INVENTORY, ACCESS, INTERPRETATION: THE EVOLUTION OF MUSEUM COLLECTION MANAGEMENT SOFTWARE

by

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EXECUTIVE SUMMARY

In 1997, an employee at Willoughby Associates, Ltd., a company involved with creating software for managing museum software, wrote a scathing paper about the direction of museum collection Websites. Kevin Donovan presented his paper at the 1997 Museum on the Web Conference in Los Angeles, the first annual conference about how museums can learn to utilize the World Wide Web to further their missions. Donovan was disdainful of the term "public access," calling it "infuriatingly vague and meaningless." He recounted a story in which a director complained that the community was pressuring him to make the museum more accessible and community-oriented. The director's defense was, "The doors are always open." As Donovan saw it, "The pointed implication of this statement was that, to him, providing physical access to objects was the sum total of what museums are required to do to meet their educational mission." Instead, Donovan argued, museums should not limit themselves to merely opening their doors. They should provide more than images, more than simple inventory information. Museums should collect all of the content a museum generates in all departments and use the Web to disseminate it in ways that are meaningful to a broad range of visitors.

One of the solutions he proposed was

> Moving the museum information system paradigm away from just collections management systems to content management systems capable of dynamically delivering enriched, value-added content to Internet and intranet-based on-line public learning interface.[1]

Now, nearly ten years later, has the field expanded its horizons beyond simply opening the doors? Or are museum staff still trying to unravel archival mysteries and focus on the day to day routine tasks of collections management? How have the tools at our disposal changed over the years and how will we use them in the future?

To probe these questions, this master's project covers the topic of collections management software and its evolution from the 1960's to the present. Over the past forty years, this type of software has shifted from being a simple tool for collections care and inventory to a robust and powerful instrument for saving all information about museum objects. As such, the acronym for *collections* management software, CMS, now stands for *content* management software by many museum professionals. This shift in terminology leads to another question: are proponents of CMS use asking collections staff to do too much, and, if so, are staff supportive of increasing their software's functionality to address these broader goals?

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[1] Kevin Donovan, "The Best of Intentions: Public Access, the Web & the Evolution of Museum Automation," Museums and the Web 1997, eds. David Bearman and Jennifer Trant (Toronto: Archives & Museum Informatics, 1997. p. 127-133.

My interest in CMS stemmed from my early observations that many museums were eagerly using their software to put collections information onto their Websites. There had been a number of discussions over the years about making collections more accessible to the public. However, often there was no extended interpretive materials or curatorial text provided along with photographs of objects. My opinion, based upon what I understand of learning styles from the writings of Falk and Dierking, was that quality information needed to be presented along with the images and inventory data. I set out to answer the questions posited above, with the understanding that the topics most discussed by museologists are *access* and *interpretation* of collections.

The corollary problem to these questions has to do with practicality. It is a common problem that good ideas by field leaders often get overshadowed by day-to-day tasks. So I was interested to know, if there was in fact a dialogue about expanding the information provided through the CMS, how did collections staff feel about those ideas? Were they too busy dealing with daily collections care to be overly concerned with goals of *access* and *interpretation*? With these questions in mind, I set out to investigate discussions about CMS over the past forty years and determine if collections staff are in step with broad fieldwide goals.

My research is organized into five major sections. First, I present a glossary of commonly-used terms used in this report and then a literature review which traces the history of CMS development and the ideas surrounding it from the late 1960s to the present day. I discuss how museum professionals were eager to harness the potential of computing for organizing collections information. As the Intranet, and then the Internet became available, museums quickly realized that the information collected within these computers could be used to fulfill other objectives of museum missions; namely, CMS could not only be used to care for collections but also to form collaborative partnerships with other museums for disseminating collections information for educational purposes.

By the 1990s, museums were actively seeking ways to create opportunities for making collections accessible to other institutions and their onsite public. The development of the World Wide Web spurred this development toward making collections accessible to the entire world. Today, that is still a goal of many museums, but the dialogue has opened up to include the idea of providing interpretative content alongside the brief collection data that currently exists on most CMS-driven museum Websites.

The next section of this report communicates my research findings. My primary research consisted of 110 survey responses from collections

staff of museums around the nation. Not only did respondents discuss specific features of collections software, they also discussed their own opinions about using CMS for accessibility and interpretation. A review of fifty Websites from small and mid-sized museums illustrated how these museums are using their Websites to meet field-wide goals of access and interpretation and if they are actively using CMS to fulfill those goals on their Websites. Interviews with five professionals and museologists were instrumental for gauging the current thinking about CMS use in museums, particularly how they pertain to the specific goals listed above. Perhaps the most interesting finding was about the changing ways that staff looks at their CMS package. In the past, most collections staff only wanted their software to store and report on collections inventory information, such as titles, materials, locations, and values. Today, many collections staff are just as interested in using their CMS to respond to directives for public accessibility as they are for tracking internal collection information. Another interesting finding had to do with whether museum Websites are actually presenting collection information and using CMS to do it. Despite the motivation by professionals to use CMS to provide accessibility on their Websites, very few are actually doing so. Instead, most museums are presenting some static selected collection information on the Websites.

Next, I offer some conclusions based upon my primary research. I concluded that knowledge about what CMS can do for an institution is increasing, and the demands placed on the software are also growing. In other words, although CMS began as simple tools for managing collections, they are now used to track inventories, donor information, condition reports, artist biographies, exhibition information, bibliographic texts, and curatorial papers as well as present multimedia files and interface with the museum's Website. As previously mentioned, the function has shifted from being a *collections* management system to a *content* management system. However, I found that overall, CMS software is not being utilized to its fullest potential.

The Recommendations chapter follows. Based on my conclusions, I suggest that there needs to be more funding for and education about CMS projects by American organizations, such as the American Association of Museums and the Museum Computer Network. I also provide some suggestions for museums looking to begin a CMS project.

Finally, I present my Product chapter, which is a hard-copy version of a resource guide in PDF format. This guide provides some tips and resources for small and mid-sized museum staff embarking on a CMS project. This guide will be distributed on the Registrars Committee of the AAM's listserv; the Museum Computer Network's listserv.

GLOSSARY OF TERMS

Collections or Content Management Software (CMS) is the software used by collections staff to track all information related to and about collections objects. Primarily in this report, I am referring to software specifically designed to work with museum collections and not database software such as Microsoft Access or FileMaker Pro (although both are widely used by museums today for tracking collection information). However, when discussing the early evolution of CMS, I refer to software that is very basic in function and often did less than the database software available today.

A **database** is the underlying programming used by CMS to store information. It holds the raw data that is put into it.

Database software can take the raw data stored in the database and present it in a readable form. This differs from CMS in that CMS can take its database and organize it in a readable form that is more immediately useful to museum staff. Database software must be specially programmed to attain that same level of functionality.

For the purpose of this report, **digitization** refers to putting collections information such as media, artist, or donor records into a computer. This was the historical use of the term, but owing to the majority of museum records now being on the computer, today

digitization is usually defined as taking photographs and computerized scans of objects and placing the images within the CMS (and ultimately on the Web). As I am researching a broader scope of history, before most museums had their collection information on computers, I use the earlier, broader definition of making any and all types of collection data available on a computer.

Access and accessibility. In this context, discussions about *access* refer to making some collection information easily available to other institutions, researchers, and the general public.

Interpretation is concerned with providing extended information about collections objects to the same groups listed directly above. Often, these materials consist of curatorial notes, related Internet hyperlinks, educational classroom learning materials, researcher essays, video presentations, and Website interactives, to name a few.

Content. When discussing CMS as a *content management system*, I am referring to the software managing and providing related interpretive materials.

Metadata is data about data, which is stored within electronic format that describes it in some way. For example, an image on the computer will often have information encoded within it about the date the

image was made, who made it, and the filesize. That information is metadata.

STATEMENT OF PURPOSE

The purpose of this project was to provide an overview of the development of content management software in the context of the changing needs, motives, and philosophies of the museum profession from the 1960s to the present day. Specifically, I investigated how museums have developed their software to respond to outside pressures for increased access to collections. I also explored the many theories forwarded by collections managers and museologists as to the best way to use computers to organize collections and respond to wider institutional goals.

By researching how CMS development dovetails with larger institutional goals since the 1960s, I present a context for how to think about CMS today. Based upon responses from collections and information managers, I also report on how today's museum professionals use their software and how CMS is not being used to their fullest potential.

GOALS AND OBJECTIVES

Goal 1 – Provide an overview of the development of collections management systems in museums from the 1960s to the present.

Objectives

- Research existing literature, including books, articles, listserv discussions, Websites, and conference proceedings.

Goal 2 – Analyze and understand the issues surrounding software development from the 1960s to the present.

Objectives

- Research existing literature.
- Interview and survey collections professionals in the United States for their personal experiences and recollections of how the field has changed.

Goal 3 – Research current and future trends in CMS development.

Objectives

- Review 50 collections Websites from American museums to determine how CMS information is made accessible to the public through these Websites.
- Interview and survey collections and digital asset managers and database developers about what they would like to see developed in the future and how they are using their software now.

METHODOLOGY

For this study, my data comes from a review of the existing literature, five interviews and 110 survey responses from museum professionals from collections and information management departments, and reviews of 50 museum Websites.

I chose each type of methodology based upon the quality and type of data it was likely to produce. The literature review provided an overview of the topics discussed by professionals in this decade, with the understanding that many of those topics and ideas are proposed by large institutions with the resources to tackle and promote thinking about CMS development. My analysis comes from books, articles, Websites, and conference proceedings about technological and philosophical issues surrounding CMS. This body of information was useful for informing all aspects of my project but especially for the historical background data that defines the project. The literature documents understanding of the thinking which has guided the development of collections software. The proceedings from the 1968 Metropolitan Museum of Art's conference *Computers and Their Potential Applications in Museums* was especially enlightening about the earliest uses of collections databases. David William's 1987 essay "The Brief History of Museums" was also helpful for describing the earliest days of museum computerization. Since these

days, both Howard Besser and Robert Chenhall have been influential theorists about how computer use would affect museums, and so their ideas have been instrumental in shaping many facets of thinking about this topic. Kevin Donovan's article "The Best of Intentions: Public Access, the Web & the Evolution of Museum Automation," presented at the Museums on the Web Conference in Pittsburgh, 1997, influenced my early opinions about CMS use and interpretation and accessibility.

In order to understand how museums use CMS, I sent a survey to AAM's Registrar's Committee and Museum Computer Network's listservs, with a total return of 110 responses. This survey was designed to provide details of which features are and were important to those using CMS, as well as to gauge how important CMS are to the daily functioning of the museum. Extra comments provided by respondents gave me additional insight into the use of and feelings about CMS.

I conducted five interviews by telephone and in person. In order to understand their requirements of a CMS and their recollections of how their needs have changed, I interviewed museum collections management professionals and those staff who are concerned with the software itself, such as records administrators and database managers. They added greater depth to my analysis by providing first-person opinions on this topic. San Francisco Museum of Modern Art's (SFMOMA) collections information

manager Marla Misunas, was helpful for explaining how SFMOMA's online collections access dovetailed with their museum mission. An interview with museum theorist David Bearman provided insightful thinking about modern issues, particularly how the direction of CMS development changed once the World Wide Web (WWW) gained widespread popularity. I also spoke with Linda Poe, Collections Manager, and Julie Franklin, Exhibition Registrar, both of the Judah L. Magnes Museum in Berkeley, California, and Diane Gutenkauf, a former registrar of a small history museum and a past sales representative for Vernon Systems, a CMS developer. My interview questions are listed in Appendix A.

For my surveys, I created an online survey using the Survey Monkey Website and requested that members of the Museum Computer Network and AAM Registrars Committee participate. This survey is concerned more with the technical features of CMS development and is designed to determine how collections and database management staff use their CMS currently and how they wish to use them in the future. Responses were indicative of any disconnect between staff needs and museum theory. I asked about a variety of features, and the rankings of these features showed how professionals are looking to use their CMS

today and how they have used them in the past. A copy of my online survey can be found in Appendix B.

I was interested to know how many small and mid-sized museums used their Websites to increase access to their collections and if CMS were being used to do this. I chose fifty museums with a collections department from the 2006 AAM Annual Meeting Attendee List (Appendix C). My choices were mostly random, but I avoided well-known large museums, those with which I am professionally familiar, and those with names that suggested that they were science or children's museums. I reviewed their Websites, if they had one, and looked at what types of collection information is presented to the public and how. Specifically, I looked at how museum Websites present their collections on the Web, either using specific selections or a broad overview of collection objects, and if they used CMS to present that information. I was also curious to see if they used any interactive elements or interpretive text. I was interested in determining what collection information is most commonly presented to the public and how museums are using newer CMS capabilities, if they are at all.

