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Goans, Doug  
Leach, Guy  
Vogel, Teri M

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**BEYOND HTML:  
DEVELOPING AND RE-IMAGINING LIBRARY WEB GUIDES IN A  
CONTENT MANAGEMENT SYSTEM**

Doug Goans

[dgoans@gsu.edu](mailto:dgoans@gsu.edu)

Guy Leach

[guy.leach@library.gatech.edu](mailto:guy.leach@library.gatech.edu)

Teri M. Vogel

[tmvogel@ucsd.edu](mailto:tmvogel@ucsd.edu)

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**This is the final author-submitted copy of this manuscript, but please note:**

- As of March 2008, the second author is at the Georgia Institute of Technology.
- The images, originally submitted to the editor as a separate document, have been reinserted into this manuscript based on the authors' preferred placement as indicated in their final submitted copy. Therefore, the exact placement of the images in the manuscript and in the published article may not match, but they are in the same order. Also note: the descriptions for Figures 4 and 5 in the published article are incorrect (but are correct in this manuscript).
- The URL for the Appendixes A&B included in the article is no longer correct. If there is no redirect and the Appendixes are not available in this repository with the article, they may be found at <http://www.library.gsu.edu/files/research/68/LHT-CMS-GSU-APPENDIX-20050901.pdf>

# BEYOND HTML: DEVELOPING AND RE-IMAGINING LIBRARY WEB GUIDES IN A CONTENT MANAGEMENT SYSTEM

Doug Goans  
Guy Leach  
Teri M. Vogel

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## **Authors:**

Doug Goans has been the Web Development Librarian at the Georgia State University Library since 2000.

Guy Leach joined Georgia State University Library as the Humanities Liaison for Music and Modern/Classical Languages in 2000.

Teri M. Vogel was the Science Liaison for Biology and Chemistry at Georgia State University Library from 2001-2004, and is now the Chemistry Librarian at University of California, San Diego's Science and Engineering Library.

## **Abstract:**

**Category:** Case Study

**Purpose:** To report on the content management system designed to manage the 30 web-based research guides developed by the subject liaison librarians at the Georgia State University Library.

**Methodology/Approach:** The web development librarian, with assistance from the web programmer, designed a system using MySQL and ASP. A liaison team gave input on the system through rigorous testing and assisted with the design of the templates that control the layout of the content on the guides. A usability study and two surveys were also completed.

**Findings:** The new system met and exceeded the baseline expectations for content collection and management, offering a greater control over appearance and navigation while still offering customization features for liaisons. Improvements are planned for the templates in addition to better promotion of the guides on the library website. Initial and ongoing training for the liaisons should have been more effectively addressed. Despite their observed and future potential advantages, the CMS model has not been universally adopted by academic libraries.

**Practical Implications:** Regardless of the technology involved, libraries preparing for a CMS transition must give at least as much attention to user issues as they do to technical issues, from the organizational buy-in and comprehensive training to internal/external usability.

**Originality/Value of Paper:** This paper contributes to a small but growing collection of CMS case studies. It covers the technical, functional, and managerial developments of a CMS, while also addressing the practical user factors that sometimes get lost in the process.

**Keywords:** content management systems, web-based guides, database-driven websites liaisons, academic libraries

## **BACKGROUND**

In 2000 the Georgia State University (GSU) Library had a FrontPage-based website with minimal login security, site architecture planning, and administrative and editorial processes in place. A single librarian served in the role of network coordinator, server administrator and website manager. At the same time about fifteen liaison librarians, including the government documents librarian, were fulfilling their charge to develop web guides for their assigned subject areas. There were no policies or guidelines in place to assist the liaisons in meeting this responsibility, nor was any formal FrontPage training available. Administrative, technical and personnel support were minimal, and no editorial control was in place. Liaisons were given complete control of their guides as well as direct, barrier-free access to manage their pages on the web server. The content on the resulting guides and how that content was displayed was extremely inconsistent, which contributed to a lack of organizational voice and credibility.

The web guides were extremely diverse on a visual level. Each librarian, as well as the student assistants and support staff who also worked on the pages, used different fonts, colors and layout designs. Navigation was hampered by the lack of agreed-upon guidelines for content arrangement and labeling. While some librarians utilized their previous experience with FrontPage or other web editing programs, others had never created a single web page. The lack of any training system to address these differing web page and site-building skills among the librarians was also a factor affecting the quality and consistency of the guides.

Since there was no clearly defined or communicated mission for the library guides, the liaisons had different ideas about their purpose. There was no agreement or even discussion about how many guides a librarian should create or even what kinds of content should be included. For some departments or disciplines there was a single guide for all users. For others, multiple guides were developed to support general research, specialized subject areas, and individual classes, each guide a mix of new content and material copied over from other guides. Some guides were extremely content-rich while others had nothing more than a librarian's contact information. Time, existing workloads, and even enthusiasm also had an impact on the quantity and quality of guides created by each librarian.

Serious technical and administrative problems with the liaisons' guides that went beyond their visual and content variability also existed. The minimal security implemented with the FrontPage system, intended to allow many librarians to publish content quickly and easily to the live website, eventually backfired when the liaisons' sub-web was accidentally deleted. Most of the liaison guides were restored through backups and browser caches. This disruptive event revealed serious weaknesses of the system, while leaving some liaisons reluctant to put additional time and effort into these activities beyond what was minimally required.

In response to the growing nature of library web content and the issues surrounding the FrontPage working environment, the library's first web development librarian was hired in 2000. Implementing website security for FrontPage authors and exploring website infrastructure development were among the first steps he undertook to improve the library's web presence. He also built MySQL applications to manage the lists of databases and electronic journals as well as several major photograph collections for the special collections department.

While the web development librarian was making these significant and sorely needed improvements to the library's web infrastructure, the liaisons' share of the web site continued to grow. The liaisons, including those hired to fill new positions, continued creating guides as before, without standards, management or oversight. By 2003, there were more than 100 guides on the site, with thousands of files in the liaison directory on the web server. Uncontrolled

growth had been an ongoing though unresolved concern among the liaisons and web development librarian, but other priorities like library site-wide improvements and liaison department reorganization and reallocation had taken precedence. In 2003 the web development librarian, with help from a liaison staff assistant who was taking on more web-related responsibilities, began working with a small team of liaison librarians to help introduce site standards and better workflow.

To implement those standards, the team surveyed the library's research, subject and course guides for content and identified four common elements: books, databases, journals and websites. While surveying guides with similarly-arranged content on other library websites, the task force noticed that a few of these sites were database-driven. This observation reinforced the web development librarian's suggestion that database technology could be applied to the GSU guides. This approach would support a scalable and flexible system by shifting the liaisons away from a static HTML content delivery system to one that was more dynamic and automated. A database-driven system could also create a more efficient web publishing workflow for the liaisons as well as the entire library site. The files-and-folders infrastructure could not support the library website indefinitely, and the liaison's component of the site brought the situation to a critical mass.

### **LIBRARY CONTENT MANAGEMENT SYSTEMS DEFINED**

Content management (CM) can be defined as the process of collecting, managing and publishing content (Boiko, 2001; Thamaraiselvi, 2002). Calling a content management system a "database" or "repository" is an oversimplification. Databases and other web technologies indeed form the technical foundation of a CMS, but the authors' vision of what a CMS can and should offer a library has evolved from conceptual foundations shaped by the experience at GSU.

#### **Content**

In a CMS, the content is disconnected from the layout and design elements of the page. Librarians create their guides in a forms-based environment, which levels the playing field for possessing HTML skills. Anyone, regardless of previous experience creating web pages, can create a basic guide in the system. Instead of devoting time with HTML or FrontPage to create the structural or presentational display where the content resides, the librarians can focus instead on identifying, creating, annotating, and selecting the content itself. The importance of empowering site contributors with the ability to contribute content without having to know markup languages like HTML (Ingersoll, 2005) or website architecture issues cannot be overlooked.

In a CMS the scope of what is identified as "content" can be as broadly defined as the organization chooses. For the liaison guides at GSU, this includes:

- Resource links for databases, journals, books and websites. Some of these links are pulled from existing sources such as the library's lists of databases and electronic journals, while other links are added by the liaisons.
- Web pages built within the CMS using a simplified HTML editor.
- Images files that can be uploaded.
- Files in other formats that can be uploaded and linked from pages in the CMS, including PDF's, PowerPoint presentations and Word documents.

