. Make sure that the CMS we are considering already has a huge list of plugins. Though we might not need plugins right away, it's important that this is available to us, later down the road.
- No Need for Programming Knowledge: If we're more "design-oriented" than anything else, make sure we select a CMS where we won't need to have extensive programming abilities to publish and maintain our site. There is a wide selection of CMS's that have WYSIWYG editors, letting us edit content without the need for code. Having to edit text through HTML markup can be time consuming and takes us away from other aspects of our managing and building our site. Complex sites, however, can require a CMS that will let us type in some code, edit files with extensions such as.php. css. html and make changes without that need for a third-party source code editor.
- Optimized for Performance and Speed: Taking into consideration the speed of our pages load on the browser and how fast our site can make a connection to a server, is vital. Choosing a CMS that is bulky will drive away visitors rather than bring them in. By visiting examples of live sites, we'll be able to gauge somewhat how fast pages load. Keep in mind that we can increase the load time of our site by choosing a good host and adding plugins that cache/compress/minify feeds, CSS, JS and also caches our database objects.
- Security: Adequate security for our site is very important and must be in place in order to protect our content. There are CMS's that allow us to install specific plugins and edit files/permissions in order to increase security levels. Make sure we choose a management system that offers modules to protect the integrity of our site. We can also protect our site by selecting a CMS that allows us to easily assign a different username and password to each user. This will let us view and control what each user has access to.
- Documentation and Community Support: Nothing's more frustrating than trying to figure out how to do something and not have references online that we

can take advantage of. One way to ensure that we won't be running into this problem is by reading through the documentation of our candidate CMS's. Also, a quick Google search will tell us how popular and well-documented a content management system is. The availability (or lack thereof) of support from users of the system can be a deal maker or deal breaker. When users are active and proud of being part of the community, we not only have access to individuals that are more familiar with the system, but also, we can be assured that the project will be developed continually.

- Emphasis on Web Standards and Best Practices: Content Management Systems developed under web standards guidelines and best practices will ensure that we won't get burned later down the road. When applications are designed with best practices in mind, we can be assured ultimate cross-browser compatibility, lean-and-mean code and ease of maintenance. Look for content management systems that promote the use of web standards and those that put it at the forefront of their development and design philosophy.

Evolution Process of Marz Content Management System: A powerful new content management tool is able to manage market and measure our business online. Our newly launched Content Management System called MARZ CMS has been designed and developed based on 5 years of content management experience and provides our clients with an intuitive way in which to manage and market their websites and more importantly measure their online success. Before we develop our MARZ CMS system, we deeply analyze the main requirements of KAU to develop a product satisfy the needs. So, there were major points have been questioned like [13-15]:

- Include other universities as clients? Can we leverage their work?
- Focus on higher education needs?
- Run on Linux?
- Use custom drivers?
- Move content easily to printers and mobile devices?
- Have records management component?
- Include a taxonomy tool?
- Use metadata?
- Have adequate security features?
- Have drag and drop (both in and out)?
- Compare versions of content easily?
- Have capacity for e-portfolios and e-commerce?
- Include a user dashboard?
- Include flexible workflow?
- Include collaborative software tools?
- Focus on learning management, content management, or web publishing?
- Having an easy to use interface for nontechnical users?
- Include/make use of style sheets?

In view point of our designing CMS Dashboard; we say that the problem was accessing data quickly, easily and in an interface that is simple to understand. The majority *of* analytics services fail in all these regards, that's where our new dashboard is different. Quickly view a wealth of statistics in real-time including:

- Completed website goals such as enquires or sales
- Visitor statistics
- Traffic sources breakdown
- Popular search keywords
- Referring websites and inbound links
- Google Awards performance
- Social networking statistics

- Within our designed MARZ CMS, we satisfy the following capabilities:

- Flexible content management editor: Creating new content pages, blog articles and customer feedback forms has never been so easy [16-20]. Our editor enables us to publish text, images and even video content with a few clicks of the mouse. Other features include delayed publishing, customization of search engine data plus much more.
- Search engine optimized content and position reports: Our content management platform provides search engine friendly, enabling us to customize Meta information at an individual page level. If we choose our search engine optimization service we'll take care of all our optimization needs. Providing weekly reports that show our website positions on Google, Yahoo and Bing, allowing us to measure our marketing success with ease [21].
- Blogs & support for social networks: Blogging is a great way to increase our website traffic and encourage users to follow our business. Sublime CMS provides RSS feeds and allows users to share articles on sites such as Facebook, Twitter and Linked In.

- Members / client portal: MARZ CMS comes complete with a member's portal as standard. This enables us share restricted content such as documents or files by simply creating login's for our existing clients. We can even send them messages using the CMS which they are presented with when logging into our website [23, 24]. As well as the features outlined above we have a large range of additional modules available designed to perform a wide range of tasks. Because our CMS is modular by design, the development time required to add additional features is kept to a minimum.
- Real-time performance monitoring & analytics: Our powerful MARZ CMS dashboard provides us with detailed real-time summaries of our website activity and online sales. Measure our digital marketing efforts with ease with powerful analytic reports that enable us to analyze information on traffic sources, customer's locations, search engines, search keyword terms and completed website goals [25].

