Library Web Site Development:
Implementing a Content Management System (CMS)

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www.library.gsu.edu/scholarship/posters

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What is a CMS?

General Definition

“A content management system (or CMS) is a system used to organize and facilitate collaborative content creation. Recently, the term has been associated almost entirely with programs for managing the content of web sites. Web Content Management (WCM) is also used to refer to these programs.”

Source: http://en.wikipedia.org/wiki/Content_management_system

“Working” Definition

A database-driven system that automates maintenance and publishing tasks for a web site. Reduces technical barriers (such as HTML, file, and folder work) historically needed to create web site content. CMS systems are able to accommodate growth, portability, and device independence for site content while empowering larger numbers of organization personnel to contribute content to the web presence.
Challenges

Historical Precedents in Our Library
- Previous model was de-centralized
- Previous model would not scale
- Previous model increasingly required more support, training, and personnel
- Previous model introduced violations of known usability standards for web sites

Current and Future Trends
- Historical model and issues are not unique to our organization
- CMS solutions becoming more common

Decisions for a Next Generation Web Publishing Solution
- Client-based software solutions (FrontPage, Dreamweaver, etc…)
  - Concern: Software would continue to require training and support and promote further issues of consistency and credibility surrounding our site design, credibility, and “voice”.
- Explore automation solutions (like CMS or database-driven concepts)
  - Concern: Costs to buy or support a package (or to build and maintain one in-house).
Web Publishing Model 2000-2002

FrontPage
(client-based web software)

SYSTEMS
IIS Server
MySQL
Active Server Pages
FrontPage Extensions

AUTOMATION
List of Databases
Intranet User
Authentication
E-journal Locator
Blogs

CONTENT
18+ Individuals
Various Skill Levels
Continuous Site Building
In Search of Library-Centric CMS Systems

- Most systems (esp. open source) appear to run on Linux and MySQL
- Most systems have associated costs to purchase or to support in-house
- Systems with the capability to act as a CMS for pages and sites but also as a repository for collections of images, files, and annotated resources such as journal, book, and web site titles are not readily available

Resources and Assets Already In Place

- Database driven components in place for the e-journals and blogs
- Authentication system for our Intranet
- MySQL database powering subscription and e-journals resource lists on the site
- Blog system implemented using the Intranet authentication system and MySQL database to store content
Decisions

Initial Exploration of CMS-like Systems
- Administrative recognition that the historical model would not scale and was introducing site management issues
- A working group was formed in 2002
- Exploration of database driven models from other libraries
- Some library sites use database technology to power their subject guides

Building In-House
- Decision to build in-house based on infrastructure that was already in-place
- Using an open source solution would still require some tweaking and modification to work with the systems already running
- Purchasing a package with the features we wanted would be an expensive option for something that had the feel of a “pilot project” at the time
- Since we were already using Windows and ASP and a proven MySQL solution we would build locally instead of modifying external solutions such as open source CMS packages
Project Teams

Technology Planning Committee

DOCUMENTATION
Web Policy, Standards and Procedures

LIAISON LIBRARIAN WEB TASK FORCE
(sub-committee)
Librarians / Beta Testers

SYSTEMS PERSONNEL
Web Development Librarian
Web Programmer
Timeline

- FrontPage Site, Decentralized
  No Standards, Policies, or Practices
  Web Development Librarian Hired

- Intranet Authentication

- In-house database-driven ILL System and Special Collections Photographs

- Implement MySQL

- Technology Planning Committee Formed, Liaison Librarian Web Task Force Formed

- Implement Blog System

- Web Programmer Hired

- Web Policy, Standards, and Procedures Adopted

- Usability Projects Begin for Home Page Re-design

- CMS Beta Project Begins (Content Migrated from HTML to CMS, Introductory Training Workshops Offered)

- New Home Page Launched
  Content Migration Complete
  CMS for Research Guides Launched