Another value of the CMS is reusability, that content can be repurposed or repackaged (Fichter, 2005). Every resource that has been added, every file or image that has been uploaded, every custom page that has been created is an object in a database. Once that object is in the database, it can be used again and again. Mescan (2004) and Thamaraiselvi (2002) cite the reuse concept, which improves efficiency of the editorial process, as one advantage of moving to a CMS. There should also be levels of access. Some objects can be reused by any of the librarians for their own guides, while other objects can only be accessed and used by the librarian who added or created them. This model of object-oriented site development does not typically exist in a files-and-folders web system, and it is a foundational concept that librarians need to understand when working within a CMS.

### **Control**

Some libraries adopt CMS technology because they want to reduce the “gatekeeper” effect by eliminating barriers that limit library staff from contributing to the website (Ingersoll, 2005). The GSU Library had the opposite problem, and it was the lack of technological or managerial barriers that helped to create the existing situation. A CMS can allow more content creators to have direct editorial access to their assigned areas or components of the website, while still functioning as a limited gatekeeper to provide visual and navigational standards for all guides without restricting access to content developers.

ASP-generated templates using cascading style sheets (CSS) are used for the GSU guides to control how content is delivered and presented to the users, from fonts to text placement to branding. By controlling how content is presented, arranged and structured, the templates create a common style as well as navigational consistency across the guides. Users know what to expect in each guide and how to navigate them, and it is hoped that these standards will improve usability. While the templates control the automated layout of the guides, they can be modified. Over time changes will be made to the guides in order to adapt to changing technologies as well as user needs and preferences. The web development librarian will then be able to make global modifications to the templates to change the structure and presentation of the content without affecting the content itself.

### **Customization and Context**

Customizing (or tagging) content is a crucial feature of the CMS because it 1) allows librarians to work in the same system and create guides for users in different subject disciplines, and 2) allows them to take the reusable content and repackage it in ways that are most meaningful to the users. Librarians have the freedom to group resources into categories of their own choosing, to place them in any particular order (Bills, Cheng, and Nathanson, 2003), and to identify key resources within groupings. Each time a resource is selected from an existing database table, the librarian has the opportunity to create a unique description. These features give the system a level of customization that can help alleviate the perceived loss of creativity, or professional expression or individual writing style in the move from a free-HTML publishing workflow to the structured template environment of a CMS (Ingersoll, 2005; Mosley, 2003; Bills, Cheng and Nathanson, 2003).

The ability to customize the metadata for CMS objects within individual guides gives these objects meaning for the user. Librarians can contextualize the content that goes into each guide, whether being a broad or more specialized subject or course guides. They are working within the more structured framework of this system to develop sites that are targeted and

customized for specific audiences, but still within an environment that allows librarians to deliver a better product to their users.

### **Complexity**

The CMS can make these concepts a reality in a way that a files-and-folder system cannot even come close. It offers the scalability necessary to accommodate the growing body of work being developed by library personnel without hindering editing and publishing workflows. The web development staff has more control over assigning access rights for librarians and support staff working on sites. System security and backups are in place to keep the content from being deleted or otherwise damaged accidentally, while allowing content creators to update their sites quickly and easily and remotely if desired. The CMS should also identify the author or contributor of each resource in the system and protect the content, so that one librarian cannot delete a resource that someone else is using elsewhere on the site.

Part of the complexity of a CMS when compared to simpler database-driven applications is the need for it to be flexible. In an increasingly IT-based learning environment, both on and off campus, the CMS must and should respond accordingly to meet the needs and expectations of library users. Use of the CMS should also not be limited to a single department or group of content creators within a library. It should be able to support the publishing activities of not just other library departments with public pages, such as Special Collections and Access Services, but also groups that use the library's intranet: such as committees, Technical Services units, and departments like Human Resources.

### **FIRST STEPS TOWARD A CMS ENVIRONMENT**

Realizing the limitations and less than optimal practices that had emerged out of the FrontPage environment, the web development librarian and liaison team began an informal and largely unstructured exploration of alternative solutions. This exploration was influenced by several factors.

#### **The Commercial Option**

Some early discussions about potential commercial software solutions took place informally between the web development librarian, the systems librarian, and within the library administration. Dreamweaver was considered and its feature set weighed against the university-wide FrontPage license that was in effect "free" and that the Library was using at the time. While Dreamweaver had some compelling features in contrast to FrontPage, the web development librarian and the systems librarian had concerns about the costs for licenses, recurring upgrades, and training and additional software. Those concerns were not present in FrontPage (aside from training, an issue regardless of the software package) due to the university-wide license that made copies of FrontPage and any ongoing updates available for "free." It was also unknown at the time if Dreamweaver would alleviate the scalability issues that were surfacing over time with FrontPage.

Some libraries have selected commercial CMS solutions, such as Vignette, or taken advantage of outsourcing to create their system (Mosley, 2003; Bills, Cheng and Nathanson, 2003). The web development librarian did not believe that either option was feasible mainly due to the even higher costs involved than "shrink-wrap" software solutions. The issues being raised were still new and a formal review process was not in place to submit an official proposal to persuade the Library to move to a new infrastructure with associated licensing and product costs.

With high competition for the limited technology funding available, spending could not be justified for a new website commercial service, software, and future upgrades or maintenance plans when the free FrontPage package was already available. Critical technological needs that could easily be explained and justified in a formal proposal were usually and rightly given the priority for funding. Since the exploration for alternative solutions was only beginning, any further research into a commercial solution and formal proposals was foregone while other alternatives were considered.

### **The Open Source Option**

As an alternative to fee-based licensing for website publishing software and services, open source solutions were a tantalizing option. Open source website systems at the time were often not developed to encompass the range of online services for an entire library web presence in one solution. Some open source solutions would address various library-centric services like the Scout Portal Toolkit to work with lists of resources or general content management systems that could manage HTML based web page content such as Zope or Midgard. Open source options were viable but it appeared that most would require “Frankensteining” several products together to facilitate the automation of all website content including research guides, regular web pages, blogs, an intranet, and single authentication to the system.

Additionally, many of these open source solutions tend to be supported or optimized for the Linux/Unix platforms. The library’s existing Windows Server platform environment greatly influenced many of the library’s technology choices, including this one. Any open source solution not designed for Windows IIS would carry with it the potential requirement of code tweaking and re-configuration to run in the library’s existing web server environment.

### **The In-House Option**

GSU Library had established a precedent with successful in-house web development projects between 2001 and 2003, most notably the blogging system <<http://www.library.gsu.edu/news/>>. Since the databases and code had already been developed for the blogging system as well as online resources and a private intranet login system, the web librarian drafted a prototype using all of the existing technology to illustrate the feasibility of an automated system for the research guides. This prototype was then presented to the liaison team to evaluate suitability as a replacement for FrontPage.

Two liaisons (and article co-authors), the music librarian and the biology/chemistry librarian, offered to test the web guide prototype in the summer of 2003. The newly-hired astronomy/physics librarian was invited join the beta group because she could start fresh with creating guides in the new system instead of working on migrating HTML/FrontPage web guides. They were joined by the liaison assistant, who had been working with the web development librarian and liaison team to improve the guides. The group tested the system and gave extensive feedback to the web development librarian and newly-hired web programmer, who programmed the system to accommodate baseline CMS functionality. By August, the librarians were satisfied enough with the improved system to go “live” and replace their FrontPage web guides with ones built in this new system now dubbed a Content Management System.

An introductory training manual and workshop were tested and refined with the beta group. The library-wide Technology Steering Committee was kept informed of these activities and concluded that the developing CMS would be sufficient as the next-generation tool for the



liaison web guides. The web development librarian then set up a schedule with the other liaisons to migrate their existing FrontPage/HTML content into the CMS. Typically, a group of four liaisons would attend a workshop provided by the web development librarian about the CMS and migration process. The session was a nuts-and-bolts workshop on the features and functions of the CMS. He would then meet with each liaison individually to review their existing web content and assist with acclimating them to the new system. The liaison was then given time to review their guides in the CMS while their FrontPage guides were still active. The web development librarian and liaison then scheduled a "switch-over" date to replace the FrontPage guides with the CMS guides on the live server. The process from initial workshop to switching over generally took four to six weeks, but remained flexible to allow for semester schedules and to work around other duties and projects.

At this time, the primary focus was on the top-level research guides (art, mathematics, etc.). Unlike the numerous subject and course guides that splintered off this group, the number of research guides was set at around a more manageable 30. These were also the first guides the users come across on the library website, and the need to "fix" these first was paramount.

