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Web Site Content Management Systems: Selection and Usage at Land-Grant Universities

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WEB SITE CONTENT MANAGEMENT SYSTEMS: SELECTION
AND USAGE AT LAND-GRANT UNIVERSITIES

A Thesis
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
Professional Communication

by
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Accepted by:
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ABSTRACT

American land-grant universities generate large amounts of information for their Web sites, which serve a variety of audiences in addition to students, faculty, and staff. Many of these universities are beginning to search for Web site content management systems (CMS) to help organize this information. However, there are hundreds – if not thousands – of systems in this emerging arena, with no clear market leader. This paper provides a snapshot of the experiences of communicators at several universities where content management systems are in use. The purpose is to provide criteria to help Web site managers at universities and other organizations make more informed decisions as they consider which content management system to implement.

Specifically, the study used an online survey followed by a questionnaire to selected Webmasters at land-grant universities across the United States, and tracked comments on a university Web developers' discussion board to determine the Web site content management system that is currently in use or under consideration, usage patterns, advantages and disadvantages, staffing requirements, and advice to colleagues considering such a system.

This study does not attempt to offer a definitive answer as to which content management system is the best. After all the questions, comments, and analysis, it confirms Noel Ward's observation (2001), "No one-size-fits-all content management solution exists." However, it does offer some insights into what Owen Linderholm (2001) aptly described as the "seemingly endless array of content management software" by identifying some criteria for evaluating CMS choices and it reveals a glimpse into

fascinating possibilities for the future of content management systems. Criteria to consider when evaluating a CMS include:

- Usability of the authoring environment for developers and content providers

- Internal needs assessment (e.g., cost of the software and the personnel to develop/maintain the CMS and train/coach content providers)

- Vendor considerations (e.g., what is involved to make the system do what the sales representative says it will do)

DEDICATION

This is dedicated to my daughter, Rebecca, who set the standard for academic achievement by graduating with honors in two majors, and to my family and friends, who patiently listened to my complaints and progress reports over the years. Thank you for your unfailing support and forbearance. *Por fin se acabó*.

ACKNOWLEDGMENTS

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CHAPTER ONE

CONTEXT FOR RESEARCH

Basis for This Study

This study explores factors to consider as communicators seek to manage Web

sites through the use of a content management system (CMS). It does not attempt to

recommend any one system. Instead, its purpose is to share information collected over a

two-year period that may be useful to other communicators as they consider which, if

any, CMS meets the needs of their organization. It also seeks to develop criteria that may

help guide their decision-making process.

The study began in 2006 as my employer, Clemson University, undertook an

effort to improve the effectiveness of its Web presence. Like many universities at the

time, Clemson's Web site was a collection of pages produced by a variety of individuals

in multiple departments using any number of tools – from writing html code to

downloading free NETSCAPE software to purchasing individual licenses for FRONTPAGE,

DREAMWEAVER, and other commercial software. Each individual or department

developed their own collection of Web pages that were linked through university servers

with little consistency of design or usability. Outside consultants were hired to assess the

effectiveness of the Web site as part of a university communications review. After their

assessment, the consultants recommended implementing a content management system to

bring consistency to the wide variety of pages managed by multiple individuals and

departments.

As one of the Clemson University communicators with responsibility for several collections of Web pages, I had a personal interest in this process so I selected it as the topic for my research project in the ENGL 850 Research Methods class for the Master of Arts in Professional Communication. As a member of a professional association for communicators at land-grant universities such as Clemson, I felt that the topic also may be of interest to my peers at other land-grant universities and to communicators at other organizations whose Web sites contain large amounts of information generated by multiple individuals and departments for a wide variety of audiences.

Why Land-Grant Universities Were Used

Communicators at land-grant universities face challenges that are distinct from colleagues at other higher education institutions. All colleges and universities communicate with a wide variety of audiences, including current and prospective students, parents, high-school guidance counselors, current and prospective faculty and staff, alumni, sports fans, and donors. In addition to these audiences, land-grant universities have a federal mandate to develop and deliver specific "how-to" information for the general public, which increases both the number of audiences and the volume of information to be communicated.

The term "land-grant" refers to the way these universities were funded in the 19th century. The land-grant university is a uniquely American institution that revolutionized higher education by providing a practical curriculum to improve the quality of life for a broad segment of the population – as opposed to a classical education for an elite class,

which was the university model developed in 13th century Europe. Land-grant

universities were created by the U.S. Congress (Morrill Act of 1862) to provide a broad

segment of the population with a practical education that related directly to their daily

lives, specifically the agricultural, mechanical, and business education needed in an

agrarian economy. Robert Connors expands on this background in his chapter in *Central

Works in Technical Communication*:

> "Prior to the Civil War, colleges in America had been predominantly
>
> religiously based, usually fairly small, and reliant upon a classically
>
> descended curriculum. With the passage of the first Morrill Act in 1862,
>
> however, the foundations were laid for a revolution in American college
>
> study. The two Morrill Acts, in 1862 and 1877, founded and promoted the
>
> land-grant agricultural and mechanical colleges that were to make college
>
> education available in the later nineteenth century to a hugely increased
>
> percentage of the population, colleges that were to broaden and specialize the
>
> college curriculum in many ways" (Robert Connors 2004).

The mission of land-grant universities was soon broadened by two additional Acts

of Congress. The Hatch Act of 1887 established an agricultural experiment station in

connection with the land-grant college in each state. This created a national system of

university scientists who share their research discoveries and thereby accelerate

development of science-based information. The Smith-Lever Act of 1914 established the

Cooperative Extension Service, a national system to transfer information generated by

land-grant university scientists directly to the people in each state. As a result, an extension office was established in every county in the nation (*The Land-Grant Tradition* 1995).

There are 50 major land-grant universities in the U.S., one in each state. The land-grant is usually one of the largest universities in the state and has a high visibility because of its public service mission. Scientists in the research and extension branches work collaboratively – both within each university and with colleagues at other land-grants – to generate and transfer research discoveries to improve the quality of life for the nation's citizens. Prior to the Internet, this knowledge transfer was accomplished through print publications or by extension agents presenting workshops in cities and towns across their state. The Internet offers a very cost-efficient and convenient way to make this information readily available to the diverse audiences served by land-grant universities, which include farmers, land managers, commercial food producers, community leaders, public policy makers, business and industry managers, families, and youth. As a result, the amount of information that land-grant universities have posted on the Internet increased dramatically since the 1990s, but without an overall method to manage the content. It simply evolved as research and extension personnel created individual Web sites, which often were not related to one another. This makes it very difficult for members of the public to find the information they are seeking. Web site visitors may locate information from one researcher or one extension agent but not from others who are working on similar issues.

In recent years, the challenge of managing Web site content has reached critical mass as land-grant universities have sought both to make information more easily available and to contain operating costs. One solution is a Web site content management system to organize information generated by research and extension personnel at each university. This approach has been a topic of much discussion for several years at the national conferences for communications and information technology staff at land-grant universities. It has also been a topic of much interest at the U.S. Department of Agriculture (USDA), which oversees the research and extension programs at land-grant universities. In February 2008, a national Web site was launched to bring together information submitted by extension scientists at all the land-grant universities. Called "eXtension," it is a Web-based content management system developed to handle the volume of information submitted by scientists from multiple universities across the nation.

Development of Web Content Management Systems

Web site content management systems are defined by Gerry McGovern (2005) as "computer software based tools that assist humans to create, manage, deliver, and navigate or browse content." These tools appeared as early as 1975 but development began accelerating rapidly in the 1990s as the use of basic Web publishing became more widespread and the number of Web pages began to increase. McGovern notes four major developments on the CMS timeline:

1. Mainframe Content Management (CM) or Electronic Publishing ~1975

2. Personal Computer CM or Desktop Publishing ~1984

3. Client Server CM ~1990

4. Web Content Management or Web Publishing ~1995

The timetable for these developments, compiled by Frank Gilbane in 2000 and cited by McGovern, is summarized in Figure 1.1. Note the number of developments in 1995/1996 and 2002/2003 as the industry moves from creating new technologies to acquisitions and mergers among competitors. Even as acquisitions occur, new providers continue to emerge in both commercial and open source systems.

1970s
- 1975 Mainframe CM and Electronic Publishing Repository
- 1977 Personal Computer, Text Interface

1980s
- 1982 Graphical Interface, Xerox Parc Star, Apple Lisa WYSIWYG
- 1984 Apple Macintosh, Mac Write, Mac Publisher
- 1985 PageMaker, Interleaf
- ___ FileNet Visual Workflow
- 1986 Quark Xpress

1990s
- 1992 Lotus Notes
- 1993 Mosaic Graphical Browser
- 1994 SoftQuad Hot Metal Pro
- 1995 Vermeer Technologies FrontPage
- ___ Apache Web Server
- ___ Interleaf Cyberleaf Internet Publishing Single Source Publishing
- ___ CNET PRISM (patented Web content management system), Personalization
- ___ Macromedia Dreamweaver
- 1996 Vignette acquires CNET PRISM, integrates into StoryBuilder and StoryServer
- ___ SoftQuad announces HotMetal Intranet Publisher
- ___ Documentum announces RightSite Industrial-Strength Web Content Management
- ___ FutureTense Texture Web Publishing System (required Java-compatible browser)
- ___ eBT Dynabase XML-based Web content management and publishing platform
- ___ Inso Electronic Publishing Systems (acquires DynaBase, DynaText, DynaWeb)
- 1997 Macromedia Dreamweaver, Adobe GoLive
- ___ Interwoven TeamSite Version Control
- 1998 Future Tense Content Server
- ___ TYPO3, later an open-source CMS

2000s
- 2000 UDDI introduced by Microsoft and IBM
- 2001 Documentum acquires Bulldog
- ___ Broadvision buys Interleaf Bladerunner
- ___ Open Market buys Future Tense Content Server
- 2002 Documentum acquires Boxcar (syndication)
- ___ FileNet acquires eGrail WCM system
- ___ Stellent acquires Ancept and Kinecta (syndication)
- ___ TikiWiki open-source CMS
- ___ Documentum acquires eRoom (collaboration)
- ___ Vignette acquires Epicentric (portal)
- ___ Divine acquires Open Market and Content Server
- 2003 Red Hat acquires Ars Digita ACS
- ___ Interwoven acquires MediaBin
- ___ Open Text acquires Gauss
- ___ Interwoven acquires iManage
- ___ Vignette acquires Intraspect
- ___ FatWire acquires Divine Content Server
- 2004 Vignette acquires Tower
- ___ Interwoven acquires Software Intelligence
- ___ Open Text acquires Artesia
- 2005 Hummingbird acquires Red Dot

Figure 1.1: Timeline of CMS development

One reason for using a content management system instead of producing individual Web pages is that information can be entered in form fields so that content is separate from presentation. Design elements and functionality are managed by the software instead of by the content provider. As a result, content providers do not have to master Web site development; instead, they can focus on generating content. Online commercial entities, such as AMAZON and EBAY, were early adopters of CMS technology because their Web sites offered a large amount of information (different types of products for sale) to multiple audiences.

Canchu Lin examines the effect of organizational size and multiple audiences on Web site design and organization. She notes, "Few studies have investigated the implications of organizational features for Web site design…. [A] single Web site may provide enough information to meet the complex wants and needs of multiple audiences" (Lin 2002). She points out that as organizational size increases the number of audiences also expands.

This is analogous to land-grant universities, which deliver a wide range of information generated by a large number of content providers to many different audiences. To date, CMS technology is not widely used by universities but interest is growing.

An obstacle to adoption of a content management system is that the technology is still evolving, as noted in Gilbane's timeline, so there is no clear market leader. In addition to dozens of commercially licensed products, there are hundreds of open-source solutions that are continuously being modified by communities of users. There also is an

unknown number of custom systems in use, which have been developed by university employees or outside developers.

The Challenge of Selecting a CMS

Because of the amount of content on complex Web sites such as those of land-grant universities, a content management system can be useful. "The number of Web pages is so large that they need to be managed systematically" (Jun Rong Chen et al. 2006). "Faced with Web sites that double and triple in size every six months, few organizations question the need for Web content management" (Kelley West 2000).

Software developers have responded to the need for a systematic management system. "The software industry…answered this question by producing content management systems" (Warren Harrison 2006). In fact, software developers responded with such enthusiasm that there is an overwhelming number of content management systems, leading to the question of how to select the one best suited for a particular organization's needs. In 2005, Bob Doyle wrote:

"It's really a jungle out there in the Content Management System space. How, with so much to choose from, can anyone begin to make an intelligent analysis of their options when selecting a CMS? ... There are well over a thousand systems listed, perhaps even two thousand….If you are starting down the long and winding road to selecting a new CMS, it should strike fear in your heart to learn that you have so many options."

This sentiment was shared by several authors in 2001. Noel Ward stated, "No one-size-fits-all content management solution exists." Owen Linderholm wrote, "Today's market offers a seemingly endless array of content management software, and the choices can be baffling. The question isn't whether to implement a content management solution; instead it's which one and how." Kim Guenther noted a further complication: "[e]ach vendor defines Web Content Management tools differently, making the choice of a product quite difficult." Neil Randall agreed with the difficulty of choices:

> "Content management means different things to different vendors. All agree
> that content needs managing, and that organizations need sophisticated tools
> and methods to do so. But a simple Web search for content management
> solutions yields an enormous range of possibilities."

Seven years later, the selection process has not gotten any easier. Figure 1.2 presents a 2008 screen capture of the CMS Matrix Web site – *www.cmsmatrix.org* – that lists more than 500 content management systems and provides a matrix to compare the features of each. However, this matrix does not provide specific recommendations on how to select among commercial products or how to decide whether to use a commercial, open-source, or custom solution.

Figure 1.2: CMS Matrix Web site <www.cmsmatrix.org>

The confusion is evident in a 2008 post to a university Web developers' listserv: "We are in the initial phases of researching and implementing a site-wide CMS. We are realizing that we may not know what questions to ask, and who to ask them to. It feels a bit like grasping at straws right now" (*uweb@umich.edu* February 18, 2008).

This study sought to address some of these concerns. Using my contacts in the professional associations for land-grant university communications and information technology staff, it explored which content management systems are in use, the deciding factor each university used to select their system, the cost range and satisfaction level, the advantages and disadvantages of the system, the challenges encountered in implementation, and advice offered to others considering a content management system.

CHAPTER TWO

RESEARCH METHODS

This research was conducted with the goal of producing two major outcomes:

1. Provide a baseline report on the experiences of land-grant universities that use a CMS

2. Assist Web site managers at universities and other limited-budget organizations to make more informed decisions as they select and implement a content management system

Research Design

The previous chapter set forth why these questions are of concern to communicators. This chapter presents research methods employed to address these questions.

Research was conducted in three phases. The first two phases – an online survey and questionnaire – utilized volunteers from professional associations for communications and information technology staff at land-grant universities. The third phase utilized an online discussion board for Web developers at any college or university. I selected land-grant universities as the basis for this study for three reasons:

1) Land-grant university Web sites contain a large quantity of information that is generated by multiple research and extension scientists as part of the national USDA system of research and knowledge transfer. This makes their Web sites

more likely candidates for using CMS than those of smaller, less complex organizations.