Conclusion and Future Works: It is important to understand how a CMS impacts a number of different people and departments in a higher education setting. Analyzing the current institution sites and seeking input from key individuals helps in understanding how a CMS fits in the school environment. Choosing is a CMS is not a simple decision, but rather a decision based on an extensive process and open communication. Higher education institutions reap tremendous benefits from using a CMS and more comprehensive preparation will lead to a more successful implementation [30]. Effective information management is key for an organization to achieve high performance and yet the sheer abundance of unstructured data causes a number of challenges. For example, the cost of data management has increased; finding the right information is difficult; information is not well leveraged among partners and it is not coming together in ways that would yield useful new insights about employees, customers or market opportunities. Today, businesses and higher institutions are using content management systems (CMS) to help them for delivering targeted information for visitors interested in their products and services. So, there are many software packages available; however selecting a CMS is sometimes difficult because trend and evaluation data does not always coexist in the same reports. Developing a new content management system represent great challenges especially if it cope with the organization needs. Using a process that incorporates trend analysis conducted by independent researchers and feature analysis conducted by open source organizations can often facilitate decision making. We concluded that the developed CMS in KAU achieved the major requirements and needs of all customers, employee, academic members whom deals with KAU either in research track or other university jobs. We expect a lot of benefits of the developed MARZ system inclusive of the following: Fast production and deployment of courses, Reduce production and deployment cost, supporting innovation of web technology, Security and privacy of contents, increased return on investment, increased security and privacy and more time and focus to learning. We hope to develop MARZ system to be adopted for e-learning system to assist in raising the education process of KAU.

REFERENCES

1. Iyer, L.S. and B. Gupta, 2001. Commercial Web Site Design and Maintenance Issues: An Overview. Proceedings of the Decision Sciences Institute.
2. King, S., 2002. Web content management. Computer Technology Review. Los Angeles, 22(11): 9.
3. Smith, T., 2003. Mixed results in managing content. B to B. Chicago, 14, 2003. Vol. 88, Iss. 4; pg. 15.
4. West, K., R. Huff and P. Turocy, 2000. Managing content on the Web. Network Computing. Manhasset: October 30, 2000. Vol. 11, Issue 21; pg. 50.
5. Chester, B., 2003. Web content management 101. AIIM E - Doc Magazine. Silver Spring: May/Jun 2003. Vol. 17, Iss. 3; pg. 24.
6. Friedlein, A., 2003. Maintaining and Evolving Successful Commercial Web Sites. San Francisco: Morgan Kaufmann.
7. Hitt, F.J., 2002. Web Content Workflow Management. Cyber Teams, Inc. A White paper. Published,
8. Falla, J. Ed. 2001. Content management: coping with the content challenge: Definitions.
9. Feldstein, M., 2002. What's Important in a Learning Content Management System?
10. GetNewWise. 2004. Glossary.
11. Chapman, B. and S.O. Hall, 2004. LCMS 2004 - 2005 Report. Comparative Analysis of Enterprise Wide Learning Content Management Systems.
12. Collis, B. and A. Strijker, 2002. New Pedagogies and Re-usable Learning Objects: Toward a Different Role for an LMS. Association for the Advancement of Computing in Education (AACE). ED9MEDIA 2002 World Conference on Educational Multimedia, Hypermedia & Telecommunications. Proceedings. pp: 24-29.

13. Donello, J., 2002. Theory and practice: Learning Content Management Systems.
14. Downes, S., 2001. Learning objects: resources for distance education worldwide. International Review of Research in Open and Distance Learning.
15. English, P., 2001. What the future holds for e-learning.
16. Microsoft Developer Network. ASP.NET Spiced: AJAX, 2008,
17. Paulsen, M.F., 2002. Online Education Systems: Discussion and Definition of Terms.
18. Barron, T., 2001. An E-learning industry update. Retrieved March 2, 2004, from.
19. Brennan, M., S. Funke and C. Anderson, 2001. The Learning Content Management System.
20. Abazi-Bexheti, L. and Z. Dika, 2008. A study on evaluation papers and surveys about Learning Content Management Systems, Proceedings of the 7th WSEAS international conference, SEPADS, UK, pp: 158-162
21. Eckerson, Wayne W., 2000. Three Tier Client/Server Architecture: Achieving Scalability, Performance and Efficiency in Client Server Applications.
22. Ferl Web Site. Evaluating Learning Platforms; 2005.
23. Garett, J.J., 2005. Ajax: A New Approach to Web Applications.
24. Lewis, B.A. and V.M. MacEntee, 2005. Learning Management Systems Comparison. In:Proceedings of the 2005 Informing Scienceand IT Education Joint Conference (InSITE2005);
25. Microsoft Developer Network. Three-tier Application Model, 2008.
26. http://www.linuxjournal.com/article/8301
27. Rainville-Pitt, S. and J.M. D'Amour, Using a CMS to create fully accessible websites Proceedings of the 2007 international cross-disciplinary conference on Web accessibility (W4A), Banff, Canada ACM, 2007, pp: 130-131.
28. Wikipedia. Content Management System, 2008.
29. Jazayeri, M., 2007. Some Trends in Web Application Development, Future of Software Engineering (FOSE '07), IEEE, pp: 199-213
30. www.hannonhill.com/.../CMS-for-Higher-Education