While this migration process was moving forward, the Liaison Web Task Force was formed to formalize the various ad hoc liaison web groups. The task force met regularly with the web development librarian and programmer to review the CMS and offer feedback and suggestions on enhancing its features and functionality to support liaison-based web publishing, including the design of the template to control the look and layout of the research guides. The web development librarian and programmer continued to improve the system and develop the rich functionality desired in the CMS for the web guides.

Between August 2003 and June 2004, the liaison web guides were moved into the CMS. Some librarians rebuilt their guides in the new system. Other librarians, either due to having too many guides or too little time to rebuild them during the transition, had their FrontPage guides copied and pasted into the CMS. The web librarian, web programmer and another liaison assistant managed the copy-and-paste activities, which helped the librarians meet the goal of completing the liaison website transition quickly. The team had met the goal to switch over the entire liaison website to the CMS by the end of June 2004. In November 2004 the FrontPage liaison website was disabled and archived.

## **THE GSU LIBRARY CMS TECHNOLOGY**

### **Database Design**

At the heart of the GSU Library CMS is a MySQL database on a Windows web server. The database is made up of resource tables, metadata tables, and personnel metadata tables. Resource tables store the content objects while metadata tables assign content to templates such as Research Guides. Figure 1 shows the entity diagram of the subscription databases in the CMS. The personnel tables shown in Figure 2 house data for logging in to the system, assignments for website authoring, and also contact information for display on web pages.

The tables for personnel and subscription resources were already running on the website during the time the team began to explore solutions to replace FrontPage. As part of the early prototype a new series of tables were designed around a core set of resources, one being the subscriptions databases that would connect with the personnel tables. By joining these two tables through an administrative interface, librarians can contribute and work with database content as individuals but also collectively. After the aforementioned meetings with the liaison team to

round out the feature requirements of the system and further work with database design, a final design emerged. Figure 3 illustrates the tables used in the CMS for the research guides in 2003.

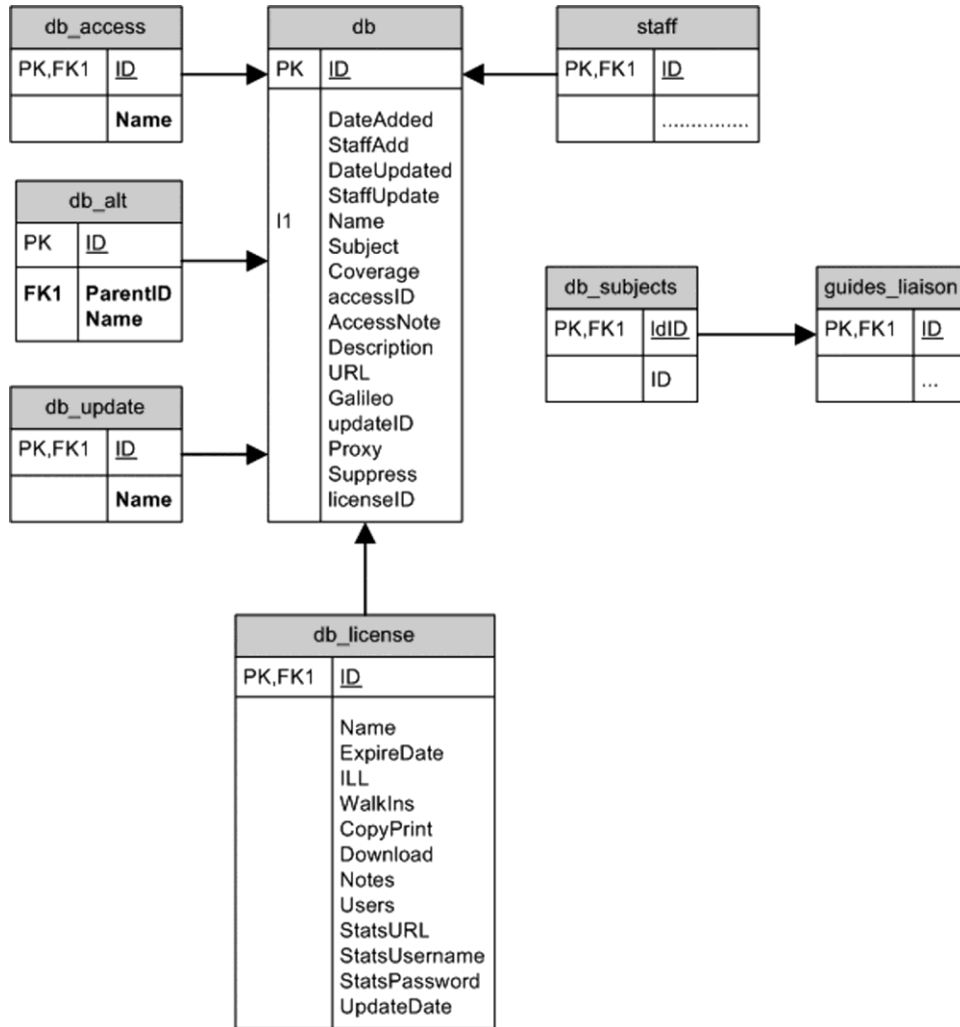


FIGURE 1  
*Entity Tables for Subscription Databases  
 Used for the library's list of databases and connected to research guides*