LIMITATIONS OF METHODOLOGY

Due to the quantity of literature available on this topic, I chose to limit my discussion to museum collections or content management systems. I did not include discussion of digital asset management, presentation, or educational software, except where those features may be integrated into CMS.

One of the issues alluded to above is collection image digitization, or photographing collections objects for inclusion into a publicly accessible portal or Website. Many collections management systems have features which support and display digital images, but specific technological issues surrounding digitization projects are outside the scope of this project, including photography, file compression, and scanning equipment.

I also limited my research to art and cultural heritage institutions within the United States and Canada. These institutions often have similar collections nomenclature and software requirements. Science museums and archives rely on different data to identify and catalogue their collection assets. Although they may have similar requirements in their collections software, that exploration is beyond the scope of my research.

Likewise, I did not discuss the specifics of collection nomenclature or naming methodologies. The topic of nomenclature is in and of itself the focus of several books and conferences.

The history of computing is well-documented. To discuss the early days of computer technology would thus be redundant. Included are brief discussions of technological advances that allow for improved collections software programming.

Database programming is a large topic for computer scientists and there is extensive literature about it. My project does not discuss computer and database programming in any depth. Instead, I explore issues on the user side and not from the programmer side. As I am less concerned about the specifics of various software packages, I did not analyze the availability of features within software packages. The Canadian Heritage Information Network has published several manuals about selecting software packages, which list the specific features available in each one. I do, however, discuss how certain tools are necessary to address current museum goals.

Finally, even though many museum directors and theorists harbor an underlying concern about the financial costs of CMS projects (not to mention if the benefits of such projects outweigh the costs), that is a topic worth pursuing on its own and outside the scope of this project.

LITERATURE REVIEW

Since the 1960s the American museum field has been intrigued by the promise of technology to help fulfill museums' educational missions. However, debates about how best to use emerging technology have changed along with political and social climates, resulting in the lack of a coherent voice about these issues.

The most common technologies adopted by museum professionals are the computer and the CMS. In the beginning, collections software was primarily used by collections staff although it was also available for use by researchers and curators. Over time, the CMS became a tool for the general public, by providing access to collections information. Advances in computer technology and the demands of the public have shaped the way that CMS are developed today. The primary purpose of this literature review is to highlight the social pressures of each decade, through the 1990s, that shaped philosophical thinking on the part of professionals, which, in turn, drove the development of the CMS to become what it is today. Understanding the history of CMS development helps to underscore how today's use of CMS by museum staff is not fulfilling its full potential as envisioned by early visionaries.

During the course of this review, it became apparent to me that the major theme pushing the evolution of the CMS was *public access*.

Political and social pressures created a public that demanded increased access and interpretation of museum holdings. My review of conference proceedings and books on the subject revealed that although many, if not most, museum professionals were concerned with this access, there was no consensus on how exactly to provide it. In the process of developing solutions for increasing public access, the other goal of educational interpretation of collection objects became lost until the late 1990s when museum Websites were produced to address the access issue. Museologists and professionals began asking if staff efforts and limited museum resources were being used most effectively when interpretative data about collection objects was not being presented to the general public. Seeing that the twin issues of access and interpretation are key topics surrounding CMS today, it is important to understand some of the past philosophical discussions that have shaped CMS development. Revisiting these debates will reframe discussion of these topics in the future.

Although much of the literature contains case studies and discussions of technical how-to, this review focuses on the major technological advancements of CMS rather than explores the specifics of how they work.

The 1960s – Political Support, Public Access and the Computer

In the 1960s, America was a dynamic place, filled with political tensions, social optimism, and global awareness. These values and fears were reflected by museum professionals. As the ideals of social unity and wholistic understanding gained momentum, and as the government began to turn its attention, and funds, upon the museum field, professionals turned to technology to help address these new ideals and respond to government oversight.

Discussing the history of museum computerization, David Williams suggests that because Americans in the 1960s were becoming more aware of their cultural and ecological past, they began to recognize museums as cultural repositories, no longer allowing them to remain sleepy sanctuaries of researchers. Museums were now required to be vital community centers, using the resources at their disposal to disseminate information about America's cultural heritage. With this new perception of the museum as a public trust, museums were now accountable for their collections and professional practices, and they had duties and responsibilities to the public and to future generations.[2]

Williams also proposed that this growing public interest in museums resulted in an increase in requests for information and

[3] David W. Williams, "A Brief History of Museum Computerization," Museum Studies Journal 3.1 (1987). p. 59.

expectations of promptly filled requests.[3] Lenore Sarasan and Everett Ellen both note that up until the late 1960s, record-keeping took a back seat to collecting. In 1968, Ellin, of the Museum Computer Network, expressed it this way, "We fell in love with custodianship and neglected our traditional responsibility for the management of information."[4] Additionally, the organization of the filing system was up to the discretion of the individual registrar or curator(s) in charge, without concern for how those records were kept at other institutions. Thus, the technical organization of filing systems lived within the memory of the registrars and curators who developed their institution's record-keeping system.[5] According to both Williams and Sarasan, the problem of cohesive record-keeping was exacerbated by the transient lifestyle now being developed within America. With professionals moving between institutions more frequently than ever before, knowledge of museum collections went with them.[6]

Obviously, an answer to the twin demands for information and accountability was needed. The museum field turned to technology. As

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[4] ibid.
[5] Everett Ellin. "Information Systems and the Humanities: A New Renaissance." Computers and Their Potential Applications in Museums. p. 325.
Lenore Sarasan, "Why Museum Computer Projects Fail," Museum News 59 (1981). p. 40. Sarasen echoes Ellin's complaint: "for decades, record-keeping took a back seat to collecting and preserving objects and came to be viewed as a task of secondary importance."
[6] Sarasen, ibid.
[7] Williams, p. 59, Sarasan, p. 40.

Kenneth C. Lindsay stated in 1968, “There is no gainsaying the archival crisis of our times. The computer, the cool cats of the McLuhan age, begins to look like the only way out.”[7]

Early computers were large mainframes, utilizing punchcards for computing their data and large magnetic reels for storing it. They required specially-trained staff, large rooms with adequate ventilation, and they were very expensive. But according to Williams, they were status symbols, seen as electronic panaceas for every ill, and the museums that had them had “entered the twentieth century.”[8]

Because of the expense of these machines, there were several early attempts to create a standardized record-keeping system for all museums. In 1966, Ling-Temco-Vought (LTV) had what was thought to be the largest computer center in the world. The executive director of the Fort Worth Museum of Science and History, Helmuth Naumer, convinced LTV to develop a system for the museum profession, with the idea that LTV would recoup its costs by leasing terminals to smaller museums. Unfortunately, Naumer was ahead of his time and received little or no

[8] Kenneth C. Lindsay, “Computer Input Form For Art Works: Problems and Possibilities.” "Computers and Their Potential Applications in Museums," trans. The Metropolitan Museum of Art, Computers and Their Potential Applications in Museums (New York: Arno Press, 1968.. p. 20.
[9] Williams, p. 60.

support from other directors.[9] Instead, the computerization of the museum remained idiosyncratic and in the purview of large institutions. It took several years and the introduction of less expensive computers, before smaller museums overcame their reluctance.

In 1967, a consortium of New York museums formed the Museum Computer Network (MCN) with the goals of creating a body of information about museum computerization and creating a collections management database, GRIPHOS, for use by all museums.[10] This database, and those that came after it, including the Smithsonian Institution's SELGEM and Arizona State University's REGIS, had to attend to complex searching and retrieval needs, which, due to the individual nature of each museum's way of managing their information, didn't always function as desired. GRIPHOS, in particular, had been designed with the aim that museums could share their information, so information needed to be standardized within the database. As a result, Sarasan argues, there was institutional disillusionment over these national

[10] Robert G. Chenhall, Museum Cataloging in the Computer Age (Nashville: American Association for State and Local History, 1975). p. 3.
[11] Williams, p. 61, and Ronald J. Kley, "MCN: An Introduction" Ronald J. Kley, "Conference on Computer Applications in Museums," ed. Ronald J. Kley (Mexico City: Curator, 1987.

schemes, and as computers became more affordable and smaller, home-grown solutions began to proliferate.[11]

In April of 1968, IBM and the Metropolitan Museum of Art convened a conference to discuss the future of computer technology in museums. Speakers at "Computers and Their Potential Application in Museums" proposed strategies for thinking about developing computerized collection management projects, discussing how their institutions were using computers already, and suggesting ideas to consider for the future. Despite the optimism presented in the proceedings, there was awareness of the reticence coming from museum directors and curators. At the closing dinner, Metropolitan Museum of Art Director Thomas P. F. Hoving related this story:

> This conference has been described as momentous, historically critical, a turning point – and inevitable. But for some … these three days have had a disturbing, unsettling effect.
>
> An old friend of mine, someone with impeccable credentials in traditional aesthetics, wandered out of curiosity into the Junior Museum auditorium yesterday morning, got an earful of such things as data banks, input, output, printout, software, hardware, and interface, and rushed to tell me that I was selling out to the barbarians. He saw himself and me and museums as Rome in the first century, clutching the glories of the past to its bosom, dewy-eyed with nostalgia for the old days, uncertain of the present, fearful of the future, listening to the horrible

[12] Sarasan, 43.

> rattling of the city gates… And I was accused of being one of those who betrayed by opening the gates to the hordes from Armonk and Poughkeepsie.[12]

This concern that curatorial or scholarly product would be overshadowed or undermined by the computer is a recurrent topic to this day. This fear was summarized in 1968 by curator J.C. Gardin, when discussing the institutional implications of collections technology. He asks if there is: a) a danger of substituting superficial, mechanical knowledge for "organic and deeper form of culture" gained from the personal work of curators, b) a contradiction between rigidly organized data of the database and the intellectual viewpoints of personal curatorial files, and c) a risk of subordinating individual research to "de facto monopolies of information that may eventually have the power to control the whos and whats of scientific inquiry?"[13] Despite the worries of curators that their oversight and knowledge would not be properly reflected within these new computer systems, the need for tracking and accountability of objects took center stage with other professionals. Curatorial writings would not be incorporated into CMS on a large scale until the late 1990s when technology advanced to the point of making that product easy to

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[13] Thomas P. F. Hoving. "Foreword" (from a speech entitled "Museums, Computers, and the Future"). *Computers and Their Potential Applications in Museums*

[14] J. C. Gardin. "On Some Reciprocal Requirements of Scholars and Computers in the Fine Arts and Archaeology." *Computers and Their Potential Applications in Museums (*pp. 121-122).

incorporate into the systems and Web sites provided an opportunity to display it.

Despite these concerns, museum professionals were eager to use computers to meet their recordkeeping goals. Although computers were being explored for uses other than record-keeping, such as payroll and bookkeeping, what would become known as the collections management system was the primary function for early computers. Rising calls for accountability by government entities, insurers, and the profession made it extremely important that the collections tracking programs supported museum recordkeeping goals and mission. Although, according to Williams, the computer could not present educational programs or curatorial content directly, the ability to search for an object quickly for research and audit purposes was of paramount importance.[14] In fact, the CMS was of such importance that, despite its high financial and staff requirements, its success would uphold the social trust placed in the museum. Everett Ellin expressed it this way:

> As the cost of any plan for conserving and developing the natural resource of information charged to the custody of our museums approaches the fiscal dimensions of other programs of social significance, its worth must, of course, be tested in the market place of the greater society which we aspire to be. The value of a museum communications system – and its own persuasiveness as a measure worthy

[15] Williams, p. 59.

> of public support – will derive from its synergistic potential for the advance of knowledge in the broadest sense. The access to neglected archives, the upgrading of institutional services, and the general enhancement of traditional activities in education and research that depend upon the data to which museums are privy, state the obvious case for such a system.[15]

Ellin goes on to state that the costs will not be worth the effort if museums only create a glorified record-keeping system. Even in the 1960s, the goal of *public access* was a key issue influencing the development of the CMS.

The 1970s – Cheaper, Smaller, & Faster – Museum Computers Gain Ground

In response to museums' new categorization as non-profit educational institutions, in 1970 the American Association of Museums launched an accreditation program to ensure standards of quality in collections care, administration, education, and exhibitions. In 1971, a division within the National Endowment for the Arts specifically for museums was created. By 1974, the museum division was the second-largest program within the NEA. And in 1977, President Gerald Ford created the Institute of Museums Services (IMS).[16] This government attention gave museums a heightened awareness of their own importance in society.