2000 2001 2002 2003 2004 2005
System Components

Components to:

- Manage the system itself
- Manage users and permissions (specifically the management of system users, assigning access and permissions to various levels of the system)
- Manage electronic resources (discreet objects or records in the database such as e-journal titles, book titles or images)
- Build sites and sub-sites
- Import or utilize data from external systems
- Output in multiple formats
- Internal applications for organizational functions such as a database for scheduling instruction sessions or consultations and a help desk
(System Components)

- User Management
- Site / Sub-site Management
- Content Management
- Resource Object Management (Book Titles, Web Links, Journal Lists, etc.)
- Applications (Blogs, Instruction Scheduling, etc.)
- System Management (Menus, Site Setup, etc...)
- External Services and Products
- SFX
- GALILEO - Databases
- GIL - Catalog

Output Options
- XML Feeds (RSS)
- Direct Links via SFX
- Links for WebCT
# User Management

<table>
<thead>
<tr>
<th></th>
<th>System Administrators</th>
<th>Content Administrators</th>
<th>Content Contributors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database Management</td>
<td>✅</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Web Server Management</td>
<td>✅</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coding Scripting Templating</td>
<td>✅</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site/Sub-Site Management</td>
<td>✅</td>
<td>✅ Sub-Site Only</td>
<td>✅ Sub-Site Only</td>
</tr>
<tr>
<td>Content Management (add, edit, delete)</td>
<td>✅</td>
<td>✅</td>
<td>✅</td>
</tr>
<tr>
<td>Resource Objects Management</td>
<td>✅</td>
<td>✅ Site-Wide Shared Only</td>
<td>✅ Custom/Local Added Only</td>
</tr>
</tbody>
</table>
Web Publishing Model 2003-2004

TECHNOLOGY
Web Sever (IIS)
Web Database (MySQL)
Scripting/Coding (ASP)

CONTENT CONTRIBUTORS
Librarians
Site Development
Page Development
Add/Aggregate Objects
Content Publishing

SYSTEMS
Centralized Support
Programming Support
Training Support
Usability Support
Quality Assurance
Standards Compliance

CMS SYSTEM COMPONENTS
Web-based Access with Forms
Site Management
Sub-site Management
Page Management
Object/Resource Management
User Management
Web Policy
- Official library policy
- Explains why we have a web presence
- Emphasizes the role of standards and usability to support the mission of the library and enhance authority and credibility of the content we provide

Web Standards and Procedures Manual
- Details the why’s and how’s of quality web content development and publishing on our site
- Emphasis on industry and accessibility standards

CMS User Manual
- Provides description and usage instructions for the menus, forms, navigation, features, and options of our CMS system

Systems Admin Manual
- Suite of documents, information, and instructions on the structure of the CMS system including database design, entity diagrams, and installation and configuration information for various portions of the system
Content Migration & Training

Planning
- CMS beta testing
- CMS adopted as a solution for the Research Guides
- Formal plan developed to migrate HTML-based content into the system and provide training

Content Migration
- Previously all subject librarians had used FrontPage for their web tasks
- Schedule for the migration of current HTML file-based content into the CMS system
- Migration occurred in small groups between 2 and 4 librarians at a time over 10 months
- Thousands of pages, images, and resource records were copied
- The Web Librarian, Web Programmer, and a couple of support staff manually copied or imported HTML content for approximately 18 librarians during the 10 month period

Training
- 90 minute introductory training workshop developed
- Training offered in small groups soon after content was migrated during the 10 months
- Follow-up training in one-on-one sessions offered
Usability Project

Home Page Re-Design Project
During the time that content migration was occurring we were also implementing usability studies for a new home page design.

Impact on CMS Site Templates
The site design changes recommended from the home page usability study would also impact the menu’s and branding site-wide.

Impact on Librarians CMS Content
The CMS implementation teams planned to improve integration between the new home page, the resource lists on the main site, and the content being developed in the Research Guides. With site-wide automation, changes to content and design are more immediate and mutually exclusive.