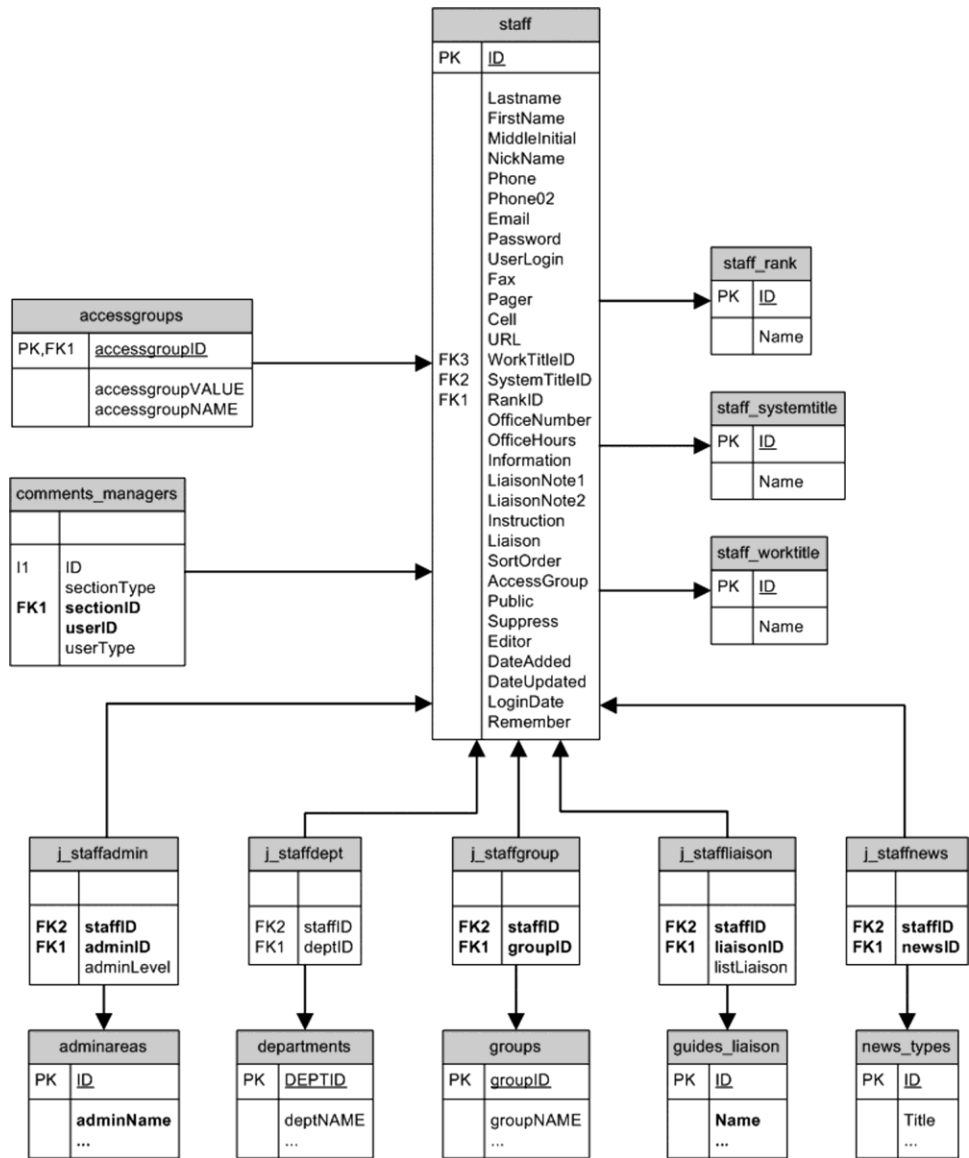
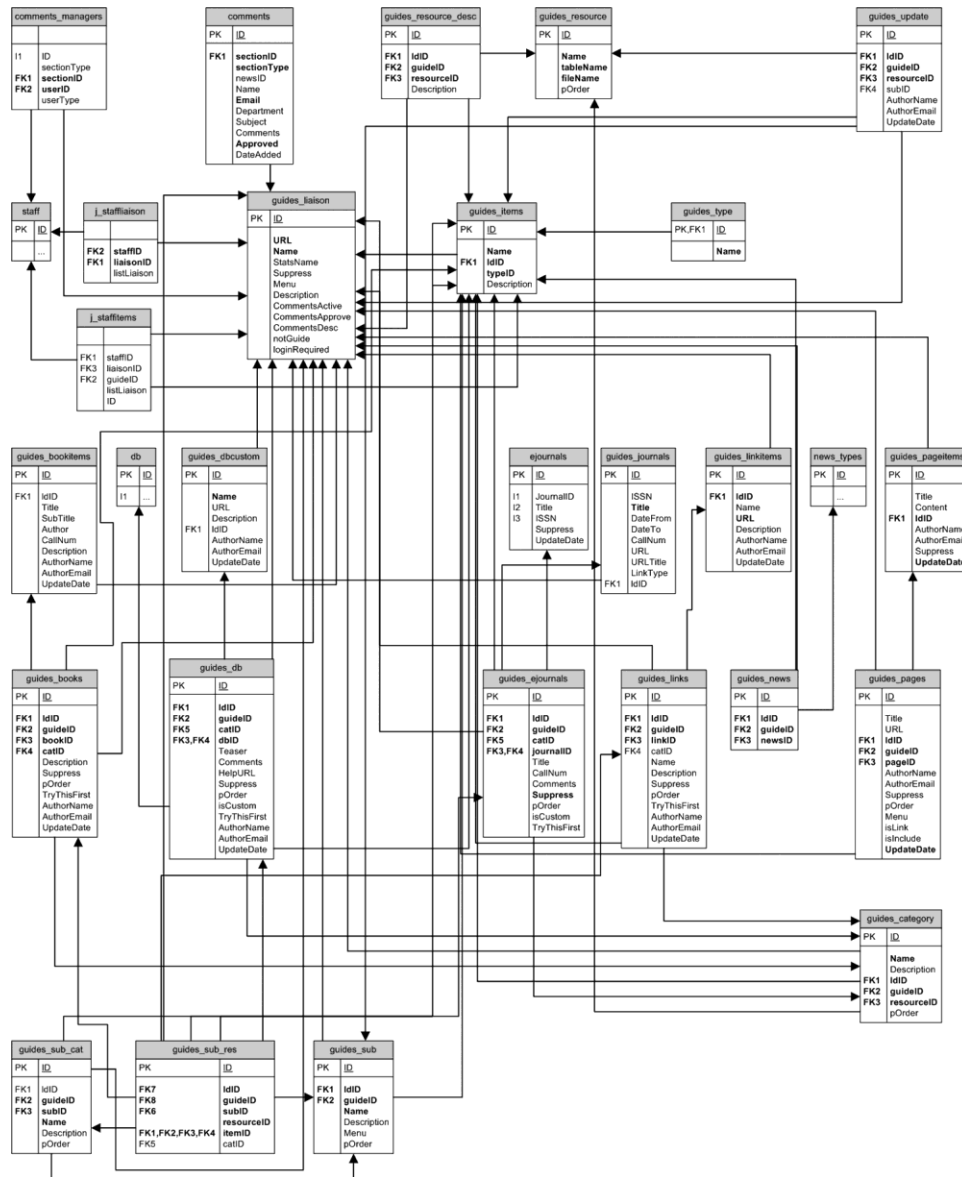


FIGURE 2  
*Entity Tables for Staff Database (Employees Database)*  
*Sets up liaison status and used in guide assignment and system login*



**FIGURE 3**  
*Entity Tables for Liaison Research Guides*  
 Tables used for the administration and presentation of Research Guides

### Administration of the CMS with Active Server Page Files

Web-based administrative interfaces, using online forms, radio buttons, and checkboxes, are password protected and enable librarians and library staff to add content to various tables in the MySQL database. These administrative forms and their various fields map to the associated database tables and fields to allow for the addition and maintenance of content. Various interfaces exist for CMS administrators to work with the personnel tables to add new employees and assign individuals or groups of people to have access to other tables. A series of interfaces also exist for librarians working in the system to add or update resources in their websites. Files for administration of the CMS exist in a directory named “dbadmin” located in the “intranet” directory. Various directories and ASP files exist in “dbadmin” that work with all the

tables in the CMS via the Web. The following directories and files constitute the site architecture of the administrative views of the CMS.

<[www.library.gsu.edu/intranet/dbadmin](http://www.library.gsu.edu/intranet/dbadmin)>

- **adminareas/** this directory provides administrators with global access for assignment of individuals to sections of the CMS.
- **cms/** this directory provides administrators with the ability to assign individuals to sites, create new sites, and get usage reports.
- **ld/** this is the liaison database directory and all Research Guide administrative files are located here.
- **ld/index.asp** The main interface for administration of a CMS research guide. See figure 5.
- **ld/books.asp** add or maintain book lists.
- **ld/databases.asp** add or maintain subscription database lists.
- **ld/links.asp** add or maintain lists of web links
- **ld/ejournals.asp** add or maintain journal lists
- **ld/media.asp** add or maintain lists of VHS, DVD, CD, or other media
- **ld/news.asp** add a link to a library blog to the guide
- **d/pages.asp** add or maintain html-based custom web pages

Functions and include files handle processing, adding, updating, or deleting records from the database. Active server pages (.ASP) can determine which guide to administer by getting the associated ID of the guide from the URL. Administration links pass a specific variable for “action” so that each page knows whether to display content for a specific guide, add new content, update existing content, or delete content.

For example, the full URL to add a web link to a course guide for a marketing course would look like:

[/intranet/dbadmin/ld/links.asp?action=select&guideID=448&ldID=52&resourceID=1](http://intranet/dbadmin/ld/links.asp?action=select&guideID=448&ldID=52&resourceID=1)

- **links.asp** determines that the online forms presented for site administration will connect to the CMS tables for web links
- **action=select** determines that a new record will be added to the table
- **guideID=448** determines that this record will be associated with the course guide
- **ldID=52** determines that this record will be associated with the parent (business) research guide
- **resourceID=1** determines that this is a website link record

By using variables for administrative actions and manipulation of database records, a single ASP file page with online forms can manage an entire CMS library of resources for all guides.

### **Public Presentation of Information from the CMS**

A group of ASP files work together as templates for the web page display of Research Guides or other content served out of the CMS. The ASP files pull data from the MySQL

database in real time to construct and present any of the hundreds of web pages, lists of resources or, research guides, on-the-fly.

The following files constitute the site architecture of the public view, or template, of the research guides in the CMS:

- **liaison.asp** is the main template file for the research guides, not including the resource lists.
- **resources.asp** is the template file used exclusively for lists of resources in the guide such as books, journals, web links, and subscription databases.
- **one library-wide style sheet (.css)** for font, color and branding control.
- **various include files** for working with the database, processing record sets from the database, handling variables, and date formatting.

In the heading of both liaison.asp and resources.asp files are a series of include files that carry out various functions.

```
<% 'include file to connect to the CMS database %>
<!--#include virtual="/includes/inc_db_cms_connect.asp" -->
<% 'include file with common functions %>
<!--#include virtual="/research/inc_functions.asp" -->
<% 'include file to format dates %>
<!--#include virtual="/includes/inc_convdate.asp"-->
<% 'include ADO constants files – used in the resources.asp file %>
<!--#include virtual="/includes/inc_adovbs.asp" -->
<% 'include file with subroutines and functions – used in the liaison.asp file %>
<!--#include virtual="/includes/inc_code.asp" -->
<% 'initialize variables %>
<% p = "main" %>
<% 'include preprocessing – gets variables from URL and sets code and variables for
resource pages, liaison pages, quick guides, or print pages %>
<!--#include virtual="/research/inc_preprocess.asp" -->
<html>
<head>
<meta name="robots" content="noarchive">
<meta name="googlebot" content="noarchive">
<title><% = headerTitle %></title>
<link rel="stylesheet" type="text/css" href="/styles/librarywide.css">
<script language="JavaScript1.1" src="inc.js"></script>
<script language="JavaScript1.2" src="inc_guides.js"></script>
</head>
```

The ASP files rely on variables passed from the URL to execute calls to the CMS database. Once variables are passed, ASP code will retrieve information from the database and assembles it for the viewer in their browser. Figure 4 illustrates a URL for a Research Guide.