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[16] Ellin, pp. 330-331.
[17] Marjorie Schwarzer, draft manuscript, *Riches, Rivals and Radicals: 100 Years of Museums in America* (American Association of Museums, 2006). pp. 250-252.

The demand for museum accountability continued. Museums of all sizes found that they needed to get their record-keeping in order. In the 1960s, large institutions had led the charge, but during the 1970s mid-sized museums realized that, they too, needed to make sure their records were in order. Fortunately, computers had decreased substantially in cost. The microcomputer became widely available to museums with fewer resources.

Even though the hardware was now available, there was no consensus on how to use cataloguing software. Williams and Sarasan state that, due to the failures of early efforts to centralize museum cataloguing, many mid-sized museums developed their own individualized or eclectic computer cataloguing systems. Also, because of lack of staff familiar with the concepts of data processing and unaware of earlier failures, many of these projects were unsuccessful. Museums had failed to determine how to extract the data once it was entered. In other cases, they had simply recreated electronic versions of their inadequate card catalogues.[17] As Sarasan writes,

> The pressure to "*do something*" about the state of collection documentation together with recent innovations in data processing led many museums to undertake computerization projects with the hope that by automating specimen records, documentation would be brought under

[18] Williams, p. 62. Sarasen, pp. 41-42.

> control. Today, several hundred individual computer projects exist in North American museums, and it is apparent that in the haste of some institutions to "*do something*" they have not necessarily done it well.[18]

Awareness of the shortcomings of other projects did not convince museum directors that their hard-won funds were going to be put to good use. Chenhall writes of a director at one of the nation's largest museums who expressed his skepticism about the efficacy of collections systems in this way: "When you can show me how I can do this cataloguing function cheaper using a computer, then I will listen. But I doubt that it will ever happen."[19] How could those museum professionals who were intrigued by the promises of technology overcome such skepticism?

One solution was to create professional associations for the dissemination of information about computers and database construction. These groups were formed to provide collections managers and information technologists with education and decision-making advice about their collections systems. Alongside the activities of MCN, the Museum Data Bank Coordinating Committee (MDBCC, later known as the Museum Data Bank Committee) was established in 1972. In addition to providing advice and instruction, the MDBCC created a set of museum catalog content standards so that any museum "can catalog its collections

[19] Sarasen, p. 42.
[20] Chenhall, p. 1.

for eventual computer entry and be confident that the work will not have to be redone at a later date."[20] These standards were extensive and could be tailored depending upon the type of institution using them. Chenhall roughly organizes them into the following categories:

- Data Determination – Objects, Attributes, and Classification. These define what kind of broad descriptions or classifications may be applied to the object.
- Data Category Definitions – These comprise more specific record-keeping schema, including cataloguing and location data, artifact history, origins, descriptions, and more specific classifications.
- Naming the Collections and/or Files – These are naming conventions, curatorial distinctions used as ways to describe a group of objects.[21]

These data standards are still in use today, albeit in more complex ways to respond to changing needs. The evolution of CMS has dictated the creation of additional standards which today are much more diverse, depending on the needs of individual institutions. There is still a lack of consensus within the museum community as to how standards should be applied, and professional associations are still active in this area.

Pressure from curators likely fueled the impetus to computerize collections information. As Chenhall explains, while organizational requirements were mostly the concern of registrars, the demand upon museums to create new kinds of educational and social programs for a

[21] Chenhall. p. 47.
[22] Chenhall. pp. 47-71.

diverse audience fell on the shoulders of curators and the education departments. These programs included both exhibitions and public programming. The information needs of these departments, particularly curators who developed collection-based exhibitions, required that database contents be understandable to them. In addition to the location, valuation, and descriptive information requirements of registrars, curators needed to be able to find documentation that would help them put together exhibits. As Chenhall tells us, "They would *like* to have ten different catalogs," along with any one of ten different classifications and ways of organizing the information.[22] With public pressure for expanded public programming, educational departments had similar needs for collection information. Obviously, the database needed to be more than a glorified card catalog.

Discussion of "real information needs" was a major priority for Chenhall, who echoed earlier sentiments by participants in the Metropolitan Museum of Art's 1968 computer conference. He stressed that in order for database systems to be viable organizational and research tools for all museum departments and outside researchers, museums would need to change their thinking about how their data is collected and presented. Organizations needed to look at the ways they wanted to use

[22] Chenhall, p. 17.

information, and adjust their databases and create more content to fully serve current and future requirements.[23]

Awareness of future use was another focus for museum technology professionals. While there was no Internet in the 1970s (at least, not in the form we know of it today), intranets did exist in some large institutions, especially those within universities. It was feasible for a museum to set up terminals throughout the institution, connected to a central database. A museum could share its computer data with another organization by feeding a paper tape attachment into a machine at the other location.[24] The need to share information at remote locations spurred the development of networking groups such as MCN, MDBC, and SELGEM and DAMIS user groups, all of which were created to define national standards for information sharing. The defining of information standards to permit ease of sharing between diverse systems continues to the present day.

The 1980s – Crisis, Images, and Internet

The great era of government funding for museums came to an abrupt end in the 1980s. In 1981, President Ronald Reagan, who believed that government was not responsible for art and culture, began to dismantle the NEA, NEH, and IMS, severely restricting their budget

[23] Chenhall. p. 245.
[24] Chenhall. pp. 86-87. The drawback to this setup was that two people could not access and modify the same database at the same time. There was a "time sharing" requirement.

allocations. Schwarzer notes that during the 1980s, governmental funding for arts and culture dropped by 40 percent.[25]

As if the cuts in funding weren't enough, backlash from deaccessioning scandals caused museum professionals to make sure that their practices were beyond reproach. If the 1960s and 1970s were a time for exploring the goal of wider public access for museums, the 1980s funding cuts further accelerated these explorations. With the shift toward more business-like practices, museums continued the development of their CMS, with the idea that new innovations that would help further the goal of serving the public and improving documentation of collections.

Fortunately, the ongoing decline in price for faster computers helped spur the movement for further CMS development. The microcomputer, what we know as a PC desktop today, was widely available. Microcomputers, unlike the mainframe computers of the 1960s or the minicomputers of the 1970s, did not require specially trained data processors to use.[26] Thus, even small institutions could afford to purchase and operate a microcomputer.

By the end of the decade, PCs could display graphics. This was not so commonplace early in the decade, when image display required very specialized computers. Even so, many museums were aware that the

[25] Schwarzer, p. 266-269.
[26] Williams, p. 63.

image was a major asset for sharing collections information with other institutions as well as for onsite education.[27] These museums created collections databases on laserdiscs, which were searchable and navigable according to the viewer's inclination, rather than simply following a defined storyline through the information. The downside to laserdiscs was that they could not be modified once the information was imprinted, and so they were impractical as dynamic internal databases.

Although the inclusion of images into database information had been a major consideration for many professionals since the 1960s, the file size of an image was enormous. It took many years for the computer industry to build inexpensive PCs with sufficient storage capacity. Chenhall and Vance note that, historically, file size limitations had been the prime obstacle to the computerization of images.[28]

The call for increased public access to collections, at a time when museums were pressured to make all aspects of their operations transparent, meant that making digital images of collections objects easily retrievable an important topic of discussion by museologists. It would take

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[27] Brenda Femenias and Patricia K. Mansfield, "Artsearch: An Interactive Laser Videodisc Computer System for Museum Collections," Museum Studies Journal 2.1 (1985). p. 50. "The system is interactive, combining a laser videodisc and a computer database… the principals apply to almost any museum seeking to expand access and improve documentation."

[28] Robert G. Chenhall and David Vance, Museum Collections and Today's Computers (New York: Greenwood Press, 1988). p. 75.

the introduction of the World Wide Web in the 1990s to advance this aspiration as a necessity for most museums.

Despite the early appeal of digitization, inclusion of images in computerized documentation was not without its concerns for museologists. Howard Besser writes eloquently about possible ramifications of digitization. In his opinion, the main impact of digitization would be the democratization of museums. Digital images and collections information together would provide both increased access and interactivity, but the control that a museum has over who will see and interpret their objects would decrease. If visitors could see objects remotely, and interact with them without a curator's interpretation, what need would they have to come to the museum? The authority of the museum as arbiters of culture would erode. Besser addresses this point by stating that although museums would lose their authority of being the only place to view certain objects, the museum would "become less like an archive and more like a library." It would take on a more active role in providing educational content.[29] Beyond public access, however, Besser predicted that the inclusion of digital images in CMS would affect information retrieval, collections management, conservation, preservation,

[29] Howard Besser, "Digital Images for Museums," Museum Studies Journal 3.1 (1987). pp. 78-79.

exhibitions and research.[30] Responding to the budget cuts of the era, Besser felt that image digitization was a good thing because museums would possibly have to limit requests by scholars to see original objects, and computer images and documentation available on the CMS would be a necessary solution to that problem.[31] Boston Computer Museum director Michael Templeton took this argument a step further and believed that "the time will come when we are given copies and then be denied access to the original objects."[32]

Relating to the curatorial concerns of the 1960s and 1970s, Templeton also writes about the impact on a museum's control of its information when collection records are digitized and disseminated. He points out that, once digitized, information is easily spread and controlling corruption and context of the data is difficult to limit. Echoing Gardin's fears in the 1960s, Templeton was concerned that curatorial connections and research notes become lost when digital information is disseminated because presenting too much information is confusing. Curatorial oversight is necessary to help the viewer make sense of it. "Balancing

[30] ibid. p. 74.
[31] ibid. p. 80.
[32] Michael Templeton, "Information Technology and Museums," Museum Studies Journal 3.1 (1987). p. 44.

content and meaning for museum users, scholars as well as casual visitors, will remain an art of selection."[33]

Awareness of this shortcoming meant that the search for meaning by their "customers" spurred museums to experiment with how collections and curatorial content is provided by the CMS. University of Maryland researchers found that hypertext links within collections databases facilitated browsing and information retrieval by novice users.[34] Discussions of nomenclature, lexicon, and data standards continued as museums struggled to find a system that would make sense to the greatest number of people. [35]

Unfortunately, during the 1980s, standardization of computerized collections information never reached consensus. As in the 1970s, museums could purchase a computer, purchase a CMS from a vendor or develop one themselves, and input their data in ways that worked for individual collections departments. Professionals like Sarasan and Williams urged museums to take into account the needs of the end-user and public when developing the museum's CMS. Chenhall and Besser, on the other hand, although they understood the individual needs of

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[33] ibid. p. 44.
[34] Ben Shneiderman, Dorothy Brethauer, Catherine Plaisant and Richard Potter, "Evaluating Three Museum Installations of a Hypertext System," Journal of the American Society for Information Science 40.3 (1989). p. 172.
[35] Kley, "Conference on Computer Applications in Museums," (

museums, stressed the need for nomenclature and data standards, with the aim that one day, soon, museums would need to share their information digitally, a practice that required cohesive definitions.

1990s – Oh, What A Tangled WWWeb

During the 1990s, museums continued to look to technology to organize collections and provide access to them by the public. The decade of the Web would provide solutions.

In 1992, American Association of Museums published its landmark report, *Excellence and Equity.* This report outlined AAM's policy that every area of museum activity, including collections, contribute to the public services museums provide. In 1997, President Bill Clinton formed the Institute for Museum and Library Services (IMLS) out of the IMS and Institute for Library Services, which in 1999, began providing grants for museum and library digitization projects. According to the IMLS Website, Maine State Museum was the first recipient of a digitization grant, although specific IMLS initiatives for digitization didn't begin until 2001.[36]

With more powerful and less expensive computers came the great technology-driven economic bubble of the 1990s. The development of the World Wide Web spurred global interconnection in ways only imagined in

[36] IMLS Website search. http://www.imls.gov/search.asp (accessed 4/16/2006).

the previous decade. Creation of personal Websites increased exponentially and everyone had a voice. The democratization, dissemination and rapid availability of information led to the public perception that all facts and ideas should be immediately available at any time. The ways in which this information became available, through searching, hyperlinking and "surfing," meant that users could now access information at their own leisure, at their own direction. This shifting perception of how information needed to be presented had its ramifications for museums. Social critic William J. Mitchell commented in 1992 about the role the Web plays on shifting the public perception of art:

> So we must abandon the traditional conception of an art world populated by stable, enduring, finished works and replace it with one that recognizes continual mutation and proliferation of variants.[37]

For museums, this meant responding to the needs of a digitized culture which demanded many different types of information all at once, all the time. Steve Dietz, founding Director of New Media Initiatives at the Walker Art Center, pointed out that museum audiences' relationship to culture was quickly changing, having been brought up on the rapid

[37] Steve Dietz, "Telling Stories: Procedural Authorship and Extracting Meaning from Museum Databases." Museums and the Web 1999 (Toronto: Archives & Museum Informatics, 1999). http://www.archimuse.com/mw99/papers/dietz/dietz.html (accessed 12/7/2005).

information presented by MTV, video games, and the Internet. In other words, the new museum visitor was now accustomed to being able to make their own connections between presented information, rather than depending on the storyline approach of the traditional museum exhibition. In order for museums to make sense to this audience, information needed to be presented on *their* terms.[38] For CMS, this meant that information presented and contained within the database not only has to be easily available, it had to have enough information contained within for the public to make connections with the objects.