Future
As of Fall 2004, specific usability of the CMS based research guides are underway.
Support for Teaching and Learning

CMS Based Research Guides (Subject Guides)
- Resources selected by librarians to provide instruction to students
- Online guides act as a teaching tool for librarians when providing library instruction
- Guides include subject-specific resources (print and electronic) as well as content to support information literacy (how to evaluate and cite sources).

Using the CMS with Courseware (WebCT)
- Any part of a CMS Research Subject Guide can be linked to from web sites or courseware used by teaching faculty
- Library content links are available at many levels:
  - Library Home page link
  - Resource lists (e-journal locator, subscription databases, etc.)
  - Subject guides (home page for the guide, specific sections within the guide)
  - Librarian assistance (virtual chat, email chat, office hours, etc.)
  - Direct links to specific databases or journals
  - Direct links to full text articles (via SFX)

Future Linking Scenarios
- Currently librarian subject discipline blogs with RSS feeds are available
- The CMS can output content as web feeds via XML
- Integration with future campus courseware and other applications such as portals may be possible
Workflow

1. CMS USER AUTHENTICATION
   Library employee signs onto the CMS system via private Intranet.

2. WEB INTERFACE
   Employees use web-based forms to work on the site and manage assigned content.

3. ASP / SQL
   Data from forms inserted and stored in the MySQL database.

4. WEB SERVER
   All requests go through the server where ASP page scripting determines the content that should be added to or displayed from the database.

5. MySQL
   The relational database system that stores site content. Web pages contain active server page scripting which "talks" to the database to add, edit, delete, or display content via SQL. Automated backups of all databases and tables are performed daily, weekly, and monthly.

6. ASP / SQL
   A page (specifically some type of content) is requested by the user via web browsers or other devices. Variables contained in page links or forms are used by ASP and SQL to "talk" to the database to find or manipulate the requested content. The "page" content is collected and filtered through ASP, CSS, or other final processing methods before being to presented to the user.

7. CSS / XML / TEMPLATES
   Content is styled with standard fonts, colors, and layout via Cascading Style Sheets. Other page or content processing may also be applied via CSS or ASP. Feed or export processing with XML/XSL may also occur at this stage.

Site Visitor
Content Integration and Storage

1. **Administrators**
   Use web forms or direct access to the database to import or harvest external data (bibliographic data, resources, or direct links to consortial resources).

2. **Harvest / Import**
   Data is gathered via "screen-scraping" techniques, manually downloading text files, or connecting to datasources via ODBC.

3. **External Data Re-Purposing**
   Harvested data is used to provide custom lists of resources for subject guides, new titles lists, e-journal lists, subscription database lists, etc...

4. **Processing**
   Data from some external sources need further offline processing via Word, Access, or text editing prior to importing into the MySQL database.

5. **Storage / Archive**
   The MySQL databases and tables are backed up in various ways such as daily text dumps, weekly incremental server backup, and full monthly backup.

6. **Output**
   Content is usually output as HTML for web browsers. The CMS is capable of XML output or act as a DSN source for ODBC.
Page Templates

1. **MASTHEAD**
   - Site-wide branding and navigation. Site-wide mastheads and footers are applied via server-side includes.

2. **CRUMB TRAIL**
   - ASP creates links and CSS applies color.

3. **PAGE TITLE / RELATED LINKS**
   - Page titles are pulled from database, positioned in the site template, and styled with CSS. Related links are also pulled and displayed, when present, in the same fashion.

4. **MAIN CONTENT**
   - The content is pulled from the database. There are no .htm page files since all content is stored in whole (or more commonly in pieces in the database). For custom pages the content is stored as HTML and shown. For automated pages (like lists of resources) SQL queries and pulls content that a librarian has selected for display in a customized and aggregated list.