The 3 variables passed to the system from the URL are:

- **ldID** (Liaison Database ID) is the record identifier for a specific research guide
- **guideID** determines whether the system displays content from the main research guide or any of the course guides or specific subject guides it contains. If the value is “0” the system defaults to the main research guide located with ldID.
- **resourceID** determines if the content being presented is a book, electronic journal, web link, database, or other types of resource objects that may exist in the system. In the URL example in diagram 1A the resources shown are subscription databases which fall under the resourceID value of “2.”

**Music Research Guide Subscription > Database List**  
<http://www.library.gsu.edu/research/resources.asp?ldID=35&guideID=0&resourceID=2>

If the URL does not pass a "guideID" value or if it passes a "0" then the content and any resources displayed are pulled from the main research guide which is designated in the system with the value passed by "ldID".

**Music Research Guide > American Popular Music > Database List**  
<http://www.library.gsu.edu/research/resources.asp?ldID=35&guideID=33&resourceID=2>

If a value is passed for "guideID", such as "35" in this example, then the system knows that a course or more specific type of guide exists as a child of the parent guide designated by the value from "ldID". In this example guide "35" is Music and "guideID=33" tells the system to pull the content from the specific guide called "American Popular Music" which is record "33" in the guides table of the CMS.

FIGURE 4

*Values passed in URL's determine what content to show*

## Supporting CMS Concepts with the GSU Library Technology Infrastructure

### Content

The MySQL database contains tables for specific types of resource objects such as databases, e-journals, books, media, and internet links. The fields for resources include information such as title, description, URLs, and also the date added and the numeric identifier of the person adding the data. In some ways the system behaves as a digital repository or digital library system. Most resource content, such as e-journals or subscription databases that are used by all librarians, are populated and maintained by the electronic resource librarian or CMS administrators.

Librarians, using the administrative interfaces can select from the collection of existing content to quickly collate resources for a guide or web page. Librarians also enrich the resource tables since they are capable of inserting new records for their assigned websites. Other tables in the database assist in making the system more CMS-like by storing information (descriptive and administrative metadata) about collections of resource objects and descriptions of those

collections. Resource objects in the table are tied to the guide’s metadata table through join tables in MySQL.

The reuse and re-purposing features of the system are used repeatedly and make up a sizeable portion of the website development model of the CMS. Librarians have the ability to add a resource item once, such as a book or journal, and then reuse that item in many research or course guides instead of creating duplicate entries of the resource over time. Librarians can utilize resources added by other librarians in the system as well to help reduce duplication of data.

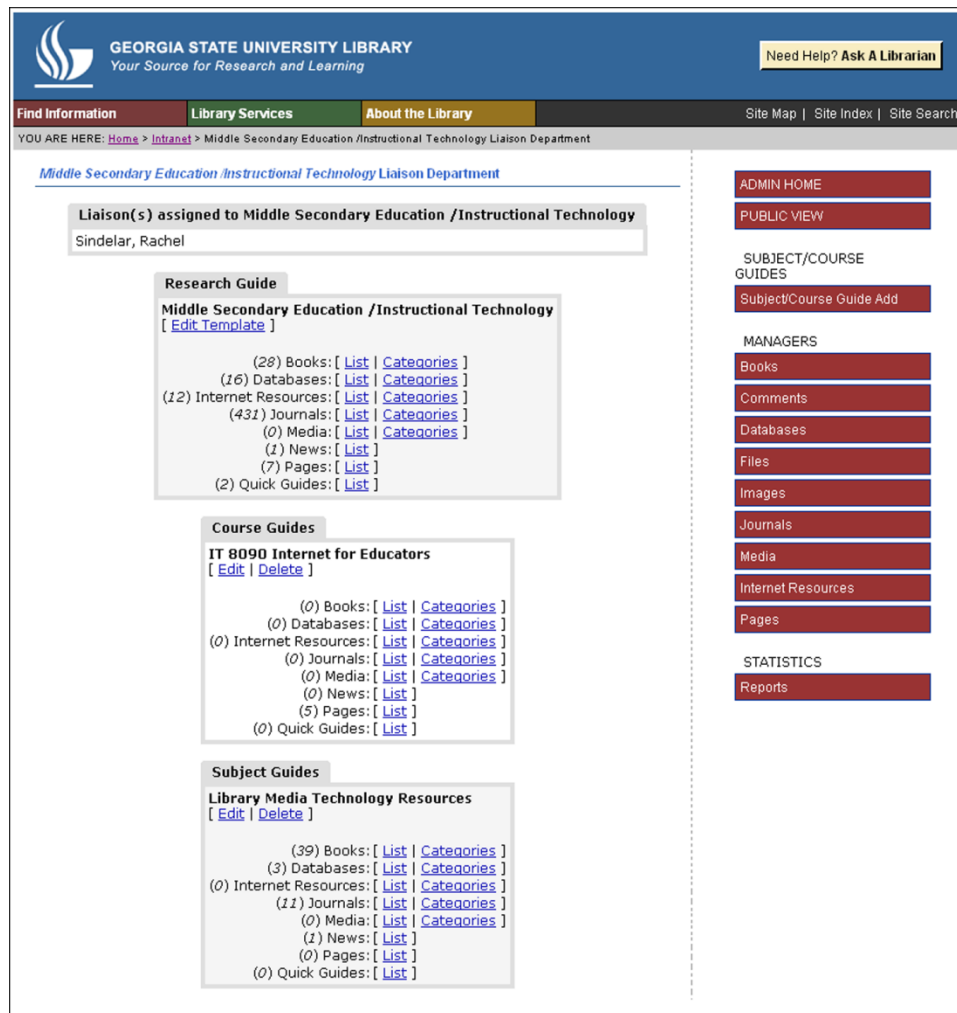


FIGURE 5  
CMS Interface Administrative View

### Control and Customization

The system offers both presentational control and administrative control over the library web presence. Control mechanisms are available to site administrators and also to librarians in their assigned CMS spaces. Librarians have online forms to work with resources and web pages stored in the CMS while site administrators have online forms to edit or add website sections (such as new research guides) and also assign people and authorship rights to those sections.



The ASP template and CSS files manage presentational control. These are maintained and developed by the web development personnel to meet functional requirements requested by the liaison librarian web group. Librarians have the ability to customize resource or content presentation within the constraints of the library-wide template system. The most apparent examples of librarian customization are found in the custom descriptions, custom categories, and custom rankings features of the system in addition to the ability to add custom HTML-based web pages.

Custom web pages, like resource objects, are fields in the “pages” table that utilize large field lengths to accommodate the HTML markup needed to store a web page in the database.