The CMS of the 1990s was a much more sophisticated program than the CMS of the 1980s. The software could take advantage of faster computers and present images, sort information in any one of a myriad of configurations, record exhibition information, track locations, and interface with a museum Website. Still, despite a wide range of features, some professionals felt that use of CMS within the museum was often underutilized. Richard Gerrard looked at the number of failed projects in the past and suggested that failure was a historical trend, because there was often early enthusiasm for new features, buoyed by an infusion of grants. This, he said, created inflated expectations on the part of users, a lack of critical examination by developers, and resistance within the

[38] ibid.

institution's administrative structure. Soon thereafter, the feature which promises this great advancement in productivity is abandoned in favor of the next technological wonder.[39] Still, many CMS features developed in the 90s remain valuable and useful today, with more features being added all the time.

With the goal of *access* still a compelling reason behind CMS development, museums began to publish some of their collections information on the Web. With the new ability for CMS to store image and multimedia information next to textual object information,[40] museums could present their collections visually to anyone with an Internet connection. Unfortunately, due to early concerns over curatorial control and lack of staffing to input extended information, CMS had developed primarily as inventory tracking systems. Thus the information available for presentation on Websites was limited to brief collection management information, such as media, title, artist name, dimensions, and credit line. Some museum professionals believed that this limited information did not address the needs of a diverse public. Kevin Donovan was blunt when he

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[39] Richard Gerrard, "With All This I.T., Are We Doing Our Job Better?" Museums and the Web 1998 (Toronto: Archives & Museum Informatics, 1998.. http://www.archimuse.com/mw98/papers/gerrard/gerrard_paper.html (accessed 3/11/2006).

[40] Howard Besser, "Integrating Collections Management Information into Online Exhibits: The Worldwide Web as a Facilitator for Linking 2 Separate Processes.," Museums and the Web 1997, ed. David Bearman and Jennifer Trant (Toronto: Archives & Museum Informatics, 1997. http://www.archimuse.com/mw97/speak/besser.htm (accessed 12/5/2005).

suggested that "access is not enough." He believed that "access to much of our on-line sources is of little value because museums add so little value to the data they provide."[41] In other words, the on-line collection does not go far enough to bridge collections information with interpretive or educational resources. According to Donovan, the ways in which information is presented in the database is of little use to the broader public and difficult to locate without a firm understanding of what's already in the database.[42] Dietz echoes this concern by asking if the data input into CMS by museums over the past twenty years is the information the public is looking for and, if so, how can it be made compelling?[43]

The desire to "make it compelling" while providing full access would be a major topic at museum conferences throughout the 1990s to the present day. Besser discusses a movement to present collections information with item-level descriptions. These descriptions would link to similar objects with those same words embedded within the text. The theory was that a user could choose a search term and find other objects that had a contextual relationship to other objects within the collection.[44] Besser also believed that one day, it would be possible for search terms to be generated on the fly, which would connect to outside sources of

[41] Donovan. pp. 127-129.
[42] ibid. p. 129.
[43] Dietz
[44] Besser, 1997.

information, perhaps anticipating Wikipedia.[45] The interconnectivity of museum records with external sources of information was but one suggestion for expanding the online visitor's interaction with collections information.

In 1999, Maurita Holland and Kari Smith suggested that "the visitor learner can become a collaborator" by providing the opportunity for on-line visitors to add to item information. Holland and Smith believed that inviting visitors to become part of a "cultural collective" allows the visitor to create context between objects. Such interaction may also help the museum identify objects. In addition, visitor interaction with virtual objects increases awareness of the museum and broadens the audience. [46] Dietz and Donovan both liken ideal interaction with collection objects to a conversation, rather than storytelling. That is, stories are one-directional and declamatory, whereas good conversations have equal participation by both parties.[47]

As a way to further the conversation, Donovan states that even if CMS information becomes more democratic and complex, museums already produce large amounts of educational and scholarly content. He

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[45] ibid. see http://www.wikipedia.org
[46] Maurita Holland and Kari Smith, "Broadening Access to Native American Collections Via the Internet," *Museums and the Web 1999*, ed. David Bearman and Jennifer Trant (Toronto: Archives & Museum Informatics, 1999.). http://www.archimuse.com/mw99/papers/holland/holland.html (accessed 12/7/2005)
[47] Dietz. Donovan, p. 130.

believed that museums should include exhibition labels and educational texts alongside object information, but this information simply isn't being saved.[48]

The desire for more intensive and interactive relationships with the visitor led professionals to understand that they needed to know more about what visitors wanted. Gerrard, among others, urged the field to evaluate the information presented by their CMS on the museum Websites.[49] Evaluation of Websites is a relatively new innovation, and will likely become an important step in the future.

CMS Today

Current literature on this topic is composed mostly of case studies and philosophical discussions about accessibility, collaborative efforts, metadata standards, and interpretation, building on earlier discussions. Twenty-six of thirty-five articles about CMS chosen from journals such as *Museums on the Web, Curator, Journal of the American Society for Information Science* and *FirstMonday.org*, focused on access. Only three papers were purely about technical solutions for CMS. Even though the other papers did not talk about accessibility to collections directly, it was an underlying theme or key concept. These papers discussed using CMS to interact with the public through the Web, defining research terminology

[48] Donovan, p. 131.
[49] Gerrard.

that could be shared between institutions and creating publishing systems or tools with which visitors can interact.

Collaborations between institutions or between museums, archives, and libraries was another popular topic of discussion. Often these papers were concerned with case studies and the technical details of making different CMS and data systems "talk to one another."

At a Museums on the Web conference in Arlington, Virginia in 2004, Darren Peacock, Derek Ellis, and John Doolan presented a case study about interpretive materials. In their paper, they cited a review of 100 museum Websites. They found that 78% of these Websites had a link to a collections area on the Website, but only about a quarter provided ways to search collections. Only about half of those with that capability offered expanded content or non-linear ways of searching. I discovered a similar percentage during my own 2006 Website review, outlined in the next section. Suggesting that there is a fundamental difference between information and knowledge,[50] they stated that museums traffic in information, but information isn't always usable or valuable as knowledge.

[50] Darren Peacock, Derek Ellis and John Doolan, "Searching for Meaning: Not Just Records," *Museums and the Web 2004*, eds. David Bearman and Jennifer Trant (Toronto: Archives & Museum Informatics, 2004.). As the authors put it, knowledge entails a "knower" and that it requires a human participant. Information is simply raw data.

The literature has shown that many hopes and demands have been placed upon collections management software. Collections managers wanted to be able to control the inventory requirements of collections. Directors needed the CMS as a tool for addressing public pressure for accountability, transparency and increased access. These demands have shaped the way the software has evolved from a simple tracking tool to a complex, Internet-accessible, cultural information instrument. More recently the field is moving toward an interpretive, collaboration-based approach to disseminating collections information. This will increase the likelihood that CMS can fulfill its promise of greater public access to museum collections. Despite this, as CMS become more vital to the museum field, questions remain about the software is and should be best utilized. These are the questions I addressed in my research.

FINDINGS

This master's project explores the discussions and realities surrounding collections management systems. The review of the literature covers the evolution of CMS from the 1960s through the present, as such context is valuable to understanding why CMS are the central collections information management tool for today's museums and their potential for facilitating mission-driven practices. In order to recognize where CMS are today and the direction in which they are likely to be developed in the future, I conducted an on-line survey sent to the Registrar's Committee of the American Association of Museums (RC-AAM) and Museum Computer Network (MCN) listservs. The survey yielded a total of 110 responses. I conducted five interviews with museum registrars, a records administrator, and a leader in the scholarly community. I also completed a Website review of fifty historical and/or art museums.

Survey Results

A survey sent to the RC-AAM and MCN listservs in April 2006 yielded a number of interesting responses. Out of 110 responses, 63 (58%) were from small museums, with fewer than 31 full- or part-time employees at their institution. Nearly a quarter had 31-100 employees, and only 19 respondents were from large museums, with more than 100 employees (Appendix D). Despite this variety of staff size, 75 percent had

a staff member dedicated to records and database maintenance (Appendix E). Two-thirds of respondents had 1,000 to 50,000 objects in their collection, with another 30% reporting even larger collections. Only 3% said that their collection size was smaller than 1,000 objects (Appendix F).

The next section of my survey covered CMS upgrades, planning, and usage. I was interested to know how long institutions had been using their CMS. The majority of respondents, 59%, had been using their software for one to five years. Yet almost one-third indicated that they had been using the same software for six to ten years and about 10 percent of the total respondents said they had been using their software for eleven to fifteen years. Amazingly, two staff even reported that they have used their CMS for sixteen to twenty years! Four said they had just upgraded or changed within the past year (Appendix G).

I asked if the institution was planning to upgrade or purchase new software within the next 1-2 years. A third responded that they were. Another 5% were thinking about it or weren't sure. Nine percent of the respondents were simply continuing to upgrade their existing software and another 4% had just replaced their CMS. Half of the respondents indicated that they were not going to replace or upgrade their systems. The comments appended to this question indicated that lack of funds was a major reason for this (Appendix H).

Next, I asked those who had indicated that they were planning to upgrade or replace their systems, what kind of software they were arranging to purchase or upgrade to. This question included database management software like FileMaker Pro and Microsoft Access, which does allow for customization of fields, but the core features of these packages are not changed. Out of 45 responses to this question, forty percent said they were simply going to update and redevelop their existing software. A quarter planned to purchase and customize a CMS program. Another six respondents were going to purchase a CMS or data management software and leave it as-is. At the time of this survey, 16%, weren't sure which solution to go with. Only two respondents said they were planning to develop their program in-house (Appendix I).

In comparison to the question above, I asked which kind of software they used currently. Less than ten percent said that they were using a system developed in-house. The remaining responses were split fifty-fifty between those who had systems that had been purchased and not customized (including FileMaker Pro and Microsoft Access) and those which had been purchased and customized (Appendix J).

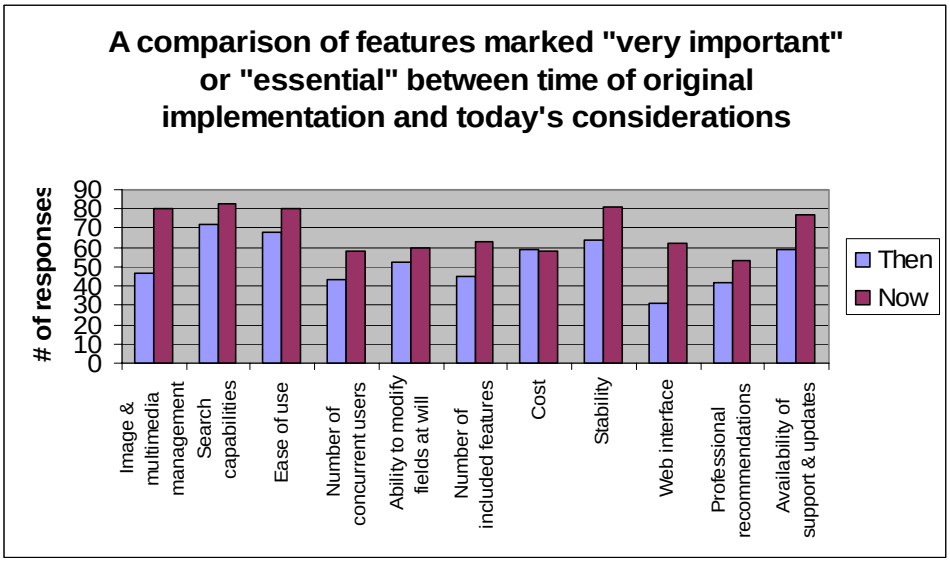
I was also interested in which features were important to respondents at the time of developing their current system and if they were to purchase or upgrade today, which features would be important now. I

asked individuals to rate eleven common features of CMS on a ranking scale, from "not important" to "essential." Asked about their current software, respondents revealed that the most important features at the time of purchase were searching capability, ease of use, stability and support. Multimedia management and Web interfaces were considered the least important. In comparison, when asked about the choices they made for new or future software, searching capability still topped the most important feature list with ease of use, availability of support and updates and stability as the next three most important features. Moreover, despite its earlier ranking as being the least important, image and multimedia capability followed a close fifth with 54 respondents marking it as "essential." Only four respondents said that a Web interface wasn't important today, in comparison with 19 respondents who didn't feel it to be important in the past.