2) There is a strong culture of cooperation among land-grant universities because they are part of the national USDA system and share a mission of public service.

3) My membership in the professional association for communicators at land-grant universities allowed me access to discussions at annual conferences and to listservs to contact peers across the nation.

The first research phase, conducted in March 2006, consisted of a survey to gather background information on which content management systems land-grant universities are currently using, how these systems are being used, and how well are they meeting the needs of communicators and information technology staff. The second phase, conducted in March 2008, consisted of an open-ended questionnaire to collect qualitative data on the advantages and disadvantages of the CMS in use, staffing required to implement and maintain the system, challenges faced during implementation, and advice for others considering a CMS. The pool of participants for the follow-up data collection consisted of volunteers from the first phase survey who had agreed to participate in phase two and had provided their contact information. The method was changed from a telephone interview to an online questionnaire to simplify data collection. This change was approved by the university's Institutional Review Board (Appendix D).

The third phase, conducted from July 2007 to April 2008, consisted of monitoring the University Web Developers online discussion board. The discussion board is hosted

by the University of Michigan; participants include employees at any college or university who register to join at no charge. The purpose is to share information on a broad range of topics related to higher education Web sites. I was not a member of this group in 2006 when I began my research but joined in 2007 when it was announced to the Clemson University Web communications team. Monitoring the discussion board allowed me to determine if the CMS question was still valid two years after my research began and offered an opportunity to determine if CMS was a concern to colleges and universities outside the land-grant system.

<u>Research Phase One: Online Survey</u>

The first phase of research, conducted for the ENGL 850 Research Methods class in spring 2006, consisted of an online survey to gather background information on which, if any, CMS was used, how the system was being used, and how well it was meeting the needs of the organization. The method was approved by the Clemson University Institutional Review Board (Appendix A). Participants were recruited through an email listserv for members of the professional associations for land-grant communications and information technology staff (Appendix B). This method was selected as an efficient way to poll representatives from all 50 major land-grant universities, identify which ones were using CMS, and collect background information. The culture of cooperation among land-grant universities – and the shared desire for better ways to manage Web site content as voiced at national conferences – provided a basis to expect strong participation in the survey. The final question on the survey was: "Would you be willing to participate in a

brief telephone interview to answer follow-up questions on staffing and implementation?" (Appendix C). Survey participants who answered "yes" to this question volunteered to participate in the second phase of research.

The online survey was posted March 16-27, 2006, for the Clemson University ENGL 850 Research Methods class. Survey participants were recruited by e-mail through two land-grant university listservs: 1) the Association for Communication Excellence (ACE), which includes communications, marketing, and information technology staff; and 2) the National Extension Technology Conference (NETC), which includes information technology staff for the Cooperative Extension Service at land-grant universities. These listservs include primarily employees in the colleges of agriculture at the 50 major land-grant universities in the United States, former employees of land-grant universities who now work at other institutions, and employees at other agricultural research institutions in the U.S. and other countries. A list of the 50 major land-grant universities included in these listservs is presented in Table 2.1.

U. Alaska	U. Idaho	Montana State U.	Rutgers U.
U. Arizona	U. Illinois	U. Nebraska	S. Dakota State U.
U. Arkansas	Iowa State U.	U. Nevada	U. Tennessee
Auburn U.	Kansas State U.	U. New Hampshire	Texas A&M U.
U. California	U. Kentucky	New Mexico State U.	Utah State U.
Clemson U.	Louisiana State U.	N. Carolina State U.	U. Vermont
Colorado State U.	U. Maine	N. Dakota State U.	Virginia Polytech. U.
U. Connecticut	U. Maryland	Ohio State U.	Washington State U.
Cornell U.	U. Massachusetts	Oklahoma State U.	W. Virginia U.
U. Delaware	Michigan State U.	Oregon State U.	U. Wisconsin
U. Florida	U. Minnesota	Pennsylvania State U.	U. Wyoming
U. Georgia	Mississippi State U.	Purdue U.	
U. Hawaii	U. Missouri	U. Rhode Island	

Table 2.1: Land-grant universities included in the survey listservs

Survey participants either volunteered or were referred by a colleague, resulting in a convenience and snowball sample of ACE and NETC members. I received responses from 12 of the 50 major land-grant universities, which represents a 24% response rate. Since not every land-grant uses a CMS, this provided a reasonable sample for background information. In addition, there were two respondents who were not employees of land-grant universities but were members of the professional associations. There were two participants from different areas of the same land-grant university and five survey participants chose not to provide any identifying information about their organization.

Survey participants were asked to answer 10 questions, which sought to identify: which CMS was in use or planned for implementation, what was the deciding factor in selecting the CMS, which units were using the CMS, the estimated number of users providing content for the CMS, the types of information included in the CMS, how well the CMS met the organization's communication needs, an estimated cost for the CMS, and would the participant recommend their CMS to other organizations. (See Appendix C for full survey.) The final question asked survey respondents to volunteer for phase two research.

Survey responses were coded into three categories: number of users, cost of the software, and level of satisfaction; and correlations among these three factors were explored. There were two goals for the online survey: 1) collect quantitative background information on the usage of CMS at land-grant universities, and 2) recruit volunteers to provide qualitative information in phase two.

An overview of survey participants, their comment on the CMS in use, and their response to the request to volunteer for phase two is presented in Table 2.2.

CMS	Comment on CMS in use	Volunteer
Contribute 1	Good for small sites	Yes
Contribute 2	Not integrated with Collage yet	Yes
Contribute 3	Simple, cheap	Yes
Contribute 4	Standard platform, easy to use	Yes
Microsoft 1*	Awkward, more work	No
Microsoft 2*	More work, worthless	No
Microsoft 3	Extensively tailored	Yes
Custom 1*	No comment	No
Custom 2*	Looking into marketing our system	No
Custom 3*	No comment	No
Custom 4	Wonderful system, continues to evolve	Yes
Custom 5	CMS is just another buzzword	Yes
Custom 6	Too limited	Yes
Other: Cold Fusion	Redoing system	No
Other: FileNet	Outdated	Yes
Other: Nucleus	Works, easy to maintain	Yes
Other: Plone	Long learning curve	Yes
Other: RedDot	Initial conversion	Yes
Other: Sungard	Not implemented yet	Yes
Other: Typo3	Investigating	Yes

Table 2.2: Questionnaire participant pool from survey respondents

Research Phase Two: Online Questionnaire

At the end of the online survey, participants were asked to volunteer for a follow-up study to gain additional insights into the advantages and disadvantages of the content management systems reported in the survey. Of the 20 survey respondents, 14 volunteered to participate in phase two, and provided their email and telephone contact information. The method for this phase of research was changed from a telephone interview to an online questionnaire to facilitate data collection. The change was approved by the Institutional Review Board (Appendix D) and a recruiting email was

sent to the volunteers on March 7, 2008 (Appendix E). The online questionnaire was posted from March 7-21, 2008.

Questionnaire participants were asked to respond to six open-ended questions: the advantages and disadvantages of their organization's CMS; the staffing in place to design, implement and maintain the CMS; the challenges encountered in designing, implementing, using, and maintaining the CMS; advice they would offer to others considering a CMS for a complex organization; and an option to provide any additional comments (Appendix F). Out of the 14 initial volunteers, eight actually participated in the questionnaire phase. The goal of the questionnaire was to collect qualitative information that might be used to identify criteria for evaluating a CMS. Responses were coded to identify four major advantages and three major disadvantages of participants' CMS, the main challenge to implementing a CMS, and three primary criteria for selecting a CMS.

An overview of questionnaire participants and their type of organization is presented in Table 2.3.

CMS	Organization
Contribute 1	Mid-Atlantic college of agriculture
Contribute 2	Midwest college of agriculture
Custom 6 *	Midwest Extension service
Other: FileNet *	Midwest college of agriculture
Other: Nucleus	Nonprofit agricultural research institute
Other: Plone	Midwest Extension service
Other: RedDot	Mid-Atlantic college of agriculture
Other: Sungard	South-Central Extension service

Table 2.3: Questionnaire participants' organizations
        * Participants from two areas of the same university

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Research Phase Three: Discussion Board

The third phase of research was to monitor the University Web Developers discussion board during a nine-month period from July 5, 2007 to April 6, 2008. This discussion board is open to employees at any college or university. Web developers raise questions and share information, experiences, and opinions on a variety of topics, including technical issues, software, Web policies, and job postings, as well as content management systems. For the first eight months (July 5, 2007–March 14, 2008), I collected only the posts that referenced CMS as a way to determine the number of comments on this topic. For the next three weeks (March 17–April 6, 2008) I collected all the posts on this discussion board and compared the number of posts on CMS to the number on other topics.

This method served three purposes; it: 1) established that the research question was still valid two years after launching the first phase of research, 2) gathered input from a wider variety of universities, and 3) confirmed that the issue is not limited to land-grant universities.

Research Methods Summary

The survey collected background information and the questionnaire collected qualitative information on the use of CMS among communicators and information technology staff members primarily in colleges of agriculture and the Cooperative Extension Service at land-grant universities. The discussion board allowed me to monitor the level of interest in CMS among Web developers at a broader segment of colleges and

universities. This data was collected with the goal of providing information that could be used by Web site managers at universities and other limited-budget organizations to make more informed decisions as they consider whether, and which, CMS meets the needs of their organization. The next chapter will present the data collected in each phase.

CHAPTER THREE

COMMENTS ON VARIOUS SYSTEMS

The previous chapter set forth the methods used in this study. This chapter presents findings from my research, which was conducted in three phases: 1) online survey, 2) online questionnaire, and 3) online discussion board with the goals of providing a baseline report on the experiences of land-grant universities that use a CMS and assisting Web site managers to make more informed decisions as they select and implement a content management system

Survey and questionnaire participants were recruited by e-mail through two land-grant university listservs available to me through my employment at Clemson University: 1) the Association for Communication Excellence (ACE), which includes communications, marketing, and information technology staff at land-grant universities and other institutions; and 2) the National Extension Technology Conference (NETC), which includes information technology staff for the Cooperative Extension Service at land-grant universities. My university affiliation also allowed me to join the online discussion board for university Web developers, which is open to employees at any college or university who register.

The survey sought to collect quantitative information on the usage of CMS at land-grant universities and to recruit volunteers to provide qualitative information in phase two. Survey results revealed almost as many content management systems in use as there were participants. However, there was consistency in the types of users and content for the various systems, as well as similarities in the deciding factor for selecting an

organization's content management system. There also was a correlation between cost and satisfaction level that seemed to be independent of the number of users in the system.

Questionnaire responses showed clear patterns as to advantages and disadvantages, as well as agreement on the major challenges faced in implementing a content management system. While the number of staff members varied, there were similarities in the types of positions to design, implement, and maintain the system; and participants offered advice, based on their experience, to others who might consider implementing a CMS.

Finally, discussion board comments by Web site staff members at all types of colleges and universities revealed that these concerns are not exclusive to land-grant universities.

<center>Research Phase One: Survey Results</center>

Of the 20 survey participants, 14 volunteered to participate in a follow-up questionnaire. The strong volunteer response is due to the collaborative spirit among members of the two professional associations.

Fifteen survey participants identified their organization. Their affiliations included 12 land-grant universities, one private liberal arts university, and one international nonprofit agricultural research institute. Survey participants identified multiple types of content management systems that they are using. The systems fell into four broad groups:

1. MACROMEDIA CONTRIBUTE (4 mentions)

2. MICROSOFT CMS (3 mentions)

3. Custom systems developed by university staff (6 mentions)

4. Other systems (7 mentions, one each for COLDFUSION, FILENET, NUCLEUS, PLONE, REDDOT, SUNGARD, and TYPO3)

Survey: Deciding Factors in Selecting a CMS

Using a checklist of 23 possible criteria, survey participants selected the one major deciding factor in selecting their content management system. Seventeen of the 20 survey participants provided information in a text box to describe the factor that was most important in making their decision. Many of their responses used language directly from the checklist, such as: "usability," "ease of use," "cost," "support," or "templates." One participant mentioned a factor that was not on the checklist: "it was the only choice." Some responses were more narrative in nature. I analyzed all the responses and coded them into five broad categories, represented in Figure 3.1. An explanation of the categories follows the chart.
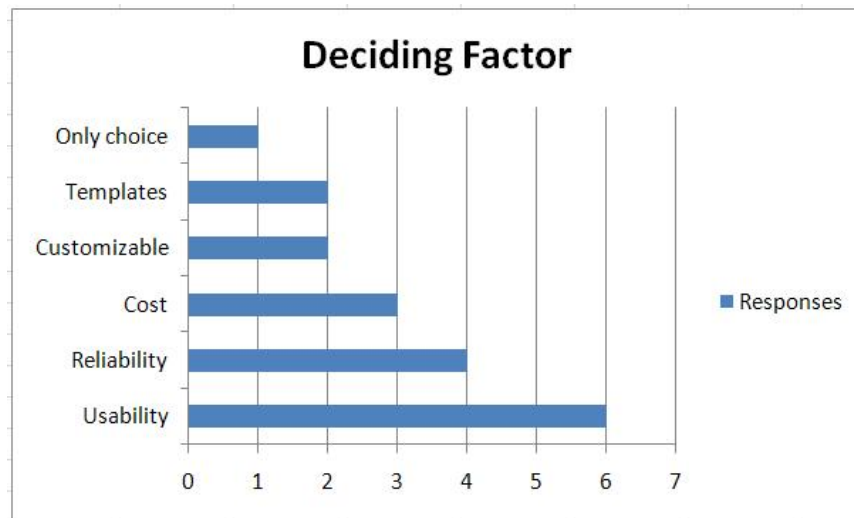
Figure 3.1: Deciding factor in selecting a CMS

The categories, in rank order based on the survey, and their definitions are:

1. Usability (6 responses)

   Ease of use for technical staff to implement and maintain the system and for

   content providers to enter data

2. Reliability (4 responses)

   Dependable, sustainable system that functions smoothly without crashing, losing

   data, or blocking data entry

3. Cost (3 responses)

   Purchase price, license fees, or development expenses

4. Customizability (2 responses)

   System can be adapted to the university's specific needs

5. Use of templates (2 responses)

Consistent design and branding is applied to the selected units, departments, or entire university

6. Only choice (1 mention)

Self explanatory

Usability received the highest number of mentions, followed by reliability and cost. The reason that usability and reliability are so important is that large numbers of faculty and staff members are contributing content to the CMS. Half of the participants selected "more than 150" to report the number of users for their CMS. Given the size of their universities, it is possible that some systems have several hundred users.

Survey: Number of Users, Cost, and Satisfaction

Interesting correlations emerged when the number of users, the cost of the system, and the satisfaction level for the various systems were compared. The survey focused on three main types of systems: MACROMEDIA CONTRIBUTE, MICROSOFT CMS, and custom systems, which the users described as "homegrown." Within these groups, there was a wide range of responses. Of particular interest are the extremes, the respondents who are either very pleased or very displeased with their current system. In each case, there was a strong correlation between low cost and high satisfaction and, conversely, between high cost and low satisfaction. The number of users did not appear to affect satisfaction level as much as cost did.