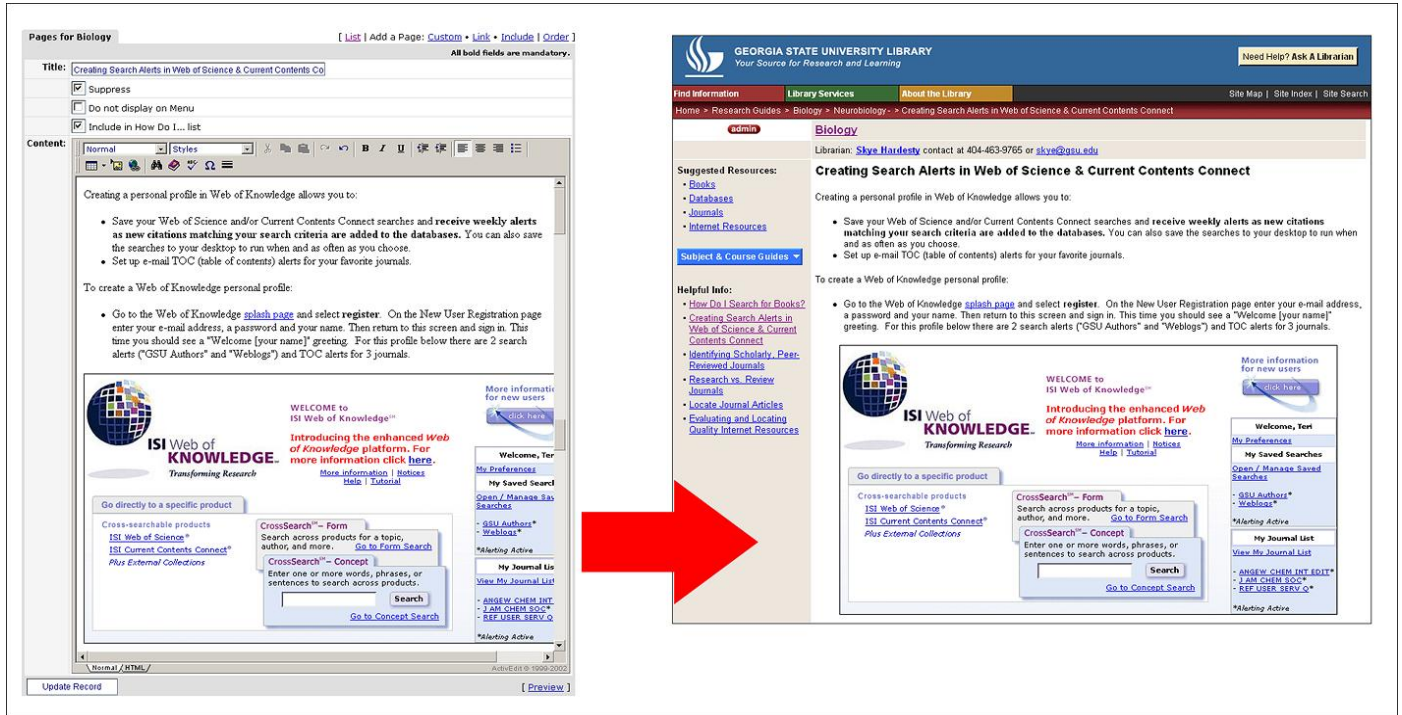


FIGURE 6

*Example of web editor showing a custom page in the CMS administrative view and the same content rendered in the template for the public view*

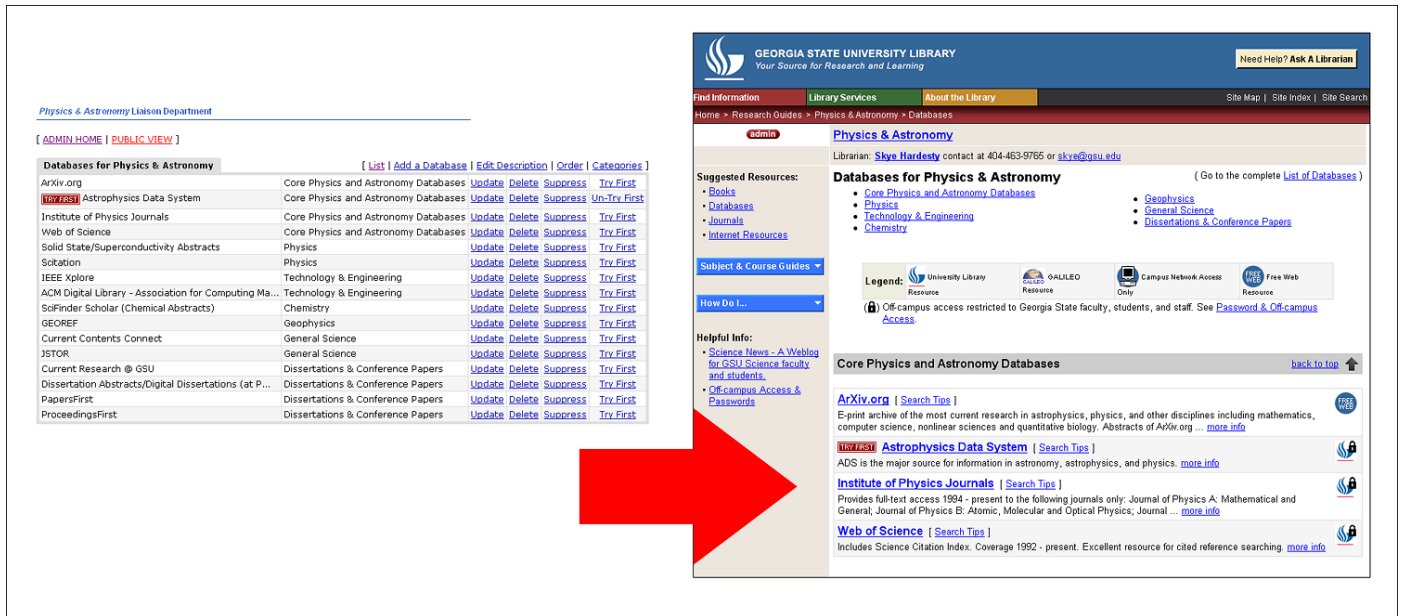


FIGURE 7

*Example of subscription database list in the CMS administrative view and the same content rendered in the template for the public view*

Without presentational controls, the system would simply provide alphanumeric listings of resources with universal descriptions applied every time resources were displayed to the user. While simple listings might be sufficient in some cases, customization of resource listings allow for the use of CMS guides in courses or for instructional purposes where objects need to be presented in a particular order to support learning objectives.

### Complexity and Context

The Research Guides component of the system is the most complex since it dynamically joins content from many separate tables: information about the assigned librarian(s), the name and collection information of a guide's topic, the individual resources that are present in the guide's collection, and finally any HTML-based web content that lives in the web page table.

The liaisons' component of the FrontPage site had 14,000 files, hundreds of folders, and was approximately 270 MB in size. In contrast, the entire textual content of the library website now in the CMS amounts to less than 100 MB. The FrontPage research guides which were composed of thousands of HTML pages are now represented by less than a dozen ASP files that create pages on-the-fly. The database system affords better statistics and reporting on the numbers of guides, resources, which resources are used in which guides, and more. Broken link checking in FrontPage was a project that never got off the ground due to the laborious task of checking and editing thousands of HTML page files and repeatedly updating broken links that may have been copied from guide to guide. In a CMS all links can be checked, their associated use in guides identified, and then all of those associated pages can be updated with a single update to an objects URL in the resource table.

## **DESIGNING A USABLE CMS RESEARCH GUIDE TEMPLATE FOR STUDENTS AND LIBRARIANS**

Just as the development of the CMS was an evolutionary process, so was the development of the template that would standardize the research guides. A temporary transitional template was used for several months until the content from the guides was migrated to the CMS and a new template could be globally implemented. The temporary template consisted of a sidebar menu with standardized labels and links for books, databases, internet resources and journals and a text area that was simply copied from the FrontPage version of the guide. The liaisons could add unlimited additional links to this sidebar menu and could edit the main text area without restrictions.

Throughout the template development process the liaisons (first the informal team, then later the more formalized task force) examined the research and subject guides of other libraries to identify common or best practices regarding content, layout/templates and navigation. While some guides organized content into broad format categories (books, journals, databases, websites), others had items grouped by function (dictionaries, encyclopedias, and indexes), regardless of whether they are print or online, licensed or free. This grouping allowed all encyclopedias to be displayed together, whether they were print, licensed databases or freely available websites. In a format-based system of organization, like that used for most existing FrontPage guides, the encyclopedias would be displayed on three separate lists. While having one place to look rather than three may be simpler, changing the resource lists would have required the liaisons to re-categorize thousands of data elements and would have significantly delayed the CMS transition and migration. The choice to build the CMS database tables around existing data categories (books, databases, journals, internet resources) was based on manpower, time, and the liaison's desire to limit the reworking of their guides. While re-categorizing all the data was not feasible the programmer developed pages that allow the liaisons to select from all of the formats/tables and combine print and electronic resources into custom lists.

As far as layout and navigation, some of the library guides the task force examined were arranged as a single scrolling page of resources thus providing immediate access to resources. Others were broken down into secondary pages linked to the main page for the guide, similar to most of the existing GSU research guides. Although the task force wanted the research guide template to provide immediate access to information, our existing guides contained far too much information to be presented on a single scrollable page. Since the liaisons were concerned over the perceived loss of flexibility and autonomy and having to rework all of their guides, the template would have to accommodate existing content. The solution was the creation of a template that highlighted and provided direct access to a few core resources with linked pages for the resource lists, subject and course guides, and custom pages.