Another interesting finding was the shift in thinking about the total number of features offered within a package. Respondents said that this had not been a very important consideration when they purchased their systems. In comparison, nearly all of the features I listed are deemed by the respondents as an important consideration for purchasing a system today or in the future (Appendix K, including comparison charts). However, some respondents commented that many CMS capabilities were

beyond the needs of their institution at this time. Survey comments are discussed below.

The following chart shows a comparison of those features marked "very important" or "essential" between past decisions and current or future considerations. It shows us that overall, the demand for features in CMS packages has increased. Only one factor, cost, saw a decrease in its importance in the decision-making process. This is likely a reflection of how staff views the CMS as a necessary tool for their work and the availability of funding for digitization projects.



My open-ended questions (Appendix L provides a selection of responses) provided some additional information about the types of features respondents would like to see better developed as well as the challenges they have with their current systems. Most respondents noted

that the features they would most like to see developed in the future are better report creation, integration with other museum functions such as the library, archives, or development departments, barcode tracking, security or accessibility levels, and better Web interfaces. Of the thirty-two respondents who answered this question, twelve indicated that they wished for better or easier report generation. Five respondents said that they wished for easier Web interfaces from their CMS. Barcode tracking integration and security or accessibility levels were also important. Integration with other museum functions, such as archives, libraries, and development software, was also desired by some.

When asked about the challenges of their current systems and the features they would like to see in the future, many respondents said that they had difficulties with creating reports, setting security levels, searching for information, managing Web interfaces, using image or multimedia functions, and modifying fields. A number of people also said that their systems did not function ideally for the type of collection the software was being used for. When asked about what users liked about their current system, simplicity or ease of use was the most common response, followed by searching capabilities, availability of support staff or user forums, cost, flexibility to modify fields or make changes to the structure, linking to images and availability of specific modules (such as

being able to track location changes, loans, and conservation treatments, for example).

Although not specific to particular questions, some responses indicated a concern that larger CMS packages were loaded with unnecessary features, that they did more than was really needed. As Lana Newhart-Kellen of Conner Prairie Museum wrote, "I often felt the more expensive systems did much more than what our museum needed it to do." Mark Janzen of Ulrich Museum of Art suggested, "I would like to see one program eventually developed that incorporated all of the features needed in various museums, but which offers the ability to turn them off easily." This contrasts with the survey responses indicating that nearly every available CMS feature is an important consideration for future purchases.

Interviews

For this project, I interviewed Julie Franklin, Exhibition Registrar and Linda Poe, Collection Manager and Permanent Collection Registrar, both at Judah L. Magnes Museum in Berkeley; Marla Misunas, Collections Information Manager at San Francisco Museum of Modern Art and President of the Museum Computer Network; David Bearman, President of Archives & Museum Informatics, an organization that offers conferences, publications, and consulting about museum technology issues; and Diane Gutenkauf, currently working for ExhibitWorks, an

exhibit fabrication firm, but who was a registrar for a small local history museum for seven years in the 1990s and a representative for Vernon Systems, a CMS developer (see Appendix A for interview questions).

Rather than emphasizing access, all interviewees agreed that the primary function of CMS were for inventory controls and sorting museum-generated data. Most interviewees also believed that authority controls were an important feature in CMS, as the records administrator could have control over the consistency and quality of data being entered. Interdepartmental functions were independently mentioned by Misunas and Poe as being important, and both agreed that the database should be able to present relevant fields to individual departments or users.

The Internet and the Web were important to my interviewees. Bearman discussed the history of CMS with me, noting that the emphasis on CMS shifted radically in the 1990s, when the World Wide Web became more widely available. He noted that the evolution of the CMS as an auditing or inventory tool changed when the Web appeared. He said that the function of CMS shifted to become tools for public accessibility. Enforcing this statement, Franklin suggested that "collections are only useful when people see it… Access builds trust and bridges to the community."

On the issue of interpretive data of objects stored within the CMS, Franklin and Gutenkauf believed that, to quote Gutenkauf, there is "no point in having data if you're not interpreting it." Bearman, however, suggested instead that all of the data museums save is a form of interpretation, and recording the context of the information fulfills the need for interpretation. Much of this data, including text and images, is information that the public wishes to see and engage with, but much of it is equally useful to the museum professional, even if the public isn't interested in it.

As for sharing the data itself, four interviewees mentioned the importance of being able to create collaborative data or sharing data with other systems, either internally or in a consortium. Gutenkauf offered an interesting perspective, stating that she believed that the field-wide concern over metadata formats and data standards may evolve into a non-issue in five years. That is, the problems that hinder museums from sharing their data collaboratively with other institutions may eventually evaporate. Bearman, on the other hand, did not believe this to be true, although he noted that it was an ongoing topic of discussion.

Some of the interviewees mentioned how they would like to see CMS used in the future. Franklin said she would like to see more oral histories input into the CMS, as well as being able to see 3D images of

objects. Gutenkauf and Franklin both thought that there should be more training for new professionals about museum data and how and why information gets used. Plus, given the amount of information produced by museums, Gutenkauf envisioned CMS tracking contextual or interpretive information in real time. Bearman echoed that belief, stating that museums regularly create collections information that never gets put into the CMS, although this may not be a problem, he said, so long as the information is accessible somewhere. Poe thought that interfacing with cell phones and personal digital assistants (PDA) is a nice idea. Poe also felt that tying CMS in with other types of software, like Raiser's Edge development software, would be an important goal.

Bearman also touched on the topic of digital assets. He stated that the direction of CMS has, by default because of the Web, become about digital assets, not just physical collection objects. He points out that historically, the collection management system was designed to organize metadata about physical objects, including the history of its management. In the late 1990s, content management systems were created to manage digital assets. More recently, the collection management system has incorporated many features of the content management system and is now colloquially referred to as a content management system. This change and confusion in terminology has "displaced in part, and certainly in profile"

some of the original function of the collection management software to incorporate the tools needed to organize and display digital assets.

Website reviews

With the understanding that putting collections information on the Web is a priority for many museums, I looked at fifty museum Websites and counted how many utilized the Web for presenting their collections. I also looked at how object information was offered to the public (Appendix C). Of the fifty museums I chose, 49 had a Website. The one that did not was linked to a local tourism site and provided no information other than the museum's location and hours.

Of the remaining museums, 72% had a link directly to information about the collection. This link led to a page or pages which utilized one of three different strategies for presenting collection information. These strategies were:

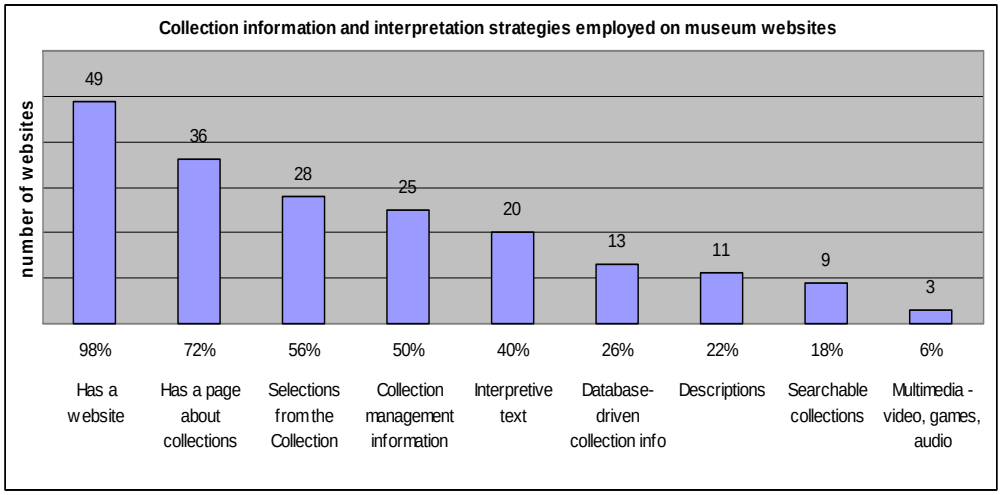
- Viewing selections from the collection - These selections are offered on the website with no interpretive information. Often there are very few objects presented. An online visitor may be able to search these selections, but the information is static on the website and does not use a CMS to present information or images.
- Curatorial highlights – Objects are chosen by curatorial staff, almost like an online exhibition, and usually provide some form of expanded interpretive information along with the image. Curatorial highlights also do not use CMS for providing this content.
- Searching the online database – This type of presentation usually uses the CMS to present collection information. It may or may not offer interpretive content.

Museums use one or all of these strategies for offering on-line collection access. Methods may overlap and offer different types of information.

The Dallas Museum of Art Website utilized all three of these strategies. The museum Website had a banner directly on the page with a link to view collections. This led to the choice of viewing selections from the collection, reading curatorial highlights, or searching the online database. Just over half of all Websites reviewed, a total of 28, or 56%, utilized a selections strategy for presenting objects. Only 20 Websites provided didactic text along with the photographs, such as Colorado University Art Gallery's essay about Louise Bourgeois presented next to a photograph of her print, *Ste. Sebastienne*, 1993. Even fewer (13) used their CMS to interface with their Website, although some museums utilized both a selections and a database searching strategy for presenting object information. An example of using CMS to present collection objects could be seen on the Computer History Museum's Website. It was very basic however and only presented images and inventory information within a list format. In contrast, the Dallas Museum of Art's CMS-driven Website was user-friendly, visually appealing, and organized by subject. Half of the Websites reviewed offered their collection management information, such as accession number, title, or credit line, along with the object photographs. Only 22% provided descriptions of the object along with

interpretive information or collection data. Despite the fact that searching capabilities is one of the strengths of CMS, little more than a quarter of museums used their CMS to interface with the Website and only 18% offered collection searching capability.

Overall, use of multimedia - such as games, videos, or Flash-driven interactives – was minimal. Only 6% of the sites I visited provided multimedia as an option for finding information. For example, the Textile Museum in Washington D.C. offered a Flash-driven "interactive learning experience" called *Common Threads*, which allowed a visitor to compare two textiles from different areas of the world. The program answered questions about how the textiles are made, significance of the motifs, and where it is from. The following chart shows a comparison of strategies used on museum Websites to present collections information:



CONCLUSIONS

I began this project with the goal of exploring whether there was any disconnect between philosophical thinking about CMS and how museum professionals actually use this software. I hypothesized that the issue of accessibility to collections is now a core mission-driven goal for most museums, regardless of size, and that CMS is a tool to fulfill this goal. Therefore, I was interested to know if the focus on accessibility had shifted in any way and if it defined how CMS are currently regarded. I was also curious about the actual use of CMS in museums today and in the near future. Finally, as I was conducting my research, I began to wonder if CMS are in fact the best tools to address issues of accessibility and interpretation or if they should remain focused on managing collection information.

To address the first question about theory versus real usage, I found that philosophical discussions lead many museums to wish to change their practices. But perhaps not surprisingly, the desire for change lags behind actual practice. The literature review clearly showed that museologists are suggesting that accessibility to and interpretation of collections is a key goal and that CMS is the solution for promoting this. However, the Website review and survey results showed that practice is

lagging behind, although attempts are being made to promote access and/or interpretation online, even if those attempts are small in scope.

Despite the fact that the majority of Websites reviewed, 72 percent, had a link to collections, only 26 percent used a CMS to interface with the Website. Furthermore, of the museums which integrated their CMS with the Website, only six also provided interpretive text about collection objects. Compare that with the Websites offering selected objects to view, 71 percent of those also offered interpretive text along with it. Taken together, these facts show that museums are interested in offering both access and interpretation of collections, but they are not currently using their CMS to do it. Clearly, museums are not using CMS to provide online access to collections, nor, when they do use a CMS-driven Website, do they take advantage of its capabilities to provide extended information about objects.