Survey respondents could select from five levels for number of users, from four

levels for cost of the system, and from six levels for satisfaction, or how well the system

met their needs. To simplify the comparison of these three factors, a scoring system was

developed to convert all responses to a five-point scale. The actual survey options and the

five-point conversion scores used to generate the correlation graphs for each CMS are

presented in Table 3.1.

	Survey	Score
Users	<20	1
	21-50	2
	51-150	3
	151-250	4
	251>	5
Cost	<$20K	1.25
	$20-50K	2.5
	$50-100K	3.75
	$100K>	5
Satisfied	1-Not at all	1
	2	1.5
	3	2.5
	4	3.25
	5	4
	6-Extremely	5

Table 3.1: Conversion scores assigned to survey responses

Survey: MACROMEDIA CONTRIBUTE Responses

Four survey participants reported using MACROMEDIA CONTRIBUTE. For these

participants, cost was relatively low (under $20,000) and satisfaction was in the mid-

range (3.25 to 4) while the number of users was in the mid- to high range (51 to more

than 251). A summary profile of the respondents is presented in Table 3.2; descriptive text for each follows the table. The satisfaction score is on a five-point scale, with 1 as the lowest and 5 as the highest. To protect their confidentiality, participants are identified by the name of their CMS. In cases where there was more than one user of the same CMS, they are assigned numbers correlating to when their responses were entered in the online survey.

CMS	Reason	Users	Cost	Satisfied
Contribute 1	Cost	51-150	<$20 K	3.25
Contribute 2	Reliability	51-150	<$20 K	3.25
Contribute 3	Usability	51-150	<$20 K	4
Contribute 4	Usability	251>	$20-$50 K	4

Table 3.2: Profile of CONTRIBUTE users

"Contribute 1" was a college of agriculture at a Mid-Atlantic land-grant university that has 51-150 users, a software investment of less than $20,000, and a satisfaction level of 3.25 out of 5. The system is used for academic curricula, multimedia (images, audio, video), dynamic content (XML, RSS), and information for current and prospective students and employees.

"Contribute 2" is a college of agriculture at a Midwest land-grant university that has 51-150 users, an investment of less than $20,000, and a satisfaction level of 3.25 out of 5. The system is used for academic programs, event calendars, multimedia (images, audio, video), dynamic content (XML, RSS), and information for current and prospective

students and employees. The respondent reported that the group was using CONTRIBUTE and moving to SERENA COLLAGE.

"Contribute 3" is a private liberal arts college in the Midwest. This respondent had been employed at a land-grant university and continued membership in the professional association after moving to a different school. The respondent reported 51-150 users, an investment of less than $20,000, and a satisfaction level of 4 out of 5. The system is used for academic programs, event calendars, athletics, performing arts, PowerPoint and other presentations, multimedia (images, audio, video), dynamic content (XML, RSS), online charitable donations, faculty vitae, faculty and student personal pages, and information for current and prospective students and employees.

"Contribute 4" is a college of agriculture at a Southeast land-grant university that has more than 251 users, an investment between $20,000 and $50,000, and a satisfaction level of 4 out of 5. The system is used for research reports and extension fact sheets, academic programs, event calendars, PowerPoint and other presentations, multimedia (images, audio, video), dynamic content (XML, RSS), online charitable donations, faculty vitae and activity reports, and information for current and prospective students and employees.

Correlations among number of users, cost, and satisfaction level of the four CONTRIBUTE survey participants are presented in Figure 3.2. All ratings are on a five-point scale.
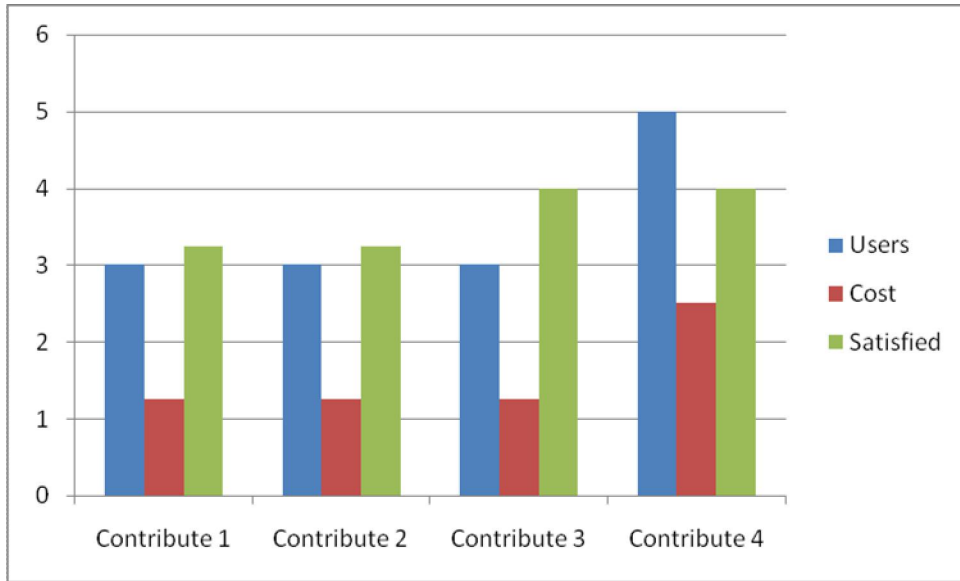
Figure 3.2: Ratings of CONTRIBUTE by survey participants

Survey: MICROSOFT CMS Responses

Three participants reported using MICROSOFT CMS. Only two reported cost information, which was relatively high; both these respondents also reported a high number of users. Satisfaction was low for two of the three, but the highest possible for the third participant. A summary profile of the respondents is presented in Table 3.3 with descriptive text for each following. The satisfaction score is on a five-point scale, with 1 as the lowest and 5 as the highest.

CMS	Reason	Users	Cost	Satisfied
Microsoft 1	n/a	n/a	n/a	1.5
Microsoft 2	No choice	251>	$50-$100 K	1.5
Microsoft 3	Usability	251>	$20-$50 K	5

Table 3.3: Profile of MICROSOFT CMS users

"Microsoft 1" provided only partial information, omitting the type of organization, number of users, and cost of the system, but did report a satisfaction level of 1.5 out of 5. The system is used for research reports, Extension fact sheets, accountability reports, refereed journal articles, event calendars, PowerPoint and other presentations, multimedia (images, audio, video), dynamic content (XML, RSS), online sales, faculty vitae and activity reports, and information for prospective employees.

"Microsoft 2" did not provide any identifying information but did report more than 251 users, an investment between $50,000 and $100,000, and a satisfaction level of 1.5 out of 5. The system is used for research reports, Extension fact sheets, refereed journal articles, event calendars, PowerPoint and other presentations, multimedia (images, audio, video), faculty vitae, faculty and staff personal pages, online sales, and information for prospective employees.

"Microsoft 3" is a college of agriculture at a South Central land-grant university and is using "an extensively tailored" MICROSOFT system. This respondent reported more than 251 users, a software investment between $20,000 and $50,000, and a satisfaction level of 5 out of 5. The system is used for research reports, Extension fact sheets, accountability reports, academic degree programs, refereed journal articles, event calendars, PowerPoint and other presentations, multimedia (images, audio, video), dynamic content (XML, RSS), online charitable donations, faculty vitae, faculty and staff personal pages, and information for current and prospective employees.

The ratings for number of users, cost, and satisfaction level of the three
MICROSOFT survey participants are presented in Figure 3.3 to demonstrate the
correlations among the three factors. All ratings are on a five-point scale.

Figure 3.3: Ratings of MICROSOFT CMS by survey participants

Survey: Custom CMS Responses

Six participants reported using custom systems. For these participants, cost was
relatively low and satisfaction was generally in the mid-range while the number of users
varied widely. A summary profile of the respondents is presented in Table 3.4 with
descriptive text for each following. The satisfaction score is on a five-point scale, with 1
as the lowest and 5 as the highest.

CMS	Reason	Users	Cost	Satisfied
Custom 1	Cost	251>	<$20 K	4
Custom 2	Usability	51-150	<$20 K	3.25
Custom 3	n/a	151-250	n/a	4
Custom 4	Customize	251>	<$20 K	4
Custom 5	Customize	21-50	$20-$50 K	1.5
Custom 6	Usability	21-50	$100 K>	1

Table 3.4: Profile of custom CMS users

"Custom 1" did not identify their organization but reported more than 251 users, a cost of less than $20,000, and a satisfaction level of 4 out of 5. The system is used for research reports, Extension fact sheets, academic programs, refereed journals, event calendars, PowerPoint and other presentations, multimedia (images, audio, video), dynamic content (XML, RSS), online sales, faculty vitae, faculty and staff personal pages, and information for current and prospective students and prospective employees.

"Custom 2" is a college of agriculture at a Western land-grant university that has 51-150 users, a cost of less than $20,000, and a satisfaction level of 3.25 out of 5. The system is used for Extension reports, event calendars, PowerPoint and other presentations, dynamic content (XML, RSS), and information for current and prospective students.

"Custom 3" did not identify their organization but reported 151-250 users, no cost information, and a satisfaction level of 4 out of 5. The system is used for research reports, Extension fact sheets, accountability reports, academic degree programs, refereed journal articles, event calendars, PowerPoint and other

presentations, multimedia (images, audio, video), dynamic content (XML, RSS), and information for current and prospective students.

"Custom 4" is a college of agriculture at a Midwest land-grant university that has more than 251 users, a cost of less than $20,000, and a satisfaction level of 4 out of 5. The system is used for research reports, Extension fact sheets, academic degree programs, refereed journal articles, event calendars, PowerPoint and other presentations, multimedia (images, audio, video), dynamic content (XML, RSS), faculty vitae, faculty/staff and student personal pages, and information for current and prospective students and employees.

"Custom 5" is a college of agriculture at a Midwest land-grant university that has between 21 and 50 users, a cost between $20,000 and $50,000, and a satisfaction level of 1.5 out of 5. The system is used for research reports, Extension fact sheets, event calendars, PowerPoint and other presentations, multimedia (images, audio, video), dynamic content (XML, RSS), and faculty vitae.

"Custom 6" is the Cooperative Extension Service at a Midwest land-grant university that has between 21 and 50 users, a cost of more than $100,000, and a satisfaction level of 1 out of 5. The system is used for research reports, Extension fact sheets, accountability reports, PowerPoint and other presentations, multimedia (images, audio, video), dynamic content (XML, RSS), faculty vitae, online sales, and information for current employees.

The ratings for number of users, cost, and satisfaction level of the six custom CMS survey participants are presented in Figure 3.4 to demonstrate the correlations among the three factors. All ratings are on a five-point scale.
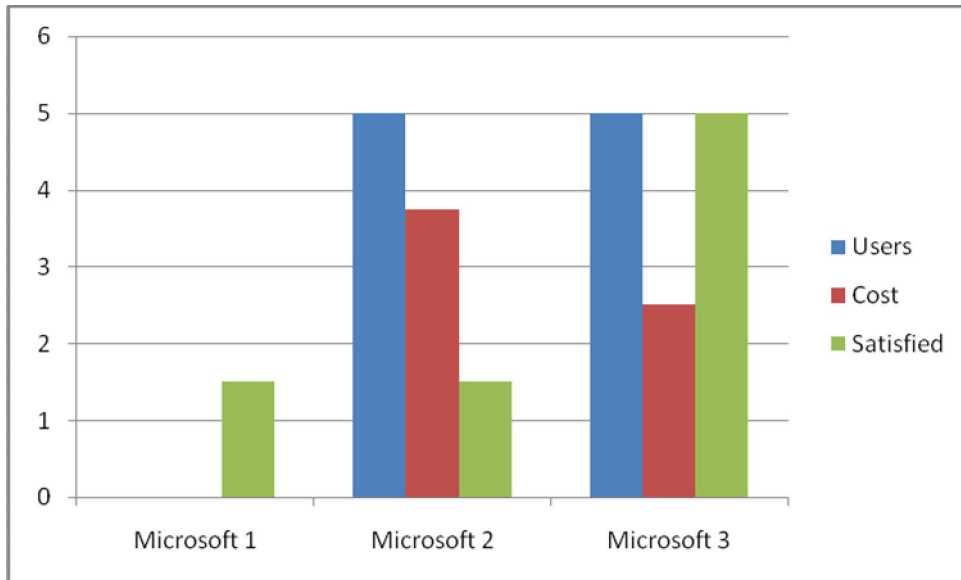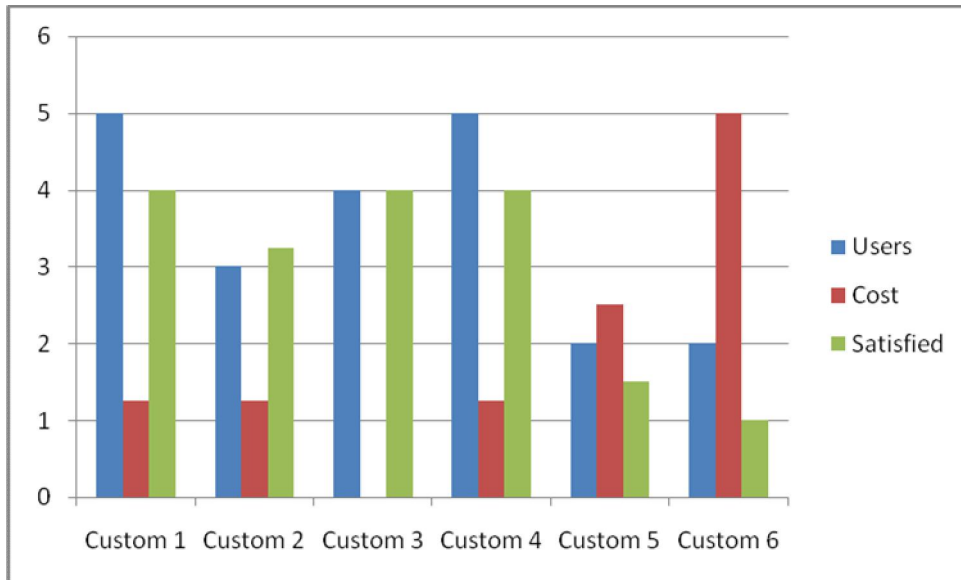

Figure 3.4: Ratings of custom CMS by survey participants

Survey: Other CMS Responses

Seven participants reported using other systems. Because of the small sample size – only one user for each of seven different systems – it is difficult to draw any comparisons for this group. For these participants, cost and number of users both varied widely, as did satisfaction. A summary profile of the respondents is presented in Table 3.5, followed by descriptive text for each participant. The satisfaction score is on a five-point scale, with 1 as the lowest and 5 as the highest.