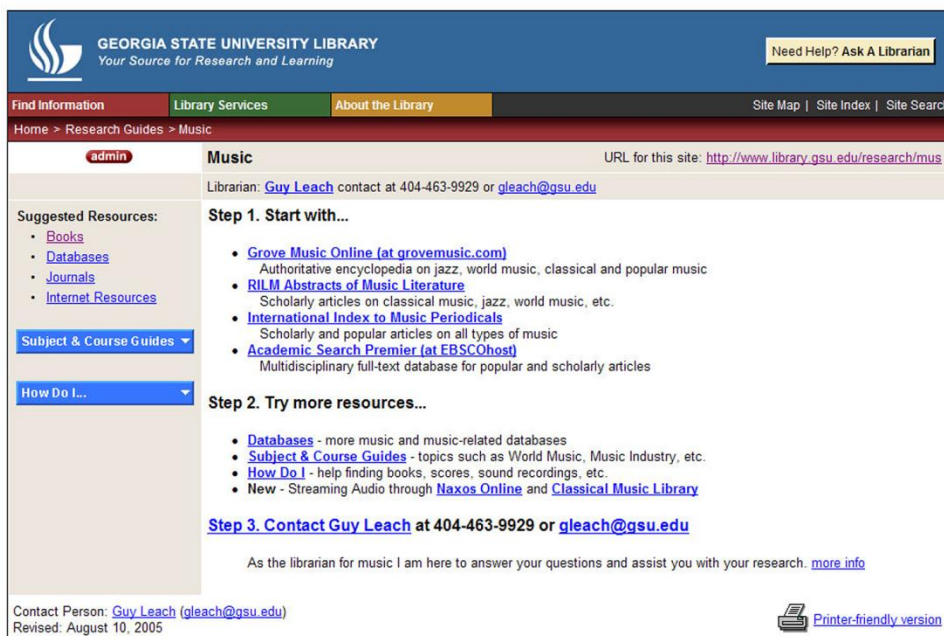
The template (Figure 8) consists of a sidebar menu and a formatted main section which follows a step-wise progression. The first step (1. "Start with...") requires the liaison to list no more than four core resources which can be accompanied by custom descriptions. The next step (2. "Try more resources...") provides an area for a second list of up to four additional sources of information and comments. In the third step (3. Contact...), a default sentence with the liaison's contact information is provided, along with some optional free-text space to describe their services. In addition to limiting the number of resources, the number of characters for resource annotations and the free-text space are also limited, thus allowing the three steps to be visible on a single screen. In the area following these steps the liaison is provided with unlimited free text

space which is often used to include specialized materials that did not easily fit within the defined template.

Where the main section focuses on core resources, the sidebar menu provides a uniform display for resource lists, subject and course guides, custom pages, and miscellaneous helpful information. The resource lists (“Suggested Resources”) for books, databases, journals and internet resources are required elements for all research guides. The subject and course guides and tutorial/custom pages (“How Do I?”) are available through drop-down menus. The drop-down menus were a solution to the previous display of this information as a long list of links.

This template accomplished several goals of the task force. The required elements ensured that every research guide offered some baseline resources to help a user get started with research, and the limits kept the required, standardized content visible on the first page. Although the research guide template contains many required elements, it still offers a fair level of customization for the liaisons. They can annotate their selected core resources, organize their “Try more resources” section, and take advantage of the free-text space, utilize the numerous optional elements in the side bar menu.

As mentioned earlier, the template was initially only applied to the research guides. Despite their initial resistance to the idea of a template, the liaisons expressed their acceptance and approval of the template by requesting that it be made available as an option for the subject and course guides. It should also be noted that the template was designed to serve all of the liaisons for their disciplines: sciences, humanities and social sciences. While this “one size fits all” approach was largely successful, the template was still flexible enough that some modifications could be made to accommodate unique needs of several librarians.



The screenshot displays the Georgia State University Library website. At the top, the logo and name "GEORGIA STATE UNIVERSITY LIBRARY" are visible, along with the tagline "Your Source for Research and Learning" and a "Need Help? Ask A Librarian" button. Below this is a navigation bar with "Find Information", "Library Services", and "About the Library" tabs, and links for "Site Map", "Site Index", and "Site Search". The main content area is titled "Music" and includes a URL for the site: <http://www.library.gsu.edu/research/mus>. A sidebar on the left contains "Suggested Resources" (Books, Databases, Journals, Internet Resources), "Subject & Course Guides", and "How Do I...". The main content area is divided into three steps: "Step 1. Start with..." (listing Grove Music Online, RILM Abstracts of Music Literature, International Index to Music Periodicals, and Academic Search Premier), "Step 2. Try more resources..." (listing Databases, Subject & Course Guides, How Do I, and New - Streaming Audio), and "Step 3. Contact Guy Leach at 404-463-9929 or [gleach@gsu.edu](mailto:gleach@gsu.edu)". A footer section includes "Contact Person: Guy Leach ([gleach@gsu.edu](mailto:gleach@gsu.edu))" and "Revised: August 10, 2005", along with a "Printer-friendly version" link.

FIGURE 8  
*Public view of a Research Guide dynamically displayed from the CMS.*

The template was introduced in August 2004 with the understanding that usability testing would need to be completed. That fall, a usability study was conducted to evaluate the structure, layout and labeling of the research guide template and data elements. While the study identified many small improvements that could be made to the existing template, the study also revealed that the basic layout of the template did not achieve the desired result, which was to make a variety of research resources readily apparent to the users. In general, the usability study subjects focused on the resources in the main content area of the guide and almost ignored the resources listed on the sidebar menu. As of this writing, the template is being revised to better utilize the geography of the page and to improve navigation. The sidebar menu may be removed, and its content incorporated into the main body of the page. The layout and labeling changes will be managed globally through the CMS. The liaisons will have to make some decisions about content changes that cannot be globally updated. Once the revised template is ready, usability testing will be conducted with students to ensure that the changes demonstrate a significant improvement.

In addition to the research guide home page, templates were also required for the pages of books, databases, journals and websites linked from a guide homepage. The templates standardize the layout of these pages but still provide the liaison with the flexibility to create categories to group the resources on a particular page. Liaisons can order these categories and the resources within each category, and they can prioritize selected resources by marking them with a “Try First” icon (Figure 9). The liaisons also have the freedom to add custom descriptions for categories and individual resources. These descriptions provide context to the resources within a particular guide. For example, the history and the music liaisons may refer users to the same database, but describe the database differently for the benefit of their users. Creating categories, ordering and prioritizing resources, and writing custom descriptions provide valuable information for the users of the guides, whether they are students, faculty or librarians.

**Databases for Music** (Go to the complete [List of Databases](#))

- [Music](#)
- [Music Education](#)
- [World Music](#)
- [Biographical Indexes](#)
- [General Databases](#)
- [Streaming Audio Files](#)

**Legend:** University Library Resource GALILEO Resource Campus Network Access Only Free Web Resource

Off-campus access restricted to Georgia State faculty, students, and staff. See [Password & Off-campus Access](#).

**Music** [back to top](#)

**TRY FIRST** [RILM Abstracts of Music Literature](#)   
Scholarly writings including articles, books, bibliographies, dissertations, conference proceedings, etc. [more info](#)

**TRY FIRST** [Grove Music Online \(at grovemusic.com\)](#)   
Scholarly encyclopedia articles covering all types of music: classical, opera, jazz, etc. [more info](#)

[International Index to Music Periodicals](#)   
Scholarly and popular music articles, as well as numerous reviews for books and sound recordings. [more info](#)

[Music Index Online](#)   
Scholarly and popular music articles, as well as numerous reviews for books and sound recordings. [more info](#)

[Doctoral Dissertations in Musicology Online](#)   
Dissertations and new dissertation topics in the fields of musicology, music theory, and ethnomusicology. [more info](#)

**Music Education** [back to top](#)

The databases listed should be used in addition to the Music Databases listed above.

**TRY FIRST** [ERIC \(at EBSCOhost\)](#)   
Covers all aspects of education and educational research, includes published and unpublished sources. [more info](#)

[Professional Development Collection \(at EBSCOhost\)](#)   
A specialized collection of journal articles and pamphlets especially for professional educators. [more info](#)

FIGURE 9  
View of resource list in a Guide showing the “Try First” icon.

While the CMS provides a variety of tools for organizing content, the liaisons are responsible for supplying the content and manipulating those tools. To assist the liaisons with the new system and templates, the task force created a “best practices” checklist for reviewing each research guide template and the accompanying linked pages. The checklist review provided the liaisons with positive feedback as well as areas that could be improved. While the checklist identified content or layout issues that either did not comply with library web policy and the research guides mission and purpose, it also highlighted content that could be displayed and formatted better using some of the advanced features of the CMS. For example, some liaisons, having worked in a FrontPage HTML environment, resorted to creating custom HTML pages in the CMS. Often, the content of these HTML pages could have been entered into the CMS resource object table to automate the process of creating lists of resources instead of hand coding HTML.