The survey results also exposed the division between theory in the field and real usage. The questions which most illuminated this disconnect were the ranking questions about prior considerations when choosing a package and how professionals would choose today. With the sole exception of cost, all of the issues respondents were asked to rank increased to being an essential or very important consideration for choosing a CMS package. Both the importance of a CMS having a Web

interface and an image or multimedia capability nearly doubled in importance between then and now. This suggests that discussions about accessibility through the Internet are being heard by the field. However, considering the many comments about the importance of report generation and searching capabilities, I can conclude that the original function of a CMS as a collection management system, as opposed to a content management system, is just as important today as it was when this type of software was first evolving. Professionals today want their CMS to do it all – manage collection information, track donor records, generate reports, store exhibition information, present multimedia files, and increase access on the Web. Several comments from my interviewees and survey respondents take this "kitchen sink" mentality one step further and suggest that professionals will also want to throw in the whole kitchen, by tossing in archives, development, and library department functions into CMS!

This relates to my second question, if feelings about CMS by professionals have changed over time. As I illustrated above, CMS have shifted from being a simple collection management tool to a robust type of program designed to deliver a complex institutional goal. My literature review showed that discussions about collections accessibility have changed dramatically between the 1960s and 2000s. Today, not only are museums still striving to provide access to collections information but

many are realizing that just providing database information is not useful to online visitors of all sorts. One of the interesting shifts in language between 1980 and today regards the acronym CMS. When CMS moved from being simple database programs to visual *Collection* Management Systems, they were still designed to manage collections and only manage collections. I found a reference to an article from 2004 referring to CMS as *Content* Management Systems, a distinction which is being used more frequently on museum listservs and in conference proceedings. This is an important distinction in light of current thinking about how these systems are being asked to manage information as well as what kinds of information to manage. Today, museologists are advocating for museums to input the interpretative or contextual materials that museums produce on a regular basis into the CMS and present on-line those materials along with the object information. My survey responses from professionals suggest fieldwide buy-in to this idea, but practically speaking, collection managers are still struggling to manage the collection data they've inherited, using outdated equipment and few staff resources. The priority to manage collections information and make it accessible is illustrated by the fact that 75 percent of respondents said that they had a staff member dedicated to this task.

To answer my third question, I looked at my survey responses and my interviews. Professionals use CMS to: 1) put information in; 2) move information around; and 3) get information out in the form of some sort of report. This hasn't changed during the evolution of the CMS. Ongoing discussions surrounding CMS have primarily to do with what kinds of information to put in and how to retrieve it in a useful and meaningful way. Therefore, it is not surprising that the software is still used mainly to manage simple collection information, such as tracking locations and storing donor information, in addition to the desires for Web integration and public access. My survey responses and comments suggest that getting information "out of the system" is still a big issue, given the many complaints about how difficult it is to design or produce reports. Many comments stated a desire to use CMS to put collections online, but professionals felt that they either weren't ready for that or did not have the resources to do so. As shown earlier, most museums have some sort of collection information online, but most do not use CMS to present that information. This illustrates a strong desire to put information on the Web, but could indicate that without additional resources, the time and effort it currently takes to interface a CMS with a Website is prohibitive. Survey responses lead this researcher to believe that these are issues important enough to change CMS development in order to make report generation

and Web interfacing easier in the future. The results of the survey responses and Website and literature reviews are indicative that issues of collection accountability and accessibility are very important to professionals, while the topic of using CMS for providing interpretative materials is still mostly a focus for museologists.

Interestingly, I did not see any discussion in the literature about integrating CMS with development software, as some interviewees and survey respondents have wished for. Both museum professionals and museologists have touched on the issue of integrating museum, library, and archives data. It is my belief that this will be one of the next big topics in the field and CMS will be adapted to respond to it.

Finally, my concern that we may be asking our content or collections management systems to do too much did not bear out in this research. Database programming has become more refined and powerful, and the databases behind CMS are well suited to the task for storing a myriad of information. The difficulty is less to do with the software and more to do with the time and resources available to institutions who wish to exploit a CMS to its fullest potential.

RECOMMENDATIONS

The purposes for which CMS are being used differ from institution to institution. The software was designed originally to aid cataloguing efforts and today some professionals are using CMS to achieve broader goals of public access to and interpretation of collections. However, there are still a great number of collections and records managers using their systems only for cataloguing purposes. The survey responses indicated that many staff would like to add public accessibility and interpretation to their efforts, but are greatly limited by their available technology and resources. As a result, there is a disconnect between the actual practice and theory of CMS use. I do not know that there is a simple solution to this separation between broad practice and theory. Instead, I offer some recommendations to the field in order to help museums utilize more of those features available in CMS.

Due to the increasing interest by museums for expanding their cataloguing efforts, I believe that more financial support should be available to institutions for cataloguing and digitization. IMLS and NEH offer digitization grants which are often designed to help the process of adding collection records to a CMS, prior to presenting it on the Internet. Some private foundations promote cataloguing attempts, such as Pew Charitable Trust's supporting the Museum Loan Network housed at

Massachusetts Institute of Technology.[51] Despite these few examples, many professionals said that they had difficulty getting donations or administrative support for cataloguing projects. Therefore, if the museum wants to provide access to collections, I recommend that museum development and administrative departments fully support collection staff efforts to properly catalogue and present collection objects.

For those museums fortunate enough to have resources to upgrade their systems, it is evident that many collection staff are often unclear about a number of subjects, including how to choose a CMS, how to develop a new one, which features to look for, how to get institutional buy-in, and how to prepare for a digitization project. A museum beginning a digitization or cataloguing project should define their requirements and match them up against various software packages to see which provide the best fit. These topics and decision-making processes are addressed in various articles and books, but there is no cohesive portal of information within the United States. The Canadian Heritage Information Network (CHIN) produced a series of guides addressing these topics, but even though CMS capabilities have advanced considerably since November 2003, the guides have not been updated since then. CHIN also produced

[51] For example, my own institution was the recipient of an MLN grant to catalogue and digitize Jewish objects from the former Ottoman empire. As part of the grant, we also recorded oral histories about collecting these objects. The MLN Website is located at http://loanet.mit.edu/

an extensive guide about specific software packages. According to Diane Gutenkauf, CHIN will no longer produce this guide, but the Museum Documentation Association will begin to produce something similar. Due to the importance of CMS to the American museum today, I believe that AAM should support the dissemination of information about CMS packages by producing and updating similar guides. Alternately, the Museum Computer Network may find this topic a useful one to discuss on a regular basis, particularly given its beginnings as a CMS developer.

Despite the lack of "one-stop-shopping" for information about CMS, institutions embarking on conversion or digitization projects should be sure to do their research thoroughly. Key stakeholders including collections managers, curators, and administrative staff must determine the scope of the project right from the beginning: who the target audiences are, which audiences have priority over others based on the mission, and what features are essential. There are many great ideas about how to use CMS, but museums have to understand that without a major increase in staff, it will be impossible to do accomplish all of those ideas.

Museums, especially small ones, should be aware that it is okay to not be on the cutting edge of CMS developments and Website integration. My respondents suggested some anxiety that they were behind or had "missed the boat" with digitization and presenting collections on the Web.

Current thinking is shifting to reflect the belief that it is better to provide a few good, solid, useful objects with interpretive information that facilitates knowledge than a lot of objects with only cataloguing data that is meaningless to the average viewer. With that in mind, I recommend that museums take their time when entering collections data into a CMS. They should make sure the data is consistent and relevant for each object. Museums should collect all types of information created by the collections, education, and curatorial departments and methodically enter all of that into the CMS. Staff should also remember that the modern CMS is designed to hold all sorts of information, including Word or Excel documents, videos, still photographs, programs, and audio files. It is easier than ever to collect and sort all materials a museum produces. Even if a museum has no use for rough curatorial notes from an exhibition of permanent collection objects, those notes may be very important to a future staff member or researcher. It does not hurt the modern software to keep such material. Museums must always remember to have frequent backups of the database.

Software developers should be keenly aware of complaints or concerns provided by customers. As I mentioned before, getting information out of a CMS is an issue for many users. This is something that should be addressed. In addition to the problems users have with

report generation, integration with archival or library standards will become more important to users in the future. This was a common complaint and a problem that I am personally having with my museum's brand new, feature-rich, expensive CMS. Consequently, I can sympathize with the frustration that museums have when they must use two to four different types of information management software within the same institution, sometimes within the same collection. Such is the case with my own museum, which has an archive with objects and library materials and a permanent collection with library and archival materials.

I recommend that when museums are trying to decide whether to develop their own CMS or purchase a vendor package, they should speak to other professionals first. The Registrar's Committee listserv is a good resource for asking questions.[52] Some of my survey respondents said that they did not like their in-house CMS or their database management programs, such as FileMaker Pro or Microsoft's Access, which also require a great deal of modification. Some museums may decide that no software package commercially available will fit their needs and will hire a private company to develop software for them. This is usually more expensive than simply purchasing a commercial CMS and adjusting it to suit. However, it does have the advantage that a museum can specify

[52] http://www.rcaam.org

exactly how they want to use the software and someone will write it for them. Unfortunately, that programmer is probably not likely to understand museum needs and more time and money may be spent trying to optimize the software than would buying and customizing a CMS. Plus, a commercially available CMS will have updates which will keep the software up to date. As for commercially-available database software, they are often less expensive initially but the time spent to make it work the way the museum needs it to offsets any initial cost savings. On those grounds I strongly recommend purchasing a CMS over in-house developed software.

To echo the sentiments of Diane Gutenkauf, museum professionals should be aware that CMS are content management systems, not database programs. The CMS can do much more for a museum than a simple database program can do. Education about the difference between databases and CMS is important for understanding how these tools can and should be used.

Final Thoughts

The collection or content management system has evolved from a simple inventory program run by paper punchcards to a complex database-driven tool for managing any and all information that pertains to collections objects. The way the CMS has developed has been determined

by how museums have changed in response to societal pressures. Over the years, these pressures have led to the addition of ever more features and refinements for this one single program. As a result, the CMS has become the single most important tool for almost any museum with a collection.

Despite the limited ways in which many collections staff are using collection software today, the trend to using ever more robust CMS continues. More and more museums are making their collections accessible on the Web, and more are providing interpretive information along with collections information. The CMS can, and does, help with meeting the common mission-driven goals of access to and interpretation of collections. In the future, it will do much more.

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the American Society for Information Science and Technology 56.1 (2003): 23-35.

Zeng, Marcia Lei. "Metadata Elements for Object Description and Representation: A Case Report from a Digitized Historical Fashion Collection Project." *Journal of the American Society for Information Science 50.13* (1999): 1193-208.

APPENDICIES

Appendix A - Interview Questions:

1. In your opinion, what are the major reasons for using CMS today?

2. How has your CMS helped you in your current position?

3. What features or trends for CMS do you see for the future?

4. Thinking forward, are there any philosophical discussions that have yet to be addressed by the field?

Appendix B: Survey Questions:

1. How many full and part-time employees does your institution have? *(please check one)*

- □ **1-10**
- □ **11-30**
- □ **31-100**
- □ **100+**

2. Do you have an employee dedicated to collection records and database maintenance?

□ **Yes** □ **No**

3. Approximately how many objects are in your collection (including special collections, but exclusive of archives)? *(please check one)*

- □ **under 1,000**
- □ **1,001-10,000**
- □ **10,001-50,000**
- □ **50,001-100,000**
- □ **100,000**

4. Does your institution utilize collections management software (CMS) or data management software (e.g., FileMaker Pro or Microsoft Access)?
□ **Yes** □ **No** If yes, which one?