CMS	Reason	Users	Cost	Satisfied
ColdFusion	Usability	251>	$100 K>	1.5
FileNet	Templates	151-250	$100 K>	3.25
Nucleus	Reliability	<20	<$20 K	4
Plone	Cost	251>	<$20 K	3.25
RedDot	Templates	21-50	$20-$50 K	4
Sungard	Reliability	151-250	$100 K>	n/a
Typo3	Reliability	<20	<$20 K	1

Table 3.5: Profile of other CMS users

"ColdFusion" did not identify their organization but reported more than 251 users, a cost of less than $20,000, and a satisfaction level of 1.5 out of 5. The system, sold through MACROMEDIA, is used for Extension fact sheets, event calendars PowerPoint and other presentations, multimedia (images, audio, video), dynamic content (XML, RSS), faculty vitae, and information for current and prospective employees.

"FileNet" is a Midwest land-grant university that has 151-250 users, a cost of more than $100,000, and a satisfaction level of 3.25 out of 5. The system, sold through IBM, is used for academic degree programs, performing arts schedules, PowerPoint and other presentations, multimedia (images, audio, video), dynamic content (XML, RSS), and information for current and prospective students and employees.

"Nucleus" is an international nonprofit agricultural research institute that has fewer than 20 users, a cost of less than $20,000, and a satisfaction level of 4

out of 5. The open-source system is used for research reports, PowerPoint and other presentations, dynamic content (XML, RSS), and news releases.

"Plone" is a Cooperative Extension Service at a Midwest land-grant university that has more than 251 users, a cost of less than $20,000, and a satisfaction level of 3.25 out of 5. The open-source system is used for PowerPoint and other presentations and county Extension information.

"RedDot" is a college of agriculture at a Mid-Atlantic land-grant university that has 21-50 users, a cost between $20,000 and $50,000, and a satisfaction level of 4 out of 5. The system, sold through Open Text, is used for Extension fact sheets, PowerPoint and other presentations, and multimedia (images, audio, video).

"Sungard" is a Cooperative Extension Service at a South Central land-grant university that was beginning implementation. The respondent reported 151-250 users, a cost of more than $100,000, and did not report a satisfaction level because the system was just being implemented. The system, sold through the Open Text Web Solutions, was expected to include Extension fact sheets, accountability reports, event calendars, multimedia (images, audio, video), dynamic content (XML, RSS), faculty and staff personal pages, online sales and charitable donations, and information for current and prospective employees.

"Typo3" is a college of agriculture at a Midwest land-grant university that was beginning implementation. The respondent reported fewer than 20 users, a cost of less than $20,000, and a satisfaction level of 1 out of 5. The open-source

system was expected to include research reports, accountability reports, academic degree programs, event calendars, PowerPoint and other presentations, multimedia (images, audio, video), online charitable donations, faculty vitae, faculty and staff personal pages, and information for current and prospective students and prospective employees.

The ratings for number of users, cost, and satisfaction level of the seven other CMS survey participants are presented in Figure 3.5 to demonstrate the correlations among the three factors. All ratings are on a five-point scale.
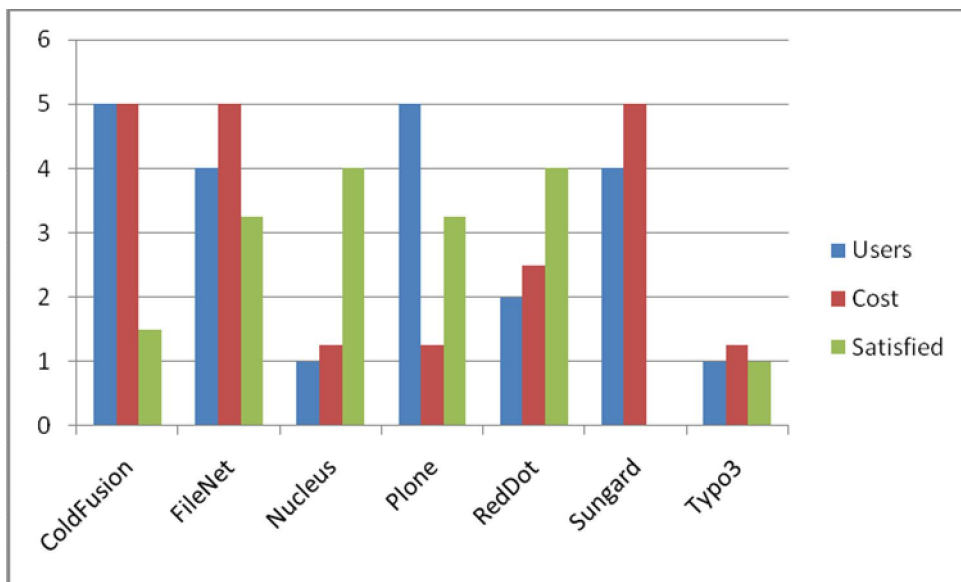
Figure 3.5: Ratings of other CMS by survey participants

Survey: Types of Information in CMS

Participants were asked to check all that applied from a list of 22 types of information that might be included in their content management system (Appendix C). Seven participants listed their content in the "Other" text box instead of, or in addition to,

checking boxes. Their responses are included after the summary table below to avoid misrepresenting their information. The most frequently mentioned types of information applied to all three land-grant university mission areas (teaching, research, and Extension), as well as to a variety of target audiences (faculty, staff, students, and the public who would use research and Extension information).

A summary of responses is presented in Table 3.6, listed in rank order by number of mentions.

Mentions	Content
17	PowerPoint and other presentations
14	Images/audio/video/Flash
13	Dynamic content using XML, RSS, or similar service
12	Event calendars
11	Information for prospective employees (job posting, applications, etc.)
10	Extension Service fact sheets and workshop materials
10	Information for prospective students (application, housing, meal plans, costs, etc.)
9	Information for current students (grades, course registration, transcript, etc.)
9	Research reports
9	Academic degree programs, curricula, and required courses
9	Faculty and administration vitae
7	Information for current employees (benefits, payroll, department accounts, etc.)
6	Teaching syllabi
6	Refereed journal articles
6	Faculty and staff personal pages
5	Online sales (publications, videos, event tickets, etc.)
4	Accreditation and accountability reports
3	Performing arts schedules and information
3	Faculty activity reports (for tenure and promotion evaluation)
3	Online charitable donations
2	Student personal pages
1	Athletic schedules, scores and information

Table 3.6: Types of information in survey participants' CMS

In addition to the listed options, other information in the content management systems included:

- Newsletters, news releases and "in the news" items

- Extension county office information

- Reservations for appointments, rooms, vehicles, and equipment

Survey: Systems That Are Recommended

When asked if they would recommend their current content management system, 11 of 20 respondents answered "yes." Reasons included low-cost, ease of use, a standard design, and the ability of content owners to add information from any Internet access. Table 3.7 presents a summary of all responses. Comment excerpts, and the system used, are below:

- "It works well for content that is not database driven; good for smaller sites" (CONTRIBUTE 1)

- "It's simple and cheap; no hardware needed, 1 person to setup, 1 person to train" (CONTRIBUTE 3)

- "It gives us a standard web content management platform; it's easy to use, low-cost, well received by users" (CONTRIBUTE 4)

- "It works, is easy to maintain and customize, costs nothing" (NUCLEUS)

- "Content owners can update their own information from any computer with Internet access" (REDDOT)

Although they would recommend their content management systems, one participant cautioned, "No canned CMS is sufficient to handle the Web-based publishing needs of a land-grant institution. Our system was extensively modified and tailored to an academic environment" (MICROSOFT 3). Another noted, "The CMS can be as good as the technical ability of your people to set it up. We had a real long learning curve" (PLONE). A summary of responses is presented in Table 3.7.

CMS	Y/N	Why or why not?
CONTRIBUTE 1	Yes	It works well for content that is not database driven. Good system for smaller sites.
CONTRIBUTE 3	Yes	It's simple. It's cheap about $3000 for the site license, no hardware needed, 1 person to setup, 1 person to train.
CONTRIBUTE 4	Yes	Contribute gives us a standard web content management platform. Its ease of use positively impacts developers and novice users and allows support personnel to concentrate on specific support materials and training. Overhead costs have been undercut by purchasing an off-the-shelf solution. Contribute has been well-received by users and is supported by our college's administration.
Custom 1	Yes	n/a
Custom 2	Yes	Actually not sure we could offer it at this time. It is homegrown but the developer is looking into marketing it.
Custom 3	Yes	n/a
Custom 4	Yes	It is a wonderful system that continues to evolve and improve.
MICROSOFT 3	Yes	No canned CMS system is sufficient to handle the Web-based publishing needs of a land-grant institution. Our system was extensively modified and tailored to an academic environment. I would recommend the basic Microsoft CMS platform plus modifications for any land-grant university that was significantly invested in the Microsoft development platform.
NUCLEUS	Yes	It works, is easy to maintain and customize, costs nothing (in cash).
PLONE	Yes	Yes, the CMS can be as good as the technical ability of your people to set it up. We had a real long learning curve.
REDDOT	Yes	For extension it will mean that all content owners can update their own information instead of having to work through a gatekeeper. Also updates/changes can be done from any computer with internet access - not limited by software (Dreamweaver) purchases

Table 3.7: Survey participants who would recommend their CMS
Survey: Systems That Are Not Recommended

Nine of 20 survey participants would not recommend their content management system. Three had not yet implemented the selected system (CONTRIBUTE 2, SUNGARD and TYPO3). Among participants who had implemented a content management system, the primary reason they would not recommend their system was difficulty of use. All responses are presented in Table 3.8. Comment excerpts, and the system used, are below:

- "We put the cart before the horse and now we are trying to fix it" (COLDFUSION)

- "Too limited for the kind of Web site we need" (Custom 6)

- "Product no longer supported; interface is old" (FILENET)

- "It is awkward for the consumer and the programmer; it has created more work" (MICROSOFT 1)

- "It takes longer to publish a page than when we were building html pages in FRONTPAGE and requires more work of editors and writers" (MICROSOFT 2)

One survey participant voiced frustration with their system: "It's difficult to navigate and difficult to come up with usable navigation systems for various portal and sub-portal pages. I would not recommend going though what we've been through over the past three to four years. It isn't paying off in my opinion" (MICROSOFT 2). A summary of responses is presented in Table 3.8.

CMS	Y/N	Why or why not?
COLDFUSION	No	We are redoing our system we put the cart before the horse and now we are trying to fix it.
CONTRIBUTE 2	No	we haven't got our system (Contribute) integrated with Collage yet
Custom 5	No	Because CMS is just another administrative buzz word that really means nothing... Concentrate on finding applications that do what is wanted and needed and integrate them into a system... CMS's tend to focus on only one direction communication... a push from the content provider with little or no support for interaction, therefore, I do not recommend any CMS
Custom 6	No	too limited for the kind of Web site we need.
MICROSOFT 1	No	It is awkward for the consumer and the programmer. It was supposed to make maintaining the Web site easier, but has created more work.
MICROSOFT 2	No	It may not be the software's fault, but the way this system has been implemented makes it almost worthless to us. It takes longer to put a page up than it did when we were building html pages in FrontPage. It requires way more work of Communications editors and writers (and we didn't get any extra people to do that). The site is ugly. It's difficult to navigate (and difficult to come up with usable navigation systems for various portal and subportal pages). I would not recommend going through what we've been through over the past three to four years.
FILENET	No	Product did an "OK" job Product no longer supported Interface is old Product has run through its lifecycle (looking for next gen. product at this point).
SUNGARD	No	We have not yet implemented.
TYPO3	No	We're still looking at one

Table 3.8: Survey participants who would not recommend their CMS

Survey: Summary

While the survey may not be generalizable to all universities because of the small sample size, it did represent nearly one out of four land-grant universities and provided a glimpse into the variety of content management systems that are being used by a homogenous group of universities. The survey results suggested that, although the various content management systems were being used for similar purposes at similar organizations by similar content providers, there were wide variations in satisfaction levels. Low satisfaction levels appeared to have some correlation to high cost but more insight into the reasons for satisfaction, or lack thereof, was revealed in the follow-up questionnaire. The next research phase, an online questionnaire, sought to learn more about the advantages and disadvantages of the different CMSs in use, and challenges faced in implementing each one.

Research Phase Two: Questionnaire Results

Of the 20 participants in the March 2006 survey, 14 volunteered for the follow-up questionnaire, and eight volunteers actually participated when the questionnaire was launched two years later in March 2008. The delay between completion of the survey phase and launch of the questionnaire phase was due to demands of my job. The delay may have contributed to the lower number of actual participants compared to the number of volunteers. The number also could have been affected by work demands for the potential participants. A profile of questionnaire participants is presented in Table 3.9,

including the deciding factor for selecting their CMS, the number of users in the system,

estimated cost of software, and satisfaction level on a five-point scale.

CMS	Factor	Users	Cost	Satisfied
Contribute 1	Cost	51-150	<$20 K	3.25
Contribute 2*	Reliability	51-150	<$20 K	3.25
Custom 6	Usability	21- 50	$100 K>	1
FileNet	Templates	151-250	$100 K>	3.25
Nucleus	Reliability	<20	<$20 K	4
Plone	Cost	251>	<$20 K	3.25
RedDot*	Templates	21- 50	$20-$50 K	4
Sungard*	Reliability	151-250	$100 K>	n/a

Table 3.9: Profile of questionnaire participants

Participants noted with (*) had selected but not yet implemented their CMS

during the survey phase. However, they provided information in the survey on how they

planned to use their system and provided feedback in the questionnaire on how it was

actually working two years after the survey.

A summary of participants, the unit(s) using their CMS, and the types of

information included in the CMS is in Table 3.10. Seven of the eight questionnaire

participants were located at a land-grant university. For this reason, five of the eight

mentioned that their Extension Service was either the only unit, or one of several units,

using the content management system. This is not surprising since the Extension Service

has a federally-mandated responsibility to transfer research information to the public on a

wide variety of topics, including home gardening, commercial crop and livestock

production, food safety and nutrition, environmental conservation, community

development, and youth development.

CMS	Who uses	Content
Contribute 1	College academic programs, development, alumni	Academic programs; PowerPoint; Images, audio, video, Flash; XML/RSS; Information for current and prospective students and employees
Contribute 2	All departments and units	Academic programs; Event calendars; PowerPoint; Images, audio, video, Flash; XML/RSS; Information for current and prospective students and employees
Custom 6	Extension	Research reports; Extension fact sheets and workshop materials; Accreditation and accountability reports; PowerPoint; Images, audio, video, Flash; XML/RSS; Faculty and administration vitae; Information for current employees
FileNet	20+ academic and administrative units, and Extension	Academic programs; Teaching syllabi; Performing arts schedules; PowerPoint; Images, audio, video, Flash; XML/RSS; Information for prospective and current students and employees; Other: Policies, newsletters, reports, financial forms, program evaluation, planning, reporting information, external relations, IT manuals, help info, HR materials
Nucleus	Public awareness only	Research reports; PowerPoint; XML/ RSS; Other: news releases and news hits
Plone	Extension county offices	PowerPoint; County information
RedDot	College administration and Extension	Extension fact sheets and workshop materials; PowerPoint; Images, audio, video, Flash
Sungard	Extension departments and county offices	Extension fact sheets and workshop materials; Accreditation and accountability reports; Event calendars; PowerPoint; Images, audio, video, Flash; XML/RSS; Faculty and staff personal pages; Information for current and prospective employees; Online sales; Online donations

Table 3.10: Unit(s) using and types of content in questionnaire participants' CMS

When this information was collected in 2006 during the survey, none of the participants had implemented an organization-wide content management system. However, when the questionnaire was conducted in 2008, three participants were struggling with a conversion to a university-wide system. Two of the participants were at the same university – one in communications and the other in information technology. The transition to a new system was noted in their responses to the questionnaire.