Completing the checklist review of the guides highlighted the limitations of the task force. The group had been formed to guide/oversee the liaison’s web presence. The group was not formed as an editorial board that monitored and reviewed the guides nor did the members have formal training in web page development and architecture. The task force was created to

assist in the development of the liaisons web presence and web templates. The templates have provided a uniform structure to increase standardization across all the guides.

The system itself, however, is not the complete solution. There is an ongoing need to train the liaisons on utilizing the diverse and developing features of the CMS, as well as to provide them assistance with learning user-centric website development practices and information architecture. Creating and nurturing a culture of learning that combines formal training sessions and workshops with more informal information sharing among content creators will help ensure that the library and librarians get the most out of the system in place.

### **ASSESSING THE LIAISON MIGRATION TO THE CMS**

The development of the CMS was a highly collaborative endeavor involving library web development personnel, the liaison web task force, and the liaisons as a group. The web development librarian and web programmer solicited and implemented task force and liaison feedback throughout the development process. This collaborative approach contributed to the CMS having numerous features and functions that allow for a high level of customization. Since the web development personnel listened and responded to their concerns and requests, the liaisons was able to participate in the process and maintain a sense of control over their guides--making the transition a little easier.

In June 2005 the authors, in partnership with the task force, surveyed the liaisons concerning their experience with the CMS. The goals of this survey were to evaluate the transition process, to identify areas for improvement regarding the training and documentation for the CMS, to develop new features in the CMS and to improve the interface used for adding, editing, and formatting content. The twenty-question survey was a mix of questions requiring a textual response and those that could be answered by selecting strongly disagree, disagree, no opinion, agree, and strongly agree. Of the twelve respondents (out of thirteen who received the survey), two had joined the library since the CMS migration and therefore had not created guides in FrontPage at GSU.

All of the respondents indicated that the reason for migrating to the CMS was clearly communicated. While all the respondents identified standardization as one of the reasons for the transition to the CMS, roughly three quarters of the respondents also mentioned ease of use. While almost all of the liaisons indicated that the CMS was easier to use than FrontPage or Dreamweaver, a few disagreed or had no opinion. In response to what they liked about the CMS, the respondents mentioned ease of use for both entering data and using existing data. Some respondents also mentioned that they liked the templates which allowed them to concentrate on content and not worry about format. As far as what they liked about FrontPage, the respondents identified specific features as well as flexibility, having more control and the ability to customize layout.

Regarding the transfer of content from FrontPage to the CMS, the vast majority considered the transition to the CMS fairly smooth, and the support from the systems office to be excellent. The systems office was praised for doing most of the work, listening to the liaisons, and meeting one-on-one to make sure the transfer of information was accurate. A recurring complaint about the transition was formatting constraints and having to rework guides or portions of existing guides to fit the new template. When asked about what additional technical support is needed, some respondents want more assistance with maintenance and clerical tasks. Others mention the need for guidance concerning the architecture and organization of their information.

The respondents had mixed opinions on the documentation and training provided during the transition. Since the CMS was continually changing, providing accurate and current documentation was difficult. Once the CMS had reached a level of stability, documentation was created. During the migration liaisons received individual and group training on the basic features of the CMS. Many respondents were satisfied with the level of training while some indicated that they would like more. When asked what topics could be addressed in additional training, suggestions included many of the more advanced features: building custom pages using the internal HTML editor, using the features of the system to combine all types of resources into single-page formatted lists, and maximizing use of the resource manager where the resource lists are accessed.

The final questions of the survey covered the interface used for creating and maintaining guides in the CMS. While the majority of the liaisons find it fairly logical and easy to use, numerous suggestions were given for improving the functionality of the CMS, many of which the task force was already aware. The feedback provided by the survey identifies successes as well as areas for improvement. (See Appendix A for this article located at <http://www.library.gsu.edu/scholarship/articles/2005/goans/> for detailed survey results.) Migrating to a new system is always a challenge, but the process is much easier and more successful when there is communication and collaboration among the parties involved.

While a CMS equalized HTML skill dependencies, the survey and anecdotal evidence reveals a crucial gap among librarians understanding about website information architecture and writing for the web medium. When publishing on the web, the librarian is responsible for the organization of content for the web medium. The CMS model, which usually separates content from presentation, may differ from the environment or tools in which the librarian was trained. Many librarians coming from an HTML background with tools such as FrontPage or Dreamweaver may not possess web development or information architecture competencies needed to fully utilize a CMS or other web publishing tools effectively. Libraries, especially those with decentralized content contribution, should consider providing library personnel with information and training on writing for the web.

### **SURVEY OF CMS ACTIVITIES IN LIBRARIES**

After a year of working with the in-house CMS, planning activities began at the systems level for updates. At this time it was decided that a peer survey was in order. Along with other assessment activities, this would help inform future decision-making and to gauge the library's activities in relation to peers in the field. The authors also felt that such a survey would offer a more accurate snapshot of current CMS activity among academic libraries than relying solely on the journal literature. Sixty-three peer institutions were identified as potential participants in a survey on CMS adoption and usage. The list was assembled from the Peer Institutions page at Georgia State University's Office of Institutional Research <<http://www2.gsu.edu/~wwire/peer/>> and included the Urban 13 group, GSU's current and proposed peer institutions as defined by the state's Board of Regents, the Southern University Group, and the ASERL academic libraries <<http://www.aserl.org/>>. An email was sent to the web librarian or closest equivalent at each location, explaining the purpose of the survey and inviting them to participate. Sixteen librarians responded that they wanted to participate, and they were sent the email-based survey in March 2005 that asked the following questions:

- Are you using database driven technology?



- Are you using a CMS?
  - If not then what do you use for web publishing and what is your process?
  - If yes then...
    - What parts of your site are CMS driven?
    - What CMS product do you use?
    - What is the status of your CMS implementation?
    - What is the process for publishing content with your CMS?

The variety of responses received indicates that content management systems are still an emerging and not yet universally adopted technology. Six of the 16 respondents reported CMS usage at their libraries, with one library using a CMS to run their entire website and the rest reporting use of CMS technology to run parts of their website. Three of the six libraries built their system in-house, while one used Macromedia Contribute, one used Zope, and the remaining library used DBMAN. Among the ten respondents who reported that their libraries were not using one, three libraries are “fully considering” moving to CMS technology while seven libraries are not. (See Appendix B located at <http://www.library.gsu.edu/scholarship/articles/2005/goans/> for detailed survey results.)

When the participants were asked about their website publishing processes, their answers reflect the potential strength in content management systems as enabling wider librarian contributions while affording better mechanisms for site administration and editorial control. Of the ten non-CMS respondents, seven reported a web publishing process with content funneled through a single person or small group of people, referred to as editors or other content oversight groups. In contrast, the six libraries using a CMS reported multi-contributor publishing activities and efforts to further streamline the process within the CMS environment.

Based on this sample, the move toward CMS migration among academic libraries is neither universal nor is it moving at the same adoption rate even among the libraries who are implementing CMS technology. Although all of the responding libraries are using database-driven technology for certain resource collections like databases and journals, there was no similar consensus on CMS adoption. Using CMS technology to develop a more efficient or collaborative publishing processes seems to be present and is viewed by CMS adopters as a benefit to the system over traditional web publishing models.

## **CONCLUSION AND FUTURE DIRECTIONS**

The move to a CMS has been a positive experience and a success due to the collaboration between web development personnel and the liaison librarians. The web development librarian and programmer were able to work with the smaller team of librarians to redesign and revision a large and content-rich subject liaison web presence. Library liaisons and web development personnel were able to leverage the skills and knowledge present in each group to create a system that serves the working objectives of both parties, to the benefit of users.

While the liaison department is the largest group of contributors to the GSU library website, they are by no means the only department that has benefited from the CMS. One of the primary goals was to create a system that could ultimately be expanded to other departments. The CMS makes up the vast majority of the library’s website infrastructure, and is also being used for committee websites and other sections of the intranet. Plans are underway to further enhance the system and migrate content from departments not yet utilizing the CMS. The need for further training as identified in the liaison survey will also be addressed.

Templates, the primary CMS component that currently presents content to users are only one part of future development. As technologies evolve to support a more content-based “remix culture,” users will tap into the library’s raw content to use in their environments and applications. Future assessment and development activities will be directed to keep the CMS poised to meet these changes.

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