5. Has your institution developed plans to upgrade or purchase new software in the next 1-2 years?

□ **Yes** □ **No**

(If you answered "No" to questions 4 & 5 please return this survey. Your response is important to my research)

6. If yes to #5, what kind of software will you purchase? *(check one)*

- □ **Purchase and not customize (including FileMaker Pro and Microsoft Access)**
- □ **Purchase and customize**
- □ **Develop in-house**
- □ **Upgrade and redevelop existing software**
- □ **Don't know yet**

7. How many years have you been using your current software?

8. Is your current software *(please check one)*:

- □ **Purchased and not customized (incl. FileMaker Pro and Microsoft Access)**
- □ **Purchased and customized**
- □ **Developed in-house**

9. At the time of implementation, how important were these features to you when choosing your current software? *(please rank each feature, with 1 the least important and 5 being the most important, or N/A)*

_____ Image & multimedia management
_____ Search capabilities
_____ Ease of use
_____ Number of concurrent users
_____ Ability to modify fields at will
_____ Number of included features
_____ Cost
_____ Stability
_____ Web interface
_____ Professional recommendations
_____ Availability of support & update
_____ Other (please describe)

10. In the future, how important are these features to you when selecting or upgrading software? *(please rank each feature, with 1 the least important and 5 being the most important)*

_____ Image & multimedia management
_____ Search capabilities

_____ Ease of use
_____ Number of concurrent users
_____ Ability to modify fields at will
_____ Number of included features
_____ Cost
_____ Stability
_____ Web interface
_____ Professional recommendations
_____ Availability of support & updates
_____ Other (please describe)

11. What, if any, additional features would you wish to see created for CMS in the future?

12. What challenges do you have with your current system?

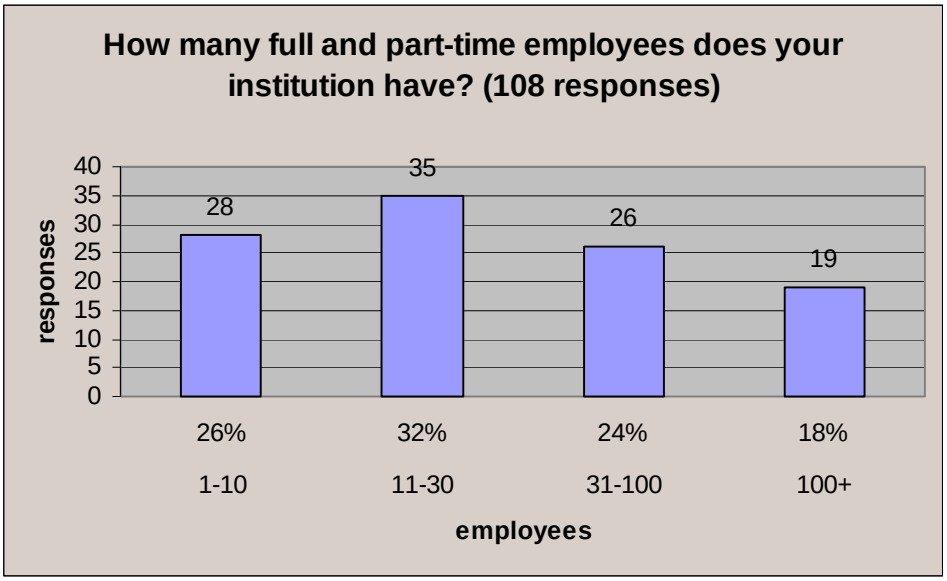
13. What do you value most about your current software?

14. Additional comments about CMS?

Appendix C - List of Websites reviewed (accessed 5/6/06):
Jewish Museum of Florida - http://www.jewishmuseum.com
Fuller Craft Museum - http://www.fullermuseum.org/
Baltimore Museum of Industry - http://www.thebmi.org/
Worcester Art Museum - http://www.worcesterart.org/
Nevada State Railroad Museum - http://www.nsrm-friends.org/
Lauren Rogers Museum of Art - http://www.lrma.org
Old State House Museum - http://www.oldstatehouse.com/
Samek Art Gallery-
http://www.bucknell.edu/The_Bucknell_Difference/Arts_at_Bucknell/Samek_Art_Gallery/index.html
The International Spy Museum - http://www.spymuseum.org/
The Textile Museum - http://www.textilemuseum.org/
Nemours Mansion and Garden -
http://www.nemours.org/Internet?url=no/vtours/mansion/mg2169.html
Isabella Stewart Gardner Museum - http://www.gardnermuseum.org/
Haggin Museum - http://www.hagginmuseum.org/
Yale University Art Gallery - http://artgallery.yale.edu
Yeshiva University Museum - http://www.yumuseum.org/
Saint Louis Art Museum - http://www.stlouis.art.museum/
Elmhurst Art Museum - http://www.elmhurstartmuseum.org/

The Newark Museum - http://www.newarkmuseum.org
Indianapolis Museum of Art - http://www.ima-art.org/
High Point Museum - http://www.highpointmuseum.org/
Orange County Museum of Art - http://www.ocma.net
Appleton Museum of Art - http://appletonmuseum.org/
CU Art Museum - http://www.colorado.edu/cuartmuseum/
Wadsworth Athenium Museum of Art -
http://www.wadsworthatheneum.org
Anderson County Museum -
http://www.andersoncountysc.org/Web/Museum_00.asp
Corning Museum of Glass - http://www.cmog.org/
George Eastman House - http://www.eastmanhouse.org/
Columbus Museum of Art - http://www.columbusmuseum.org/
Wichita-Sedgwick County Historical Museum -
http://www.wichitahistory.org/
Computer History Museum - http://www.computerhistory.org/
Oakland Museum of California - http://www.museumca.org/
Portland Museum of Art - http://www.portlandmuseum.org/
High Museum of Art - http://www.high.org/
Hillwood Museum and Gardens - http://www.hillwoodmuseum.org/
Museum of Indian Arts & Culture - http://www.miaclab.org/
Reynolda House Museum of American Art -
http://www.reynoldahouse.org/index.php
Tennessee State Museum - http://www.tnmuseum.org/
National Cowboy & Western Heritage Museum -
http://www.nationalcowboymuseum.org
Dallas Museum of Art - http://www.dallasmuseumofart.org
Central Intelligence Agency Museum -
http://www.cia.gov/cia/information/artifacts/index.htm
Cartoon Art Museum - http://www.cartoonart.org/
Charles M. Schultz Museum - http://www.schulzmuseum.org/
Stephen Phillips Memorial Trust - http://www.phillipsmuseum.org/
Maine State Museum - http://www.maine.gov/museum/
Chrysler Museum of Art - http://www.chrysler.org/
Winterthur Museum - http://www.winterthur.org
Cottonlandia Museum - http://www.cottonlandia.org/
Muskegon County Museum - http://www.muskegonmuseum.org
Busch-Reisinger Museum - http://www.artmuseums.harvard.edu/busch/
Georgia Museum of Art - http://www.uga.edu/gamuseum/index.html

Appendix D:



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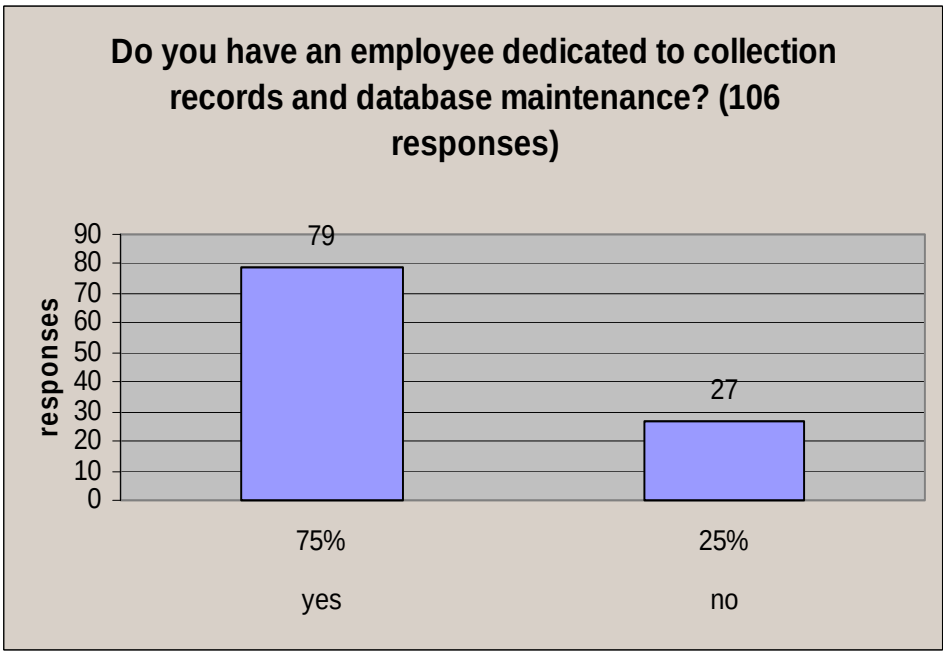

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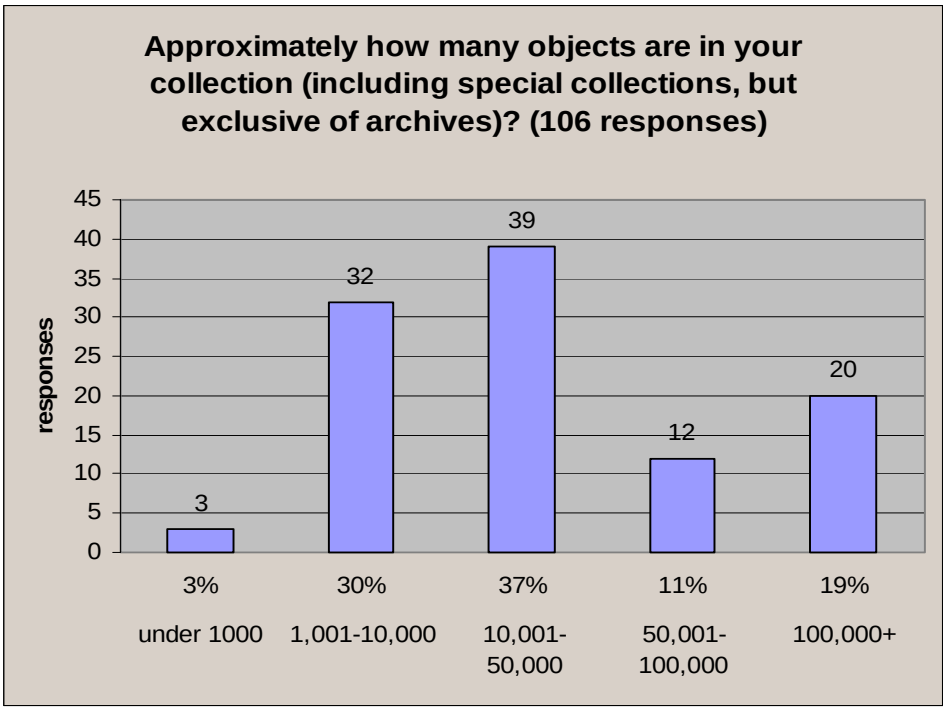