Questionnaire participants were asked to respond to six open-ended questions in an online questionnaire to identify the advantages, disadvantages, staffing, and challenges involved in implementing their organization's content management system. They also were asked if they had any advice for others considering a content management system. Finally, participants were given the opportunity to make additional comments. Below is a summary of their responses to these questions.

Questionnaire: Advantages of Participants' CMS

Advantages mentioned by participants fell into four broad areas: ability to distribute responsibility for entering content, ability for content owners to update their own content, consistent design/navigation, and ability to make global design changes. A summary of responses is presented in Table 3.11.

CMS	Distribute content	Update content	Consistent design	Global changes	Other
Contribute 1	X	X	X		
Contribute 2			X	X	
Custom 6	X		X		
File Net	X	X	X	X	
Nucleus		X			
Plone		X			
RedDot	X	X	X	X	cost
Sungard	X		X	X	

Table 3.11: Advantages of questionnaire participants' CMS

The primary advantage of a CMS mentioned by questionnaire participants was the ability for content owners to enter and update their content without the need for a gatekeeper. These factors were mentioned by seven of the eight respondents in the two related categories of "ability to distribute responsibility for content" and "ability to update content." Specific comments on content were:

- "Our CMS has allow[ed] us to decentralize the upkeep of content on our college's Web site. The responsibility is now share[d] among several people. Pages are the responsibility of the 'owners.' In most cases content is being updated more frequently." (CONTRIBUTE 1)

- "When it's implemented, the main advantage will be that we can distribute web maintenance throughout the program areas" (Custom 6 moving to ORACLE)

- "…ability for less technical people to enter content, decentralizing content entry to the units that generate content" (FILENET moving to ORACLE)

- "It allows the team to publish content quickly and easily" (NUCLEUS)

- "Very easy for the content editors to use" (PLONE)

- "…training & retraining easier and less complicated for users & content providers can update their own information" (REDDOT)

- "Distributing the responsibility for content submission" (SUNGARD)

Decentralizing responsibility for content is so important because of the nature of communications at land-grant universities. Content owners can be faculty or staff members who create or compile information that is shared with the public via the Web site. As public expectations for information on demand increases, land-grant universities are moving more research reports and Extension "how-to" information to the Web. Prior to content management systems, Web sites were created using individually licensed programs such as MICROSOFT FRONTPAGE or MACROMEDIA DREAMWEAVER. These programs require one individual to serve as the Webmaster, who then becomes the gatekeeper for the department or unit's information. While DREAMWEAVER does allow more than one individual to enter Web site information through the check-in/check-out feature, it is very rare in a land-grant university for more than one person to have the software and the training to use it. In many cases, the "Webmaster" is a hapless administrative assistant or a faculty member with a personal interest in information technology. If that individual is out of the office, no one is able to post or edit information on the Web site – either because they do not have the software or because they do not know how to use it.

The second major advantage that participants mentioned was consistency of design. These factors were mentioned by six of the eight respondents in the two related categories of "consistent design/navigation" and "ability to make global changes (in design)." Specific comments on design were:

- "The CMS has also help[ed] maintain the look and feel of the Web site. Content providers are limited to what they can and cannot change on each page, so major design elements are left in place." (CONTRIBUTE 1)

- "unity of design, unity of process" (CONTRIBUTE 2 moving to SERENA COLLAGE)

- "When it's implemented, the main advantage will be that we can… maintain control over design and structure for consistency for users, and brand management for Extension." (Custom 6 moving to ORACLE)

- "…1) more systematic storage of files and other assets; 2) more uniform navigation features including automated breadcrumbs" (FILENET moving to ORACLE)

- "Functionality and design elements are easy to globally change" (REDDOT)

- "Quickly responding to design change needs without resubmitting content" (SUNGARD)

The reasons why the two related factors – maintaining a consistent design and the ability to make global changes – are important are also related to the nature of the land-grant university Web environment, where content can be provided by many different departments and programs that all want their own identity. The significance of

maintaining a consistent look and feel on the Web site is obvious in the commercial world where branding has been practiced for decades. However, the principle of academic freedom can lead university content providers to create their own page designs so there is no consistency even within the same department, let alone across the various departments, colleges, institutes, and other entities such as Extension and its many programs. The result can be gratifying to the individuals who create their own design but very confusing to Web site visitors who sometimes cannot determine if they are still on the same university Web site.

In summary, the primary advantages of a CMS were the ability to: 1) allow content owners to enter their own content and update it more frequently, and 2) provide consistent design/navigation and make global changes.

Questionnaire: Disadvantages of Participants' CMS

Two main disadvantages were mentioned: technical expertise/staffing requirements (four) and difficulty interfacing with systems used by other university departments (three). In addition, other disadvantages received one mention each from five respondents. A summary of responses is presented in Table 3.12.

CMS	Technical expertise	Staffing	Interface	Other
Contribute 1			X	several limitations
Contribute 2				stifle creativity
Custom 6				don't know [new system]
File Net	X		X	
Nucleus			X	not working as well
Plone		X		
RedDot	X	X		
Sungard	X			cost

Table 3.12: Disadvantages of questionnaire participants' CMS

Four of the eight respondents mentioned technical expertise/staffing requirements. Specific comments were:

- "Requires more technical expertise to set-up initially vs. just designing and posting webpages; User interface/process can be intimidating" (FILENET moving to ORACLE)

- "Needs to have a full time developer for installing upgrades and helping with user problems" (PLONE)

- "Development time; programming/technical skills; global changes can be a problem; less web savvy users can struggle with CMS [learning curve] (REDDOT)

- "Staffing required to maintain the software... Significant time commitment of staffing to implement" (SUNGARD)

While a content management system enables more people to upload content, it also requires a higher level of technical skill to provide initial development and to make changes in functionality or design. This can be a slow and frustrating experience that

requires more time, staffing, and resources than originally anticipated. The challenge for developers is to resolve complex coding issues – particularly if the content management system must interface with various Web site delivery systems across multiple departments – and to make ongoing adjustments as CMS software upgrades arrive. In addition to the programming/development challenges, content providers must be trained in how to use a completely new system. This is time-consuming for the technical staff and can also be frustrating for content providers who are accustomed to designing and posting their own Web pages – or having a staff member design and post for them – using individually licensed programs such as DREAMWEAVER.

Three of the eight respondents mentioned disadvantages caused by attempting to interface with different content management systems used by other departments in their organization. Their comments were:

- "The University has just started to use a new CMS; eventually we will switch to this product. It will enable us to share content with the entire university." (CONTRIBUTE 1)

- "We now need to migrate to a new CMS which will require resources (i.e., from FileNET to Oracle)" (FILENET moving to ORACLE)

- "The other big big problem is interfacing with the organization's web site, but the problems there have been on that side, not the fault of the CMS. I've delayed switching to a better implemented CMS because the organization keeps promising to implement its own system, and I have no desire to do the export/import and rejigging [sic] twice." (NUCLEUS)

Because initial implementation of a content management system is a time-consuming and demanding task that requires a great deal of staff resources, it is no surprise that respondents "have no desire to do the export/import and rejigging [sic] twice" to interface with other systems that are adopted later by other units in the organization or by the university as a whole. In spite of the time and effort required, however, they realize that using one system across all departments offers an advantage in that it can "enable us to share content with the entire university."

Other disadvantages were mentioned by five of the respondents. These included: unspecified limitations, system capabilities, loss of individual creativity, loss of functionality, and cost. Their comments were:

- "The CMS we are currently using has several limitations. We initially chose it because it was economical and would achieve most of what we wanted it to do." (CONTRIBUTE 1)

- "We don't know. There is some question about if it can handle a hierarchy of metadata. We want to tag all documents by program, program area, topic, author, etc. and be able to generate dynamic pages, e.g. all Store products from the Parents Forever program, or all news releases from the Agroforestry program, or all web materials tagged with parenting as the topic, which would cross programs." (Custom 6 moving to ORACLE)

- "stifling of creativity" (CONTRIBUTE 2 moving to SERENA COLLAGE)

- "I think development has slowed somewhat, so that things don't work as well as they do in other systems." (NUCLEUS)

- "Cost" (SUNGARD)

In summary, the primary disadvantages of a CMS were: 1) the level of technical expertise and staffing required to implement/maintain the system, and 2) technical problems encountered when attempting to interface with various systems if there was not a university-wide CMS.

Questionnaire: Challenges in Designing, Implementing,
Using, and/or Maintaining a CMS

The main challenge in implementing a content management system was mastering the technical details, mentioned by five of the eight participants. This ranged from "only a few problems" for a CONTRIBUTE user to "CMS did not come with good reference material to problem solve" for a REDDOT user. Two respondents mentioned design as part of the technical challenge. Other issues were lack of resources, including staff turnover, "lack of commitment from administration, no funding, no research, and no testing" for a PLONE user. Two respondents were in the implementation stage or waiting to convert to a new system. A summary of responses is presented in Table 3.13.

CMS	Technical	Other
Contribute 1	X	
Contribute 2	X	
Custom 6		not implemented
File Net	X	
Nucleus	X	
Plone		resources
RedDot	X	
Sungard		not implemented

Table 3.13: Challenges faced with questionnaire participants' CMS

Specific comments on the technical challenges were:

- "Overall we encounter[ed] only a few problems related to the design and functionality of our site, but in most case we were able to work around them and come up with solutions." (CONTRIBUTE 1)

- "the software is difficult to master" (CONTRIBUTE 2 moving to SERENA COLLAGE)

- "The la[r]gest challenge of using the older CMS was probably mastering the technical side, gaining an understanding of how it worked and how it should be set-up" (FILENET moving to ORACLE)

- "See 2. [disadvantages: "things don't work as well; interfacing with organization's Web site"]" (NUCLEUS)

- "Developing is a challenge without strong programming skills; CMS did not come with good reference material to problem solve. Design was created by print company with no web knowledge (a challenge to 'recreate' a non web friendly design); development of design involved NO web people only administration (technical problems occurred!!!); multi-tiered navigation (yet to be mastered!);

Once base templates created, the process of pushing out CMS sites was streamlined. Following all University and 508 compliance standards to produce valid code; handling current web maintenance & development duties as well as learn, develop and implement CMS" (REDDOT)

Specific comments on other issues were:

▪ "Getting our hands on it, figuring out if it will do what we want it to, and rethinking our plans to work with the CMS." (Custom 6 moving to ORACLE)

▪ "Turn over in staff, lack of direction, lack of commitment from administration, no funding, no research, and no testing." (PLONE)

▪ "Still in implementation stage" (SUNGARD)

In summary, the primary challenge in implementing a CMS was the level of technical (programming) skills required to master the software.

Questionnaire: Staffing to Design, Implement,
and Maintain Participants' CMS

While the number of staff members varied among the organizations, the positions mentioned were: Web developer (five), designer (five), writer/editor/content provider (four), technical support /management (three), and trainers (two). One respondent used part-time student workers and one was the sole staff member to develop and manage the CMS.

Four respondents stated that staff members were available only part-time to support the Web site or that they filled multiple roles such as "developer/ troubleshooter/ trainer." Not surprisingly, two of the eight respondents stated that the staffing level was inadequate to meet demands. A summary of responses is presented in Table 3.14 below.

CMS	Developer	Designer	Writer / Editor	Tech	Other
Contribute 1	X	X	X		
Contribute 2	X	X	X	X	
Custom 6		X		X	students
File Net	X	X	X		
Nucleus					only one
Plone	X				
RedDot	X	X	X		
Sungard				X	managers

Table 3.14: Staffing to support questionnaire participants' CMS

Specific comments on staffing were:

- "We had 1.5 web developers, 1 graphic designer, and 1 writer/editor. We relied heavily on submitted content from the various administrative units." (CONTRIBUTE 1)

- "2 server admins, 3 web developers, 1 web designer, 6+ editors, 6+ contributors (CONTRIBUTE 2 moving to SERENA COLLAGE)

- "Webmaster (1 FT), web designer (1 FT), web manager (1 FT), business application manager (1 FT), program area web staff (4-5 FT) plus part-time students. I'd like to have web editors, but at this point, that's done with contractors if I can convince them they need it." (Custom 6 moving to ORACLE)

- "Database admins are shared with other products hosted centrally. Within just the Extension unit, we have 1 web developer who is devoted part time to the CMS. We also have 1 designer who works on the CMS part time. Then we have about 6-7 content contributors who are 'users' of the CMS for the internal/intranet site (this is a small portion of their job)" (FILENET moving to ORACLE)

- "1. Me." (NUCLEUS)

- "Part of our web developer's time, part of our only trainer's time. So total about one 1/2 person, it really does need at least one full time person." (PLONE)

- "1 developer, 1 developer/troubleshooter/trainer, 1 developer/designer, 1 part-time editor, 2 part-time site builders (add content, create pages, etc) Definitely not enough!" (REDDOT)

- "Two full time staff devoted to implementation of the portal and CMS. Part time commitment of Director, DBA, Assistant Director, Technical Support Manager" (SUNGARD)

Recalling the disadvantages, staffing was mentioned as a challenge by three of the eight participants. For each participant, the content management system was initially implemented to support just selected areas of the organization or university, primarily the Extension service, because of the unique demands to manage large amounts of content on a wide variety of subjects for many audiences. After these early adopters led the way, the rest of the university adopted a CMS. Unfortunately for three of the participants, their

university selected a different system so the early adopters were in the process of migrating to the university-wide system at the time of the questionnaire.

In summary, comments on staffing to support a CMS revealed that it was frequently inadequate either in technical expertise or in numbers required to meet demands.

Questionnaire: Advice to Others Considering a CMS

Participants offered the voice of experience when providing advice to others considering a CMS. Advice fell into three areas: advance planning (four), usability (two), and resources/support (two). One participant offered several other suggestions.