5. **AUTHORSHIP / REVISION DATE / ALTERNATIVE DISPLAY**
   - The person assigned to work on content for this page or sub-site is displayed on the page as well as the date the content was last revised. A link to a "print-friendly" version of the page is provided which shows the same content without the branding and navigation elements above and coding to make the page content suited for printing.

6. **MENU**
   - Links automatically appear based on the content that has been entered into the system. Drop-down menu choices are pulled from the database.

Final Page Assembled
Authoring and Publishing

1. **ADMINISTRATORS**
   Add electronic resources selected or subscribed to by the organization. Set up CMS site spaces and assign access to sites, sub-sites, and CMS admin modules.

2. **LIBRARIANS**
   Assigned space to create sites. Individually, librarians select resources already in the system or add non-subscription resources. Using the online web editor, librarians can create web page content without having to know HTML or work with server folders/directories or page files.

3. **ALL CMS CONTRIBUTORS**
   Organizational resources added by e-resource librarians, admins, or colleagues are available for selection and inclusion in automatic page content. Examples are custom lists of databases, journals, and internet links.

4. **APPROVAL PROCESS AND VERSIONING**
   The current system does not use any publishing approval process. CMS authors publish in real time. There is a “suppress” feature to hide content being worked on from the public. Versioning is not available to roll-back to previous versions or edits of pages. The CMS database is backed up regularly and content could be restored from the backups if needed.

5. **TEMPLATING AND OUTPUT**
   When site visitors request a page, the content is retrieved from the database. The page file presented to the user is a template that assembles the masthead, global navigation, menus, and content they requested. The template file also calls up the CSS file to control font colors, font styles, and page layout.
CMS Admin: User Management

Administrators add new users to the system and assign them to library departments and sections of the CMS. Users can update their contact and “biographical” information at any time.
Administators have access to all CMS areas via web forms. Common tasks are to assign user access to certain parts of the system, edit names, manage categories, and update or add new links in the system.
CMS Admin: Staff Assignments

Administrators assign CMS permissions to personnel as web contributors. Contributors with access to the entire system are the CMS administrators. Typically, contributors are added as administrators for their specific section(s) of the CMS (such as a librarian with admin rights to their subject guides). Setting a contributor as an “author” gives a person (usually support staff) the ability to add and update content but their names are not usually shown automatically on the page.

<table>
<thead>
<tr>
<th>Staff assigned:</th>
<th>Assign staff:</th>
</tr>
</thead>
</table>
| Administrator  | Anderson, David | ![Assignments](https://example.com.Assignments)
|                | Armbrust-Kohler, Chuck | ![Assignments](https://example.com.Assignments)
|                | Armbrust-Kohler, Kimba | ![Assignments](https://example.com.Assignments)
|                | Bagley, Elizabeth | ![Assignments](https://example.com.Assignments)
|                | Bishop, Christopher | ![Assignments](https://example.com.Assignments)
|                | Bose, Malabika | ![Assignments](https://example.com.Assignments)
|                | Botts, Laura | ![Assignments](https://example.com.Assignments)
|                | Bowen, Laurel | ![Assignments](https://example.com.Assignments)
|                | Bryant, Calandra | ![Assignments](https://example.com.Assignments)
|                | Burtles, Laura | ![Assignments](https://example.com.Assignments)
|                | Bustos, Rod | ![Assignments](https://example.com.Assignments)
|                | Cargile, Malia | ![Assignments](https://example.com.Assignments)
|                | Carr, Kathleen | ![Assignments](https://example.com.Assignments)
|                | Christian, Gayle | ![Assignments](https://example.com.Assignments)
|                | Cochran, Jim | ![Assignments](https://example.com.Assignments)

Administrator: Rod Bustos, Doug Coans, Robert Tairas

Author: None
# Content Admin E-Resources

## Database Locator

Browse Database Titles: 1 2 3 4 5 6 7 8 9 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

### List of Databases

Click the icon for more information.