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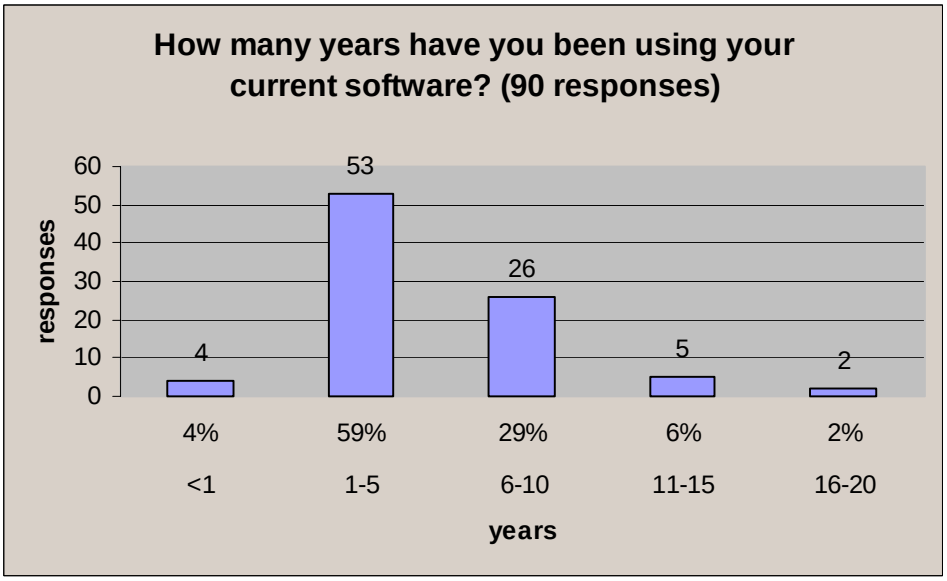
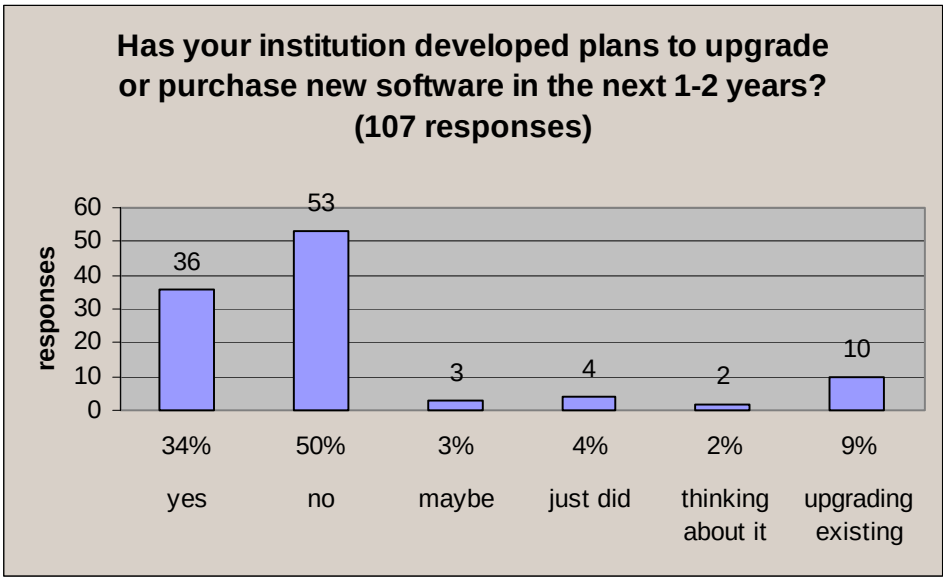
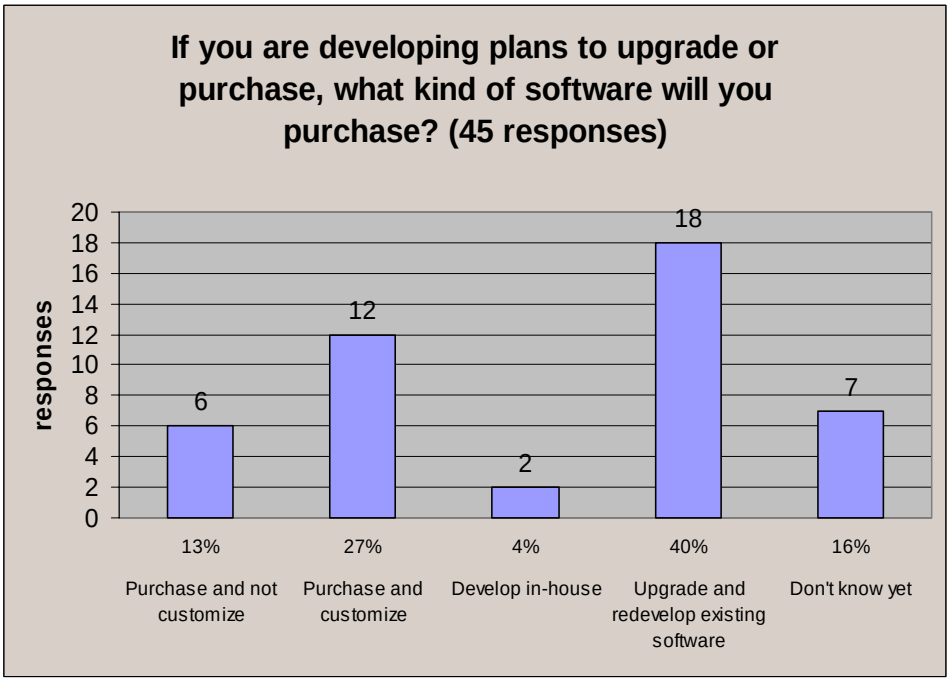


Appendix H:



Appendix I:



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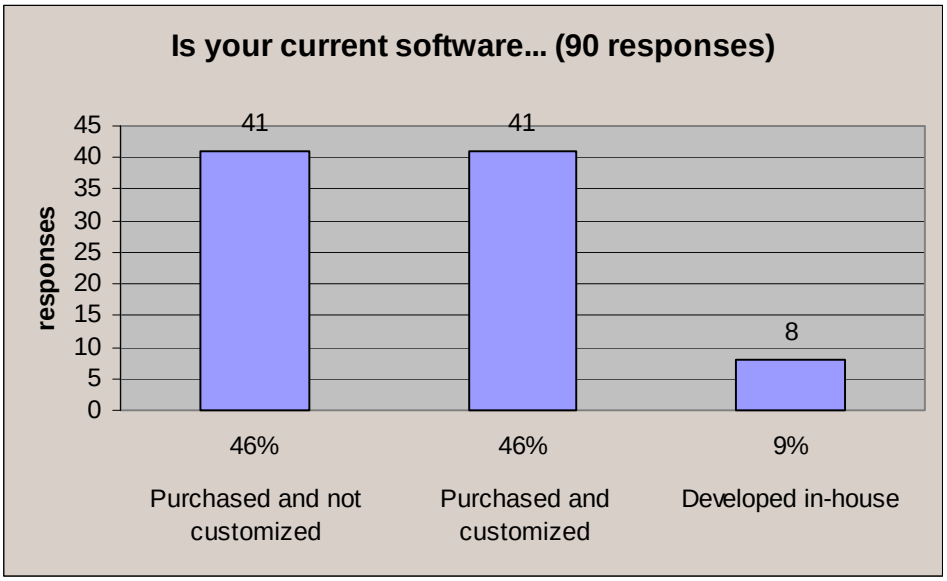

Is your current software... (90 responses)
responses
45
40
35
30
25
20
15
10
5
0
41
41
8
46%
46%
9%
Purchased and not customized
Purchased and customized
Developed in-house

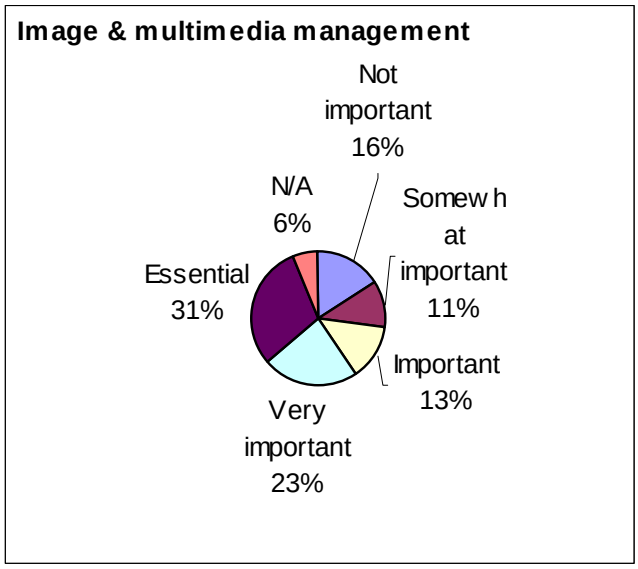
Appendix K – Consideration Weight of Features:

At the time of implementation, how important were these features to you when choosing your current software? (87 responses)						
	Not important	Somewhat important	Important	Very important	Essential	N/A
Image & multimedia management	14	10	11	20	27	5
Search capabilities	1	2	7	20	52	5
Ease of use	0	2	11	23	45	6
Number of concurrent users	7	11	18	24	19	8
Ability to modify fields at will	2	11	14	29	23	8
Number of included features	2	12	17	29	16	11
Cost	0	4	19	26	33	5
Stability	1	4	14	27	37	4
Web interface	19	17	10	22	9	10
Professional recommendations	6	4	26	27	15	9
Availability of support & updates	1	3	19	23	36	5

In the future, how important are these features to you when selecting or upgrading software? (91 responses)						
	Not important	Somewhat important	Important	Very important	Essential	N/A
Image & multimedia management	0	2	7	26	54	1
Search capabilities	0	0	6	18	65	1
Ease of use	0	0	9	21	59	1
Number of concurrent users	2	7	20	23	35	1
Ability to modify fields at will	1	11	16	25	35	1
Number of included features	2	4	17	34	29	3
Cost	1	6	24	24	34	1
Stability	0	0	8	25	56	2
Web interface	4	5	15	27	35	3
Professional recommendations	2	6	28	34	19	1
Availability of support & updates	0	2	11	19	58	1

Image and Multimedia:

Then:



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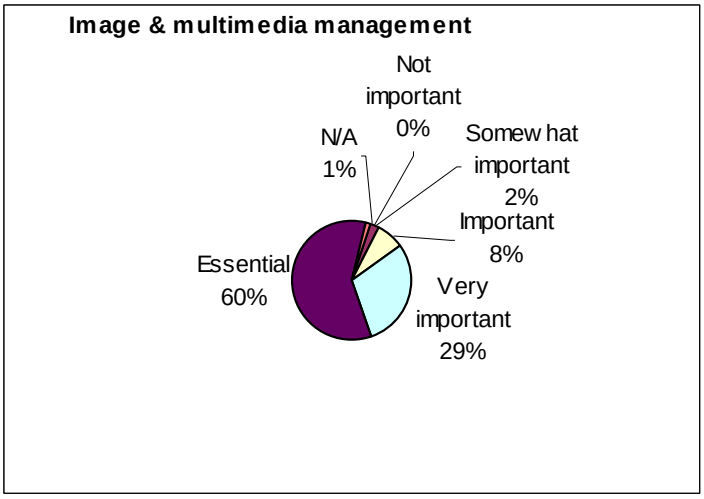

Number of Included Features:

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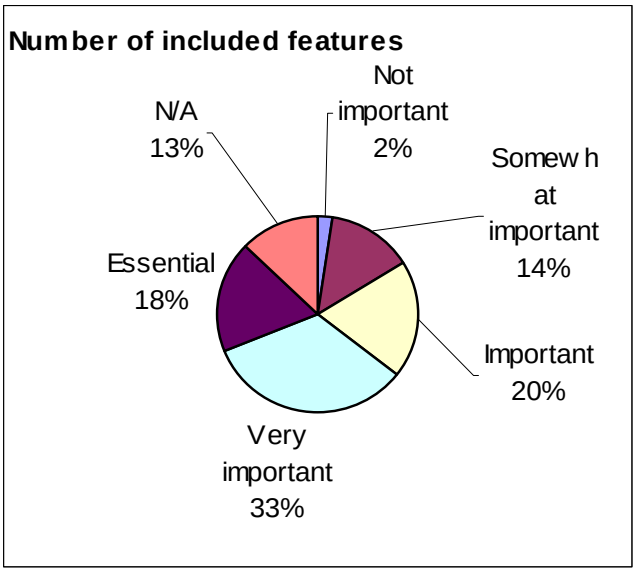

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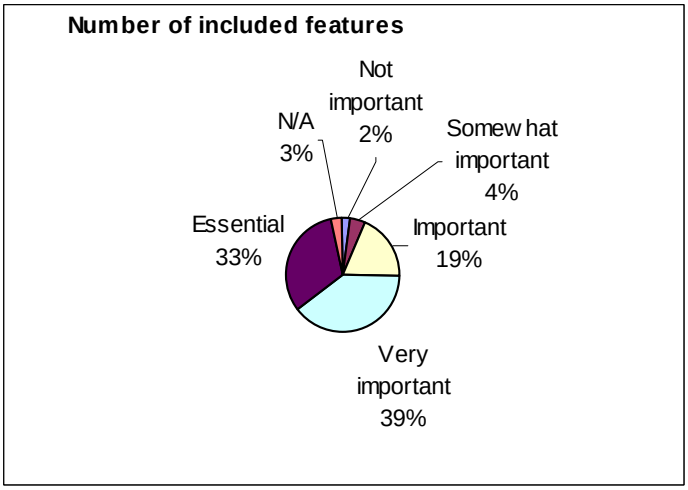
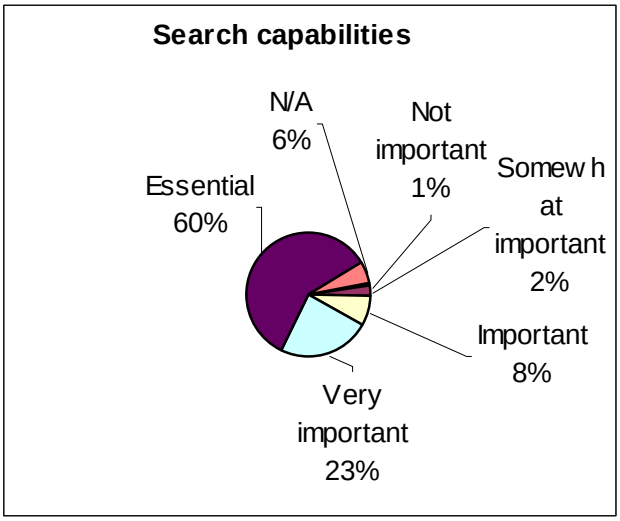


Search Capabilities:

Then:



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