CMS	Plan	Usability	Resources	Other
Contribute 1	X	X		
Contribute 2	X			
Custom 6				patience, enterprise, alternate solutions
File Net		X		
Nucleus		X		
Plone	X			
RedDot			X	
Sungard	X		X	

Table 3.15: Advice to others considering a CMS

The pain of "fixing the mess" because of "unexpected problems" came through in their comments on the importance of advance planning. Specific comments were:

- "You need to have a plan of what you want out of your site before you select a CMS. Not all CMSs are equal." (CONTRIBUTE 1)

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- "do your research, buy something that adheres as closely to Web standards as possible." (CONTRIBUTE 2 moving to SERENA COLLAGE)

- "80/20 Use 80 persent (sic) of your time for research, planning and testing and 20 persent (sic) of your time will be spent on implementation. If you do not follow this rule… and you spend 20 persent (sic) on planning, then you will spend 80 persent (sic) of the project time on fixing the mess you have created." (PLONE)

- "Create a reasonable time line with buffers built in for unexpected problems." (SUNGARD)

Usability was mentioned by three participants, again with the value of hindsight:

- "Make sure that the users and not the technicians get to make the design decisions. In my experience, anything you want to do can be done, but technicians don't always see things that way. A user with a little technical experience and interest is much more valuable than a technician who cannot think like a user." (NUCLEUS)

- "The user interface is important. It must be user friendly." (CONTRIBUTE 1)

- "There is a balance I have found between usability and functionality/ scalability. I might come down in the future on the side of usability. Examples are that Adobe Contribute is designed for smaller scale use but is *very* easy to use. Products like the Oracle/Stellent CMS or products from IBM, or other large companies are going to have greater function but much longer

configuration/training time and more difficult user interfaces." (FILENET moving to ORACLE)

The need for adequate resources, such as staffing and support by administration, was mentioned by two participants:

- "Have the necessary people in place (with the needed technical skills and the numbers to do the job) BEFORE you start the process" (REDDOT)
- "Dedicated staffing is critical. Support by upper administration is critical. Do not underestimate the scope of the project." (SUNGARD)

Other considerations were mentioned by one participant, frustrated by the slow progress in converting from a CMS developed specifically for Extension to one that was selected for the entire university:

- "Be patient. Chances are you can't afford a robust system, and it would be best if the University bought it as an enterprise system for use throughout, but that takes longer and adds complexity. Also, we've come to the conclusion that not everything will be in the CMS. We will have some applications and the data warehouse outside it, and show the content on the CMS pages." (Custom 6 moving to ORACLE)

In summary, comments on advice to others considering a CMS were: 1) allow time to develop a plan for what the CMS is to include, to conduct research on which

systems meet those needs, and to test the system before implementing; 2) focus on usability for both developers and content providers; 3) ensure that adequate staff resources are available, both in number and level of technical expertise; 4) be patient, a site-wide CMS is better than multiple different systems but takes longer to implement; and 5) not everything will fit in a CMS.

Questionnaire: Additional Comments

When offered an opportunity to add further comments outside the structured questions, four respondents offered suggestions in four different areas. All provided additional advice worth heeding for anyone considering a move to a content management system. One expanded on earlier advice about usability considerations; one underscored earlier advice on the importance of advance planning and conservative timelines; one issued a warning to avoid a commercial system that is no longer supported; and one expressed hope that this research would reveal a "system that's working well." Specific comments were:

- "1) Try to work at a University wide level, not just college or Extension level, given the complexity and support needs for a number of these systems; 2) Pay attention to user interface/ease of use - this can make or break systems; 3) Realize that initial purchase is the smallest cost in time and resources of the project. You must plan for local configuration, training, support, etc. Also, business practices must be changed to take full advantage of these systems (e.g. getting individual groups used to the idea of entering their own content).

Workflow is a major issue that needs to be examined up-front: how many

people and steps do you want to build into the process before content is

published. Too many can slow things down but, if you have editors, and (sic)

edited site that uses workflow effectively will definitely be of higher quality."

(FILENET moving to ORACLE)

- "Research, Plan, Test...get as many people in there testing as possible, before you

  go live. And do not promise deadlines you can never reach." (PLONE)

- "Stay away from Serena Collage! The company is no longer supporting the

  product." (CONTRIBUTE 2 moving to SERENA COLLAGE)

- "I'm interested in seeing the results of this survey. I hope you find out that there's

  a system that's working well, is robust, and can do complex things." (Custom 6

  moving to ORACLE)

Questionnaire Summary

The profiles of questionnaire participants confirmed that a large volume of

Extension information is delivered to the public through content management systems.

Participant responses revealed that the main advantages of a CMS were the ability for

owners to update their own content and for the Web site's design to remain consistent in

spite of having multiple people entering content for many different departments and

programs. The primary disadvantages were the technical expertise and staffing that are

required to implement and maintain such a system. Participants advised others

considering a CMS to do extensive research and planning before selecting a system, to

focus on usability of the authoring environment, to allow time for testing and resolving unexpected problems during implementation, and to be sure that staffing was adequate in both numbers and skill level required to support the system.

<div align="center">Research Phase Three: Discussion Board Posts</div>

It could be argued that monitoring the University Web Developers discussion board should have been phase one of my research. However, I was not aware of this tool until 2007, so I began my research by using land-grant university listservs for the survey and questionnaire phases, and later used the broader University Web Developers discussion board to confirm that the question on selecting a CMS was still valid. I believe that this approach, although unintentional, was beneficial because it allowed me to collect more detailed information from my peers at other land-grant universities and it provided a more homogenous group of participants for the background data. As stated in Chapter One, land-grant universities have a federal mandate to communicate more types of information to more audiences than do other types of colleges and universities. The reality is that I began monitoring the University Web Developers discussion board out of personal need as I (and several other Clemson University staff members) struggled to implement a CMS that was not used by any other land-grant university.

Posts on the University Web Developers discussion board were tracked in two stages: 1) July 5, 2007–March 14, 2008 to collect only the posts related to CMS, and 2) March 17–April 6, 2008 to compare the number of CMS posts to total posts. Participants on the discussion board included Web site staff members from both small liberal arts

colleges and major universities primarily in the U.S., but also in other countries. Discussion board posts are shared by email and allow multiple comments on the same topic to be posted by many participants. The thread is noted in the subject line. The identity of the participant is noted in the "from" line. To protect participant confidentiality, their identification has been omitted in this report.

Discussion Board: Number and Topics of CMS Posts

In the eight months from July 5, 2007–March 14, 2008, there were 189 posts by 96 individuals from 90 universities and colleges on 25 topics related to CMS. The lengthy discussions in these posts confirmed observations summed up by Owen Linderholm in 2001 that "the choices can be baffling." Seven years later, the choices are described as "overwhelming" in one of the Web posts. Comments by two participants in particular summed up this frustration:

"I have been particularly interested in the discussion about CMS because, like many of you, we are looking to purchase one. The number of choices is overwhelming" (July 5, 2007).

"We are in the initial phases of researching and implementing a site-wide CMS. We are realizing that we may not know what questions to ask, and who to ask them to. It feels a bit like grasping at straws right now" (February 18, 2008).

The complete list of discussion topics related to CMS is presented in Table 3.16.

Subject	Posts
Am I expecting too much out of a CMS?	29
How much should a CMS cost?	25
ASP.NET or ColdFusion	17
CMS: What are you using?	15
greetings and CMS question	15
Drupal CMS for a University site?	14
dotCMS and Hannon Hill's Cascade Server	11
CMS Consulting	8
Sharepoint vs DotCMS	8
Questions about CMS and University Webmaster Organization	6
Re: CMS: deciding issues	6
Cascade (Was Am I expecting too much out of a CMS?)	5
Movable type as a cms	5
RE: Drupal Templates (was Advantage Labs Drupal Training)	5
Calling all CMS users	4
Another CMS question	3
survey: Drupal, Plone, Ingeniux, Cascade	3
Coldfusion Users: RDS?	2
Help with CMS selection	2
Choosing/Comparing CMS's Transcript available	1
CMS and custom programming?	1
RE: CSS Frame work	1
RE: Ingeniux CMS Thoughts.	1
Re: SharePoint Portal and Power Campus	1
Sitecore or Oracle Stellent/Universal Content Manager	1
TOTAL	**189**

Table 3.16: CMS posts July 5, 2007–March 14, 2008

Discussion Board: Ratio of CMS Topics to Other Topics

Because of the volume of posts on this discussion board, the three-week period

from March 17–April 6, 2008, was selected to analyze the ratio of CMS-related topics to

other topics. In that three-week period, there were 63 different discussion threads and a

total of 224 messages. Nine messages were out of office replies, for a net of 215 valid

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posts. Six of the 63 discussion threads, or nearly 10 percent, were related to CMS, as shown in Figure 3.6. Thirty-four of the 215 messages, or more than 15 percent, were related to CMS, as shown in Figure 3.7.
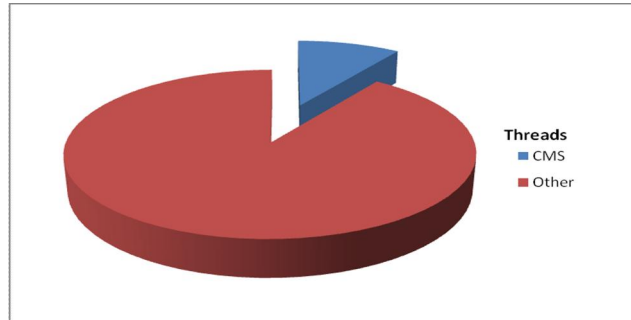
Figure 3.6: Ratio of CMS threads March 17–April 6, 2008

Figure 3.7: Ratio of CMS messages March 17–April 6, 2008

The CMS message topics from March 17–April 6, 2008, are presented in Table 3.17. A university name was removed to protect the participant's identity. The aggregate of 34 posts is the highest number on any single topic discussed during this time. The top two CMS topics generated 15 and 13 posts respectively, more than any other topic during this period.

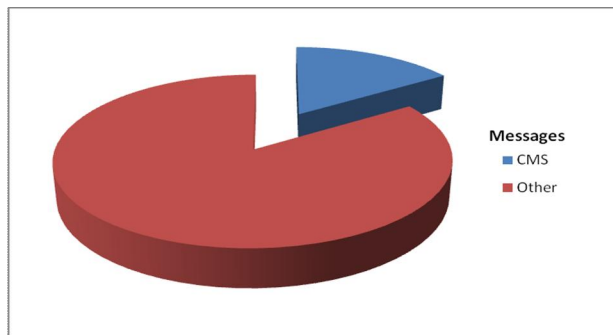| CMS discussion topics	Posts
A CMS that supports new content types? (was Evaluating Joomla)	15
Evaluating Joomla	13
Evaluating Plone [was Joomla]	1
Faculty Profiles and CMS stuff	1
Sitefinity? Sitekit? dotCMS? (Another thread about looking for a CMS.)	2
The University of XXX Web Portal Survey	2
TOTAL	**34**

Table 3.17: CMS topics March 17–April 6, 2008

Besides content management systems, the top two discussion topics were very closely related: 1) Web job openings and 2) "why put money into the Web," a discussion on ways to justify investing in hardware, software, and staffing for Web-based communications. The top 12 non-CMS topics are presented in Table 3.18.

Non-CMS discussion threads	Posts
Job opening [web related]	12
Why put money into the Web?	12
Using MacBook Pro for testing Wintel	11
Convert YYYYMMDD to Formatted Date (MYSQL/PHP)	10
For people who are recruiting for people with graphics and programming	9
Web Policies	9
What accessibility validation tools do you use or suggest to your campus?	9
April Fools Sites (2008)	8
Blogs	8
Email marketing - purchased lists?	7
How often does Google catalog sites?	7
Web site folder architecture	7

Table 3.18: Non-CMS topics March 17–April 6, 2008

In addition to this tracking, I followed the links to resources posted by listserv members. Their comments support the findings reported in this study. One listserv member summed up the premise of my study:

"In the small world of higher ed web professionals, you have either already implemented a CMS or you will at some point in your career. With so many target audiences, strategic goals, and content contributors, long gone is the time when a single person could efficiently manage an institution's web site. While some institutions still rely on a centralized approach to web content producing and publishing, more and more are turning to content management systems. As a result, a CMS implementation has become one of the most important rites of passage for higher ed web executives and teams." (Karine Joly 2006)

Another conducted a survey among discussion board members in 2007 because their university was preparing to adopt a CMS, and arrived at findings similar to those of this study:

"Our goal was to learn about the experiences – both positive and negative – of other universities in the adoption of Web CMS, and to share this information with those who may currently be considering the same…. Overall, there were no clear-cut 'market leaders' in the broad field of Web CMS solutions identified by the higher ed institutions that responded to the survey. However, Plone and Drupal – both open-source solutions – are in relatively heavy use." (Elliott Lopez 2007)

Discussion Board Summary

The University Web Developers discussion board confirmed that the challenges of selecting, implementing, and maintaining a CMS are not limited to land-grant universities. Although land-grant institutions deliver more types of information to more audiences than do other institutions of higher education, Webmasters at all colleges and universities struggle with the same challenges. It also confirmed that the questions about how to select and implement a CMS were still a major area of concern two years after I began my research.

Summary of Research Findings

The survey provided information on the variety of content management systems that are being used by a homogenous group of universities: six commercial, six custom, and three open-source systems reported by 20 participants. Two different systems were being used by different areas of one university, with plans to move both to a third CMS. The survey also suggested that, although the various systems were being used for similar purposes at similar organizations by similar content providers, there were wide variations in satisfaction levels. Low satisfaction levels appeared to have some correlation to high cost but more insight into the reasons for satisfaction, or lack thereof, was revealed in the follow-up questionnaire.

Questionnaire participants provided insight into the reasons for variations in satisfaction level through their responses to the questions on advantages, disadvantages, and challenges with their CMS, as well as the advice they would offer to others

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considering a CMS. Participants stated that the main advantages of a CMS were the ability for faculty and staff to update their own content and for the Web site's design to remain consistent in spite of having multiple content providers in many different departments and programs. The primary disadvantages were the technical expertise and staffing levels needed to implement and maintain a CMS. The primary challenge echoed the disadvantages: the technical expertise to master the software and staffing levels to implement and maintain the system. Participants advised others considering a CMS to do extensive research and planning before selecting a CMS, to focus on the usability of the authoring environment, to allow time for testing and resolving unexpected problems during implementation, and to be sure that staffing was adequate in both numbers and skill level required to support the system. These responses suggested that dissatisfaction with a CMS could be caused by: 1) lack of understanding the full scope of the project, such as the number of content providers, departments, and types of content, and the technical and political challenges of implementing a system; 2) usability problems for developers as well as content providers; and 3) resource limitations in staffing and technical skills required to implement and maintain the system.

The University Web Developers discussion board confirmed that the challenges of selecting, implementing, and maintaining a CMS are not limited to land-grant universities; and confirmed that the premise of this study was still a major area of concern two years after I began my research.

CHAPTER FOUR

HOW TO USE THIS INFORMATION

The previous chapter presented findings from my research, which was conducted in three phases: 1) online survey, 2) online questionnaire, and 3) online discussion board. I hope that, by exploring both the advantages and disadvantages of a variety of systems, this study can provide some insight into the benefits of a CMS; the investment required for both staffing and software; the challenges that can occur in designing, implementing, and maintaining the system; and some considerations when deciding which, or whether, to implement a CMS.

This research focused on collecting data on content management systems because CMS technology was most commonly used by research participants to manage complex Web sites that included large volumes of content provided by multiple content owners for a wide variety of audiences. Over the two-year course of the study, other Web site technologies, such as wikis and blogs, became more common. While these formats allow multiple contributors to post information, and may hold promise for the future, in 2006-2008 universities were not using them to organize and present large volumes of content for the entire university or even for entire departments. Instead, various forms of CMS – commercial, open-source, and custom – were used for this purpose.

Research was conducted in three phases: 1) online survey, 2) online questionnaire, and 3) online discussion board. Survey and questionnaire participants were recruited by e-mail through listservs for communications and information technology staff members at land-grant university listservs. These listservs were available through

my employment at Clemson University. The discussion board was available to Web staff members at any college of university who register through the University of Michigan.