Showing 1 to 20 of 28 databases.

<table>
<thead>
<tr>
<th>#</th>
<th>Database Name</th>
<th>Access Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EBSCOhost Databases</td>
<td>Access this resource: Off-campus access available with the GALILEO password.</td>
</tr>
<tr>
<td>2</td>
<td>Ecology Abstracts</td>
<td>Access this resource: Off-campus access available with the GALILEO password.</td>
</tr>
<tr>
<td>3</td>
<td>EconLit</td>
<td>Access this resource: Off-campus access available with your Panther ID.</td>
</tr>
<tr>
<td>4</td>
<td>Education Abstracts</td>
<td>Access this resource: Off-campus access available with your Panther ID.</td>
</tr>
<tr>
<td>5</td>
<td>Education Index</td>
<td>Access this resource: Off-campus access available with the GALILEO password.</td>
</tr>
<tr>
<td>6</td>
<td>Education Resources from GALILEO</td>
<td>Access this resource: Access via Web</td>
</tr>
<tr>
<td>7</td>
<td>eHRSD Collection of Ethnography</td>
<td>Access this resource: Off-campus access available with your Panther ID.</td>
</tr>
<tr>
<td>8</td>
<td>EIS Digests of Environmental Impact Statements</td>
<td>Access this resource: Off-campus access available with the GALILEO password.</td>
</tr>
<tr>
<td>9</td>
<td>EIU Country Commerce</td>
<td>Access this resource: Access available in the Library Building</td>
</tr>
</tbody>
</table>
### List of Databases

<table>
<thead>
<tr>
<th>Name of Resource:</th>
<th>EBSCOhost Databases  (eg. AgeLine)</th>
</tr>
</thead>
<tbody>
<tr>
<td>URL</td>
<td><a href="http://www.galileo.usg.edu/express?line=2beh">http://www.galileo.usg.edu/express?line=2beh</a></td>
</tr>
<tr>
<td>Coverage</td>
<td>Coverage dates vary by database  (eg. 1990 - Current)</td>
</tr>
<tr>
<td>Updated</td>
<td>Varies</td>
</tr>
<tr>
<td>Access Code</td>
<td>Off-campus access available with the GALILEO password:</td>
</tr>
<tr>
<td>License Agreement</td>
<td>Select One</td>
</tr>
<tr>
<td>Endnote</td>
<td>✔</td>
</tr>
<tr>
<td>Endnote Description</td>
<td>IMPORTANT NOTE: Many of the EBSCO databases export references as “General” reference type, which will cause the reference not to display properly (particularly in APA). You must manually change the reference type in order for the reference to display properly as a journal article, newspaper</td>
</tr>
<tr>
<td>GALILEO</td>
<td>✔</td>
</tr>
<tr>
<td>Proxy server</td>
<td>✔</td>
</tr>
<tr>
<td>Suppress</td>
<td>✔</td>
</tr>
</tbody>
</table>

**Update Record**
Content Administrators (like librarians) can add resources to the CMS. Adding any resources usually follows the same process whether it be for books, internet links, or other electronic resources. First the librarian can search or browse the CMS system to see if the item currently exists. If it does they simply check a box on a form to include it in their site. Librarians can customize descriptions for resources on their site. If the item does not exist in the system the librarian can add it by filling out a web form.
Publishing: Resource (Add)

Middle Secondary Education/Instructional Technology Liaison Department

<table>
<thead>
<tr>
<th>Call Number Prefix:</th>
<th>Select One</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call Number:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Link to GIL [ Preview Link ]</td>
</tr>
</tbody>
</table>

[ If Call Number has been entered, get data from GIL to populate this form ]