Survey information was collected from 12 of the 50 major land-grant universities, or nearly one in four, as well as from two other organizations that are not land-grant universities. While this did not represent all land-grant universities, it did provide a glimpse into the types of CMS used at these large, complex organizations, which tend to have limited budgets for Web site development and maintenance. In 2001, Owen Linderholm noted that there is a "seemingly endless array of content management software, and the choices can be baffling." The variety of choices was indicated in this research, which found six commercial, six custom, and three open-source systems in use by 20 survey respondents.

The survey also confirmed Noel Ward's 2001 observation that "no one-size-fits-all content management solution exists." While the land-grant universities in this study had many characteristics in common, such as types of units using a CMS and types of content delivered, no single system emerged as a clear leader that was endorsed by a majority of respondents. Each system had both advantages and disadvantages, and presented challenges during implementation and maintenance.

The selection was no easier for universities without the land-grant mission of delivering research-based information to the public. The University Web Developers discussion board, which includes staff from all types of colleges and universities, revealed 189 posts related to CMS during an eight-month period from July 2007 – March 2008. These posts were asking for advice on which CMS other schools were using and

what was their experience using those systems. These were the same questions addressed in this research and confirmed that the topic was still of interest and was not limited to land-grant universities.

While no definitive answers emerged from this research, it did provide insights that were not available earlier. The survey phase provided information on the types of systems in use, the number of employees using the system, the investment in software, the level of satisfaction, and the types of information included in participants' CMS. The questionnaire phase provided information on the advantages and disadvantages of various systems; challenges faced in designing, implementing, and maintaining the system; staffing; and advice to others considering a CMS. The University Web Developers discussion board showed that these questions and challenges were not limited to land-grant universities and continued to be a major concern for university communicators. Below is a compilation of insights gained from this two-year study.

<u>Reasons to Use a CMS</u>

It is unlikely that a CMS would benefit a small organization whose Web site contains a few pages of information provided by one person for a single audience. On the other hand, a CMS can be very useful for large, complex organizations, such as land-grant universities, whose Web sites may include thousands of pages provided by hundreds of content providers across dozens of departments to serve a wide variety of audiences.

Survey participants, who were primarily land-grant universities, tended to have large numbers of content providers: 35% reported more than 251 people using their CMS, and 15% reported 151-250 users. Their systems were being used by departments in the college of agriculture and the statewide Cooperative Extension Service.

Their Web sites also included many different types of content for a wide variety of audiences. The most frequently mentioned types of content were: PowerPoint and other presentations (85%); multimedia images, audio, and video (70%); dynamic content using XML and RSS (65%); event calendars (60%); and Extension Service fact sheets (50%). Audiences served by land-grant universities – in addition to current and prospective students, faculty, and staff – include farmers, land managers, commercial food producers, community leaders, public policy makers, business and industry managers, families, and youth who receive research information through the Cooperative Extension Service in each state.

The reasons for using a CMS for complex organizations such as land-grant universities included:

1. Organizing large volumes of information provided by multiple content providers across various departments and programs

2. Ensuring a consistent design and navigation system throughout an organization's Web site

3. Allowing content owners to update their content easily without having to master Web development software or purchase individual licenses

<u>Advantages of Using a CMS</u>

Information on the advantages of various systems was obtained through both the survey and the questionnaire. Initial insights were provided by 18 of 20 survey participants who identified the one deciding factor in selecting their CMS:

1. Ease of use for both developers and content providers (6 mentions)

2. Reliability that the system functions smoothly (4 mentions)

3. Low cost to purchase or develop the software (3 mentions)

4. Ability to customize the CMS for specific needs (2 mentions)

5. Use of templates for consistent design (2 mentions)

6. The only choice (1 mention)

The 20 survey participants were using 15 different solutions: six commercial, six custom, and three open-source. Survey participants were asked why would recommend their CMS; and questionnaire participants were asked specifically what the advantages of their CMS were. In the survey, 11 of 20 participants stated that they would recommend their CMS. Three survey participants who would recommend their CMS provided no details as to why. Two others said they would recommend their CMS but offered cautionary information that is included in "Considerations for Decision Making" on page 84. Reasons why the five other participants would recommend their CMS are below; some mentioned more than one reason:

1. Ease of use for both developers and content providers (5 mentions)

2. Low cost (3 mentions)

3. Standard design (1 mention)

4. Ability for content owners to update their content without a gatekeeper (1 mention)

A CONTRIBUTE user stated, "It gives us a standard … platform; it's easy to use, low-cost, well received by users." A NUCLEUS user agreed: "It works, is easy to maintain and customize, costs nothing." A REDDOT user commented, "Content owners can update their own information instead of having to work through a gatekeeper."

Eight of the survey participants also participated in the questionnaire. They reported using four commercial, two open-source, and one custom CMS, and stated the main advantages of a CMS were:

1. Ability for content owners to easily update their own content (7 mentions)

2. Consistent design/navigation and ability to make global changes without having to resubmit content (6 mentions)

"Pages are the responsibility of the 'owners.' In most cases content is being updated more frequently," stated a CONTRIBUTE user. The CMS makes it possible for "less technical people to enter content, decentralizing content entry to the units that generate content," said a FILENET user. A second CONTRIBUTE user stated, "Content providers are limited to what they can and cannot change on each page, so major design elements are left in place." A REDDOT user expanded on this point: "Functionality and design elements are easy to globally change." A SUNGARD user agreed on the advantage

of global changes, noting that this ability allowed design changes without having to resubmit content.

In summary, two consistent themes emerge for the advantages of using a CMS were usability and consistency:

1. Ease of use for both developers and content providers

2. Consistent design/navigation that can be changed across the entire site independent of content

<u>Disadvantages of Using a CMS</u>

Information on the disadvantages of various systems was obtained through both the survey and the questionnaire. Survey participants were asked why they would not recommend their CMS; and questionnaire participants were asked specifically what the disadvantages of their CMS were.

The 20 survey participants were using six commercial, six custom, and three open-source solutions. In the survey, nine stated that they would not recommend their CMS. One participant rejected the notion of CMS entirely: "CMS's tend to focus on only one direction communication… a push from the content provider with little or no support for interaction; therefore, I do not recommend any CMS" (Custom 5).

The resounding reason why other participants would not recommend their CMS was lack of usability for developers and content providers. "It is awkward for the consumer and the programmer. It was supposed to make maintaining the website easier but has created more work," one MICROSOFT user stated. "It takes longer to put a page up

than it did when we were building html pages in FRONTPAGE," said a second MICROSOFT user. "It requires way more work of Communications editors and writers (and we didn't get any extra people to do that.) The site is ugly. It's difficult to navigate…. I would not recommend going through what we've been through over the past three to four years."

Eight of the survey participants also participated in the questionnaire. They reported using four commercial, two open-source, and one custom system, and noted that the technical skills required were a disadvantage. A CMS "requires more technical expertise to set-up initially vs. just designing and posting webpages," said a FILENET user who noted that the "user interface/process can be intimidating." A REDDOT user added, "global changes can be a problem; less web savvy users can struggle with CMS."

In addition to technical skills, the number of staff members required can also be a disadvantage to using a CMS. A SUNGARD user stated that the "staffing required to maintain the software" as a disadvantage because it required a "significant time commitment of staffing to implement."

A third disadvantage (encountered by three of the respondents) was changing from a CMS adopted by their department to a different system selected to support the entire organization. "We now need to migrate to a new CMS which will require resources," stated a FILENET user whose organization was moving to ORACLE.

In summary, the primary disadvantages of a CMS were:

1. Lack of usability for developers and content providers
2. Technical expertise and staffing required to implement and/or maintain the system

3. Technical problems encountered when attempting to interface with various systems if there was not an organization-wide CMS

<u>Resources Required</u>

Information on the resources required to support a CMS was obtained through both the survey and the questionnaire. Survey participants were asked to select the estimated cost of their software from four ranges; and questionnaire participants were asked to specify what staffing was in place to design, implement, and maintain their CMS. It was not possible to verify exact costs of the software and I did not attempt to collect detailed specifications on the hardware required to support each system.

The 20 survey participants were using six commercial, six custom, and three open-source solutions. The majority (9 participants) stated that the estimated cost of their software was less than $20,000. This included three commercial, three custom, and three open-source systems. At the other end of the spectrum, four participants stated that the estimated cost for their software was more than $100,000. The cost ranges they identified for their software were:

- < $20 K (9 mentions / 3 commercial, 3 custom, 3 open-source)
- $20 K - $50 K (4 mentions / 3 commercial, 1 custom)
- $50 K - $100 K (1 mention / 1 commercial)
- $100 K > (4 mentions / 3 commercial, 1 custom)
- No response (2 mentions / 1 commercial, 1 custom)

Eight of the survey participants also participated in the questionnaire. They were using four different commercial, two open-source, and one custom CMS, and provided information on the staffing in place to design, implement, and maintain their system.

While the number of staff members varied among the organizations, the positions mentioned by questionnaire participants were: Web developer, technical support, designer, writer/editor, and trainer. One respondent used part-time student workers and one was the sole staff member to develop and manage the CMS. Four respondents stated that staff members were available only part-time to support the Web site or that they filled multiple roles such as "developer/ troubleshooter/ trainer." Not surprisingly respondents stated that the staffing level was inadequate to meet demands. "Definitely not enough!" stated a REDDOT user. The system "needs to have a full time developer for installing upgrades and helping with user problems," said a PLONE user. "I'd like to have web editors, but at this point, that's done with contractors if I can convince them they need it," said a custom CMS user whose organization was moving to ORACLE.

In summary, investments were needed in two types of resources, in addition to the necessary hardware, to support a CMS:

1. Software purchased from a commercial provider or custom developed (requiring an investment in either staff time or an outside provider)

2. Staffing with expertise in Web development, technical support, design, writing/editing, and developing/providing training for content providers

Challenges Faced

The main challenge in implementing a content management system was mastering the technical details, mentioned by five of the eight questionnaire participants. This ranged from "only a few problems" for a CONTRIBUTE user to "CMS did not come with good reference material to problem solve" for a REDDOT user. The REDDOT user's technical problems were compounded by trying to implement a "non web friendly design" that had been created by print designers with no Web experience. In addition, this respondent observed, "Developing is a challenge without strong programming skills." Other issues were lack of resources, including "staff turnover,…lack of direction, lack of commitment from administration, no funding, no research, and no testing" for a PLONE user. A CONTRIBUTE user who was moving to SERENA COLLAGE simply stated, "The software is difficult to master."

For each participant, their CMS was implemented to support only selected areas of the organization, primarily the Extension Service, because of their need to manage large amounts of content on a wide variety of subjects for many audiences. Unfortunately for three of the participants, their university selected a different CMS so the early adopters had to migrate their content to a different system.

In summary, the challenges faced in implementing a CMS were:

1. Technical skills and staffing required to master the software

2. Migrating content from one CMS to a different one

Considerations for Decision-Making

Survey and questionnaire participants provided several areas for consideration when evaluating a CMS. As mentioned above in the disadvantages and the challenges, usability for both developers and content providers was a primary consideration. "The CMS can be as good as the technical ability of your people to set it up. We had a real long learning curve," a PLONE user said. A NUCLEUS user added, "Make sure that the users and not the technicians get to make the design decisions. A user with a little technical experience and interest is much more valuable than a technician who cannot think like a user." More complex functionality also posed more technical challenges for developers meaning "much longer configuration/ training time and more difficult user interfaces," according to a FILENET user whose organization was moving to ORACLE.

Before evaluating any CMS, a thorough needs assessment should be conducted to determine all the potential content providers and types of content that may be included in the system. "You need to have a plan of what you want out of your site before you select a CMS. Not all CMSs are equal," a CONTRIBUTE user stated. A thorough needs assessment may also avoid the pain of adopting a system that becomes outdated or of having to convert from one CMS to another, as voiced by a NUCLEUS user: "I've delayed switching to a better implemented CMS because the organization keeps promising to implement its own system, and I have no desire to do the export/import and rejigging [sic] twice." A PLONE user summarized the importance of planning: "…[if] you spend 20 persent (sic) on planning, then you will spend 80 persent (sic) of the project time on

fixing the mess you have created." The same participant added, "Research, plan, test. Get as many people in there testing as possible before you go live. And do not promise deadlines you can never reach."

In addition to the investment in software, another consideration should be the staffing required to design, implement, and maintain a CMS. This includes not only the number of staff members but also the level of technical skills the staff members possess. A MICROSOFT user noted, "No canned CMS is sufficient to handle the Web-based publishing needs of a land-grant institution. Our system was extensively modified and tailored to an academic environment." The skill level to extensively modify a CMS is on a different order of magnitude than that required to create Web pages in a WYSIWYG (what you see is what you get) html editor such as DREAMWEAVER. In addition to staff with programming/development skills, a CMS also requires staff who can provide technical support, write and/or edit content, and train content providers. "Have the necessary people in place – with the needed technical skills and the numbers to do the job – BEFORE you start the process," advised a REDDOT user. "Dedicated staffing is critical. Support by upper administration is critical. Do not underestimate the scope of the project," stated a SUNGARD user.

Based on our experience at Clemson University, I would echo the sentiment "do not underestimate the scope of the project." In our case, CASCADE SERVER was selected to manage news releases. The system was adequate for this initial application, which was limited to fewer than 20 contributors who primarily uploaded text with a few images. However, when CASCADE was made available across the entire university, it required a

great deal of modification – over a period of more than two years – to adapt it to handle demands that were many times larger than the original scope.

A custom CMS user whose university was going through similar growing pains offered wise advice: "Be patient. Chances are you can't afford a robust system, and it would be best if the University bought it as an enterprise system for use throughout, but that takes longer and adds complexity. Also, we've come to the conclusion that not everything will be in the CMS. We will have some applications and the data warehouse outside it, and show the content on the CMS pages." A FILENET user at the same university, added, "Try to work at a University wide level, not just [a] college or Extension level." These two respondents worked at the same university, which was moving to ORACLE as a university-wide solution to replace the various systems used by different groups.

In summary, a heuristic of considerations for selecting a CMS, compiled from the experience of 20 individuals who have gone through the process, included:

1. Focus on usability for both developers and content providers

2. Conduct a thorough internal needs assessment to determine all the potential content providers and types of content that may be included in the system

3. Do not underestimate the scope of the project; allow adequate time to research, plan, and test before going live; and do not promise deadlines that cannot be met

4. Include staffing – for adequate quantity and skill sets – as well the software when calculating resources needed to support a CMS

5. Plan for an organization-wide application if possible, not just for a single department

6. Accept that not all content will fit in a CMS

CHAPTER FIVE

FUTURE DIRECTIONS

After enduring the process of implementing a CMS for Clemson University and collecting information from peers at other universities over a two-year period, I found that there is still no market leader, no "one size fits all" system. In the survey, the questionnaire, and the discussion board, the questions on selecting and implementing a CMS remain a topic of much discussion across all types of systems: commercial, open-source, and custom. This study did not seek to offer a definitive answer as to which CMS is best for a given organization. Instead it sought to accomplish two goals:

1. Provide a baseline report on the experiences of land-grant universities that use a CMS

2. Assist Web site managers at universities and other limited-budget organizations to make more informed decisions as they select and implement a CMS

Significance of this Study

In the preceding chapters, this research provided baseline information on 15 different systems being used by 12 land-grant universities and two other organizations that are members of two professional associations for communications and information technology staff. It also provided information that may assist Web site managers to make more informed decisions about a CMS, including the benefits of using a CMS, the

advantages and disadvantages of various systems; the investment required for both staffing and software; the challenges that can occur in designing, implementing, and maintaining the system; and six considerations when deciding which, or whether, to implement a CMS.

This study adds to the information that is emerging through lively discussions on the University Web Developers discussion board and other university communicators' groups. It also may provide a basis for future research as the use of CMS becomes more widely adopted, and as these systems continue to evolve.

One trend that appears to be emerging on the University Web Developers discussion board is a move away from established commercial products such as MACROMEDIA CONTRIBUTE or MICROSOFT CMS. These products were the ones most frequently mentioned in the 2006 survey but came with the disadvantages of expensive license fees and high staffing costs to address the time and technical skills required to implement them. In the last few months of this study, the University Web Developers discussion board was buzzing with comments about open-source systems – DRUPAL, MOVABLE TYPE, WORD PRESS, and JOOMLA, to name a few that require no software purchase.

Just days after formal tracking ended, two critical comments were posted that had direct bearing on this study. One comment aptly summed up the current situation:

"The CMS industry is a rapidly evolving one. Higher ed is quickly growing in its publishing and communications sophistication and in the adoption of Web publishing tools that help us meet our needs. I appreciate the ability to learn from

others' ongoing experiences and innovations on this front." (*uwebd@umich.edu* April 9, 2008)

The other comment pointed to an emerging trend toward open-source solutions: "I wonder if a company like Google, or MSN, might someday have an interest in developing an ap for creating sites in a way similar to Drupal? Something like Google Sites *http://sites.google.com*, but for creating entire sites with various bells and whistles. They would get eyes, and maybe they would sell value added aps to go along with that. If open-source CMS keeps snowballing, this could be a possibility?" (*uwebd@umich.edu* April 8, 2008).

Areas for Future Research

Web-based communications have indeed come a long way – from the early collaborations of researchers and academics who initially developed the Internet to the "techno-geeks" who created university Web pages in html code to commercial WYSIWYG programs such as FRONTPAGE and DREAMWEAVER, which allowed less technically skilled individuals to design their own Web sites, to sophisticated commercial programs such as MICROSOFT CMS, which brought the comfort of a major corporate entity to the process of delivering content through a managed system.

Now, as online communities continue to grow in number and technical sophistication – aided by the rapid expansion of social networks such as FACEBOOK, MYSPACE, and others – are we seeing a move away from the safety (and cost) of the

corporate umbrella and toward the freedom (and no-cost) of open-source communities to build content management systems through the collective experience and skills of their members? And what if GOOGLE, the brash start-up that became a corporate giant, enters this arena and brings together the power of the open-source community and the commercial enterprise? Far from providing a definitive answer, this possibility seems to offer more questions and opportunities for study.

The 2008 *Gartner Marketscope for Web Content Management* (WCM) states that the "WCM market is entering a new phase of its evolution" and refers to the "cultural upheaval that accompanies the onset of Web 2.0" that is reflected in the University Web Developers discussion board.

Future studies might include:

- An analysis of how "Web 2.0" is affecting online communities, particularly wikis, blogs, and social networks such as TWITTER, FLICKR (sic), and FACEBOOK

- A comparison of ratings by communities such as CMS MATRIX <www.cmsmatrix.org> and CMS WATCH <www.cmswatch.com>

- A study of how open-source communities are changing CMS technology

At this writing, interest in CMS technology is still very high and shows no sign of waning. As a custom CMS user stated in this study, "I'm interested in seeing the results of this survey. I hope you find out that there's a system that's working well, is robust, and can do complex things."

APPENDICES

APPENDICES

Appendix A: Survey Approval from Institutional Review Board

Appendix B: Survey Recruit/Consent Form

Appendix C: Survey

Appendix D: Questionnaire Approval from Institutional Review Board

Appendix E: Questionnaire Recruit/Consent Form

Appendix F: Questionnaire

Appendix A

Survey Approval from Institutional Review Board

Date: Wed, 15 Mar 2006 10:32:56 -0500
To: slsmith@CLEMSON.EDU
From: Daniel Harris <dharri2@CLEMSON.EDU>
Subject: Validation of IRB application #06-IRB-115EX entitled "Web site
  Content Management Systems Survey"

Dear Dr. Taylor:

The Chair of the Clemson University Institutional Review Board (IRB) validated the proposal identified above using the Exempt review procedures and a determination was made on **March 15, 2006** that the proposed activities involving human participants qualify as Exempt from continuing review under **Category 2** based on the Federal Regulations. You may begin this study.

Please remember that no change in this research proposal can be initiated without prior review by the IRB. Any unanticipated problems involving risks to subjects, complications, and/or any adverse events must be reported to the IRB immediately. The Principal Investigator is also responsible for maintaining all applicable protocol records (regardless of media type) for at least three (3) years after completion of the study (i.e., copy of validated protocol, raw data, amendments, correspondence, and other pertinent documents). You are requested to notify the Office of Research Compliance (ORC) if your study is completed or terminated.

Attached is a document developed by Clemson University regarding the Principal Investigator's Responsibilities.

Good Luck with your study and please feel free to contact us if you have any questions. Please use the IRB number and title in all communications regarding this study.

Daniel Harris
Program Assistant
Institutional Review Board (IRB)
Office of Research Compliance
dharri2@clemson.edu
Phone: 864-656-0636

Appendix B

Survey Recruit/Consent Form

To: ACE listserv members
Date: March 16, 2006
From: Debbie Dalhouse
Subject: Web site content management system survey

If you are using any type content management system for your Web site, please take a few minutes to fill out an online survey about the system(s) that you are using and the criteria you used to make your selection: ***http://people.clemson.edu/~survey2/cmssurvey.htm***

PLEASE SUBMIT YOUR SURVEY RESPONSE BY FRIDAY, MARCH 24.

I hope the results of this research will help communicators at universities and other organizations with limited budgets improve their strategies for managing complex Web sites with multiple authors and types of content.

Your participation is very important to the success of this research.
If you are not responsible for selecting the content management system for your organization, please forward this request to the person(s) with that responsibility.

If you agree to participate, you will be asked to answer 10 questions about the type of content management system your organization is currently using – or planning to implement – and the factors that led to your selection. The survey should take about 10 minutes to complete.

At the end of the survey, you may choose to volunteer for a brief follow-up telephone interview. The interview will be scheduled at your convenience no later than March 29 and will last approximately 10 minutes. Your participation is entirely voluntary; you may withdraw from the study at any time and you may decline to answer any question. You may choose to participate only in the survey and not in the interview. Both types of information are important to the study.

Your name will be kept entirely confidential and will not be used in any reports of the study results. The information that you provide may be used in summary form, without your name. If you have any questions about this study, or if any problems arise, please contact professor Summer Taylor at 864-656-6689 *slsmith@clemson.edu* or me at 864-656-6737 *ddalhou@clemson.edu*. If you have any questions or concerns about your rights as a research participant, please contact the Clemson University Office of Research Compliance at 864-656-6460 *lmoll@clemson.edu.*

By completing and submitting the survey, you give your informed consent to participate in this study. **I will post the study results online in May and send a message to the listserv so you can see my findings.**

Thank you very much for your help!

Appendix C

Survey

1. Which content management system are you currently using or plan to implement in the near future?
Please list all that apply: commercial products, open source solutions, and combination systems. Brand names are preferred wherever possible, including for open source solutions.

Current system(s)

2. Besides the system currently being used, what other systems were considered during the selection process?
Please list all that apply: commercial products, open source solutions, and combination systems. Brand names are preferred wherever possible, including for open source solutions.

Other system(s) considered

3.a. What were the MOST IMPORTANT criteria that caused you to select your current system?
*Please check at least one but **NO MORE THAN 5** criteria. If more than 5 are checked, only the first 5 will be tabulated.*

Usability
- [ ] Easy for staff to set up and maintain the system
- [ ] Easy for site visitors to navigate and find the information they seek

Adding content
- [ ] Create, apply, and edit multiple page templates
- [ ] Manage site-wide templates; limit template edits by content managers
- [ ] Add new pages
- [ ] Add, edit, or change page content
- [ ] Copy and paste text from Word format
- [ ] Include images, audio, video, and Flash movies
- [ ] Create, edit, and manage image slideshows
- [ ] Contribute and access images, audio, and video in a campus repository

Functionality
- [ ] Create and process online submission forms
- [ ] Process online sales
- [ ] Provide calendar service that supports all university events
- [ ] Include dynamic content using XML, RSS, or similar service
- [ ] Search for and replace content site-wide
- [ ] Ensure Section 508 compliance on all updated content

System management
- [ ] Define a web publishing workflow, including preview, approval, and publishing
- [ ] Create, manage, and check links for site navigation
- [ ] Track and manage page versions
- [ ] Notify administrators of recent changes and of pages/media that are old

☐ Manage indexing and metadata for more effective site searching
☐ Back up and restore a sub-site
☐ Publish content to multiple web servers

Other
☐ *Please list all that apply*:

3.b. Which ONE item was the MOST IMPORTANT deciding factor?

4.a. Which units and personnel are expected or required to use your content management system?
Please check ONLY ONE box.

☐ All departments and units (colleges, academic departments, centers, institutes, Cooperative Extension Service, Experiment Station, athletics, development, registrar, etc.)

OR

☐ Only selected departments and/or units *Please list all that apply:*

4.b. What would you estimate is the approximate number of users or site licenses for your system?

O <20   O 21–50   O 51–150   O 151–250   O 251>

5. What types of information are included in your current system?
Please check all that apply.

☐ Research reports
☐ Extension Service fact sheets and workshop materials
☐ Accreditation and accountability reports

☐ Academic degree programs, curricula, and required courses
☐ Teaching syllabi
☐ Refereed journal articles

☐ Event calendars
☐ Athletic schedules, scores and information
☐ Performing arts schedules and information

☐ PowerPoint and other presentations
☐ Images/audio/video/Flash
☐ Dynamic content using XML, RSS, or similar service

☐ Faculty and administration vitae
☐ Faculty activity reports (for tenure and promotion evaluation)
☐ Faculty and staff personal pages
☐ Student personal pages

☐ Information for prospective students (application, housing, meal plans, costs, etc.)
☐ Information for current students (grades, course registration, unofficial transcript, etc.)
☐ Information for prospective employees (job posting, applications, etc.)
☐ Information for current employees (benefits, payroll, department accounts, etc.)

☐ Online sales (publications, videos, event tickets, etc.)
☐ Online charitable donations

☐ Other *Please list all that apply:*

6. How well does your current content management system meet your organization's communication needs?
Please select a response from 1 to 6 to indicate your satisfaction level.

Not at all   Extremely well
☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐ 6

7. Would you recommend this system to other organizations?
Please check one.

☐ Yes
☐ No
8. Why or why not?
Please be as specific as possible.

9.a. What would you estimate was the INITIAL cost for the SOFTWARE to run your system?
O <$20,000   O $20,000–$50,000   O $50,000–$100,000   O $100,000>

9.b. What would you estimate was the INITIAL cost for the HARDWARE to run your system?
O <$20,000   O $20,000–$50,000   O $50,000–$100,000   O $100,000>

9.c. What would you estimate was the INITIAL staffing required to develop and implement your system?
O <10   O 11–20   O 21-30   O 31>

10. Would you be willing to participate in a brief telephone interview to answer follow-up questions on staffing and implementation?

☐ Yes
☐ No

If yes, please provide your contact information below.

This information will be used only to contact you. Your name will be kept entirely confidential and will not be used in any reports of the study results. The information that you provide in the interview may be used, without your name, in these reports.

Name	
Organization	
Telephone	
E-mail	

Thank you very much for your participation!

Appendix D

Questionnaire Approval from Institutional Review Board

From: Daniel Harris [mailto:DHARRI2@exchange.clemson.edu]
Sent: Tuesday, March 04, 2008 2:03 PM
To: sean@CLEMSON.EDU
Subject: Approval of Amendment to IRB protocol #06-IRB-115EX

Dr. Williams,
The amendment to the above-mentioned protocol has been approved. You may begin to implement this amendment. Your approval letter will be sent to you via campus mail.

Daniel Harris
IT Coordinator
Office of Research Compliance
223 Brackett Hall
Clemson University
Clemson, SC 29634-5704
dharri2@clemson.edu
Phone: 864-656-1450
Fax: 864-656-4475
www.clemson.edu/research/orcSite/indexComply.htm

Appendix E

Questionnaire Recruit/Consent Form

From: Deborah Dalhouse
Sent: Friday, March 07, 2008 3:01 PM
To: Survey volunteers for follow-up research
Subject: Web site CMS research - please respond by March 17

Thank you for agreeing to participate in the follow-up phase of my study on Web site content management systems (CMS). The online questionnaire is now available at *Web site Content Management Systems*.

(If the text link is not active, the URL is *www.surveymonkey.com/s.aspx?sm=84gBDOaOb_2beQB295mcz5wA_3d_3d*)

I would very much appreciate it if you would **submit your responses no later than Monday, March 17,** or let me know if you need more time.

Participation should take about 10 to 20 minutes to answer 6 open-ended questions on your experience with your organization's CMS. Your participation is very important to the success of this research. Participation is entirely voluntary; you may withdraw from the study at any time and you may decline to answer any question. Your name will be kept entirely confidential and will not be used in any reports of the study results. The information that you provide may be used in summary form, without your name. By completing and submitting the online questionnaire, you give your informed consent to participate in this study.

If you have any questions about this study, or if any problems arise, please contact professor Sean Williams at 864-656-5413 *sean@clemson.edu* or me at 864-656-6737 *ddalhou@clemson.edu*. If you have any questions or concerns about your rights as a research participant, please contact the Clemson University Office of Research Compliance at 864-656-6460 *lmoll@clemson.edu*.

I hope the results of this research will help communicators at universities and other organizations with limited budgets improve their strategies for managing complex Web sites with multiple authors and types of content. The final study results will be my thesis for the Master of Arts in Professional Communication at Clemson University. I also will share my findings with members of the Association for Communication Excellence (ACE) through the listserv.

Thank you for your candid comments!

Appendix F

Questionnaire

Web site Content Management Systems

1. What do you see as the advantages of your organization's Web site content management system (CMS)?

2. What are the disadvantages of your organization's CMS?

3. What is the staffing in place to design, implement, and maintain your organization's CMS? This refers to the types of positions as well as the number of employees (for example: 3 developers, 2 part-time designers, 5 writer/editors).

4. What challenges did you encounter in designing, implementing, using, and/or maintaining your organization's CMS?

5. What advice would you offer to someone who is considering a CMS for a complex organization such as a large land-grant university?

6. Is there anything else you would like to add?

Thank you very much for your comments!

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