<table>
<thead>
<tr>
<th>Title:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub Title:</td>
</tr>
<tr>
<td>Edition:</td>
</tr>
<tr>
<td>Author:</td>
</tr>
<tr>
<td>Publisher:</td>
</tr>
<tr>
<td>Place of Publication:</td>
</tr>
<tr>
<td>Date of Publication:</td>
</tr>
<tr>
<td>Category:</td>
</tr>
<tr>
<td>Description:</td>
</tr>
<tr>
<td>Suppress:</td>
</tr>
<tr>
<td>Try This First:</td>
</tr>
</tbody>
</table>

Add Record
CMS Contributors first login to the Intranet with their username and password. The Intranet home page has a CMS work channel which displays links to all the sections of the CMS site assigned to the person. From those links the person can add and maintain their CMS-based content and resource lists.
Publishing: Site Building

CMS Management View

Public View

Related guides: Education

Step 1. Start with...
- ERIC in EBSCOhost
- Academic Search Premier in EBSCOhost
- Education Abstracts

Step 2. Try more resources...
- Databases - more middle secondary education/instructional technology databases (includes tutorials and password info)
- Subject & Course Guides - help on specific topics such as ... etc.
- Ulrich's - search the online catalog for books, journals, etc.

Step 3. Contact Rachel Sindelar at 404-463-0041 or rsindelar@gsu.edu

As the librarian for middle secondary education/instructional technology, I am here to answer your questions. I provide individual research consultations for students and faculty. To find out more about the many things I can do for you, click here.

Education News
Publishing: Auto-Pages

CMS Management View

Public View
What are case studies, and what are the benefits of using them?

Case studies essentially put theory to practice by presenting a scenario. They are effective in supplementing course and research topics, and promote active reasoning to resolve the situation or address what is occurring within the scenario. Generally, this will result in a deeper understanding of the topic.

How can I find them from the University Library website?

Case studies can be found in both print and online formats and are often found within books covering a specialized topic.

To find case studies in print:
1. Go to the GIL page: http://gil.gsu.edu
2. Click on "Keyword Search"
3. In the 1st search box, type "case studies", select "AND" button.
4. In the 2nd search box, type either a general topic (e.g. Counseling) or a specific topic (e.g. Solution-focused therapy).
5. Optional: there is a 3rd search box if needed for a topic with multiple keywords.
6. Click "Go" and you should see a list of results. If not, you may need to broaden your search or try different keywords.

To find case studies online:
1. Go to Databases page: http://www.library.gsu.edu/databases/listsubject.asp?ID=3
2. Find a database which pertains to your specific major and the topic you are searching.
3. In the advanced search engine, type in your topic on the first line and "case studies" on the second line.
4. Click "search" and you should see a list of results. If not, you may need to broaden your search or try different keywords.

NOTE: Both PsychINFO and Academic Search Premier have case study searching built into the advanced search. This is found under "Document Type" (Academic Search Premier), or "Term/Content Type" (PsychINFO). Therefore, with these databases, only include the search topic in the keyword searching area.

Contact Person: Rachel Sinclaire
Contact Email: rsinclaire@gsu.edu

Revised: July 23, 2004
More Information

Contact:
Doug Goans, Web Development Librarian, Georgia State University Library, dgoans@gsu.edu

CMS Related Publishing Activities From GSU Librarians

Available online: www.library.gsu.edu/scholarship

“Library Web Development: Implementing a Content Management System (CMS)”
Poster Session by Doug Goans, GSU Library Web Development Librarian, 2004

“Developing the better mousetrap: Creating chemistry course and subject guides in a content management system (CINF 68)”
Poster Session by Teri Vogel, GSU Library Science Librarian, 2004

“Building a Home for Library News With a Blog”
Article by Doug Goans and Teri Vogel, 2003

Other CMS Information

CMS Watch: List of CMS products
http://www.cmswatch.com/

“Web Content Management Systems in Higher Education”
Powel, Wayne and Chris Gill

“Content Management Systems: Who needs them?”
Browning, Paul and Mike Lowndes
http://www.jisc.ac.uk/index.cfm?name=techwatch_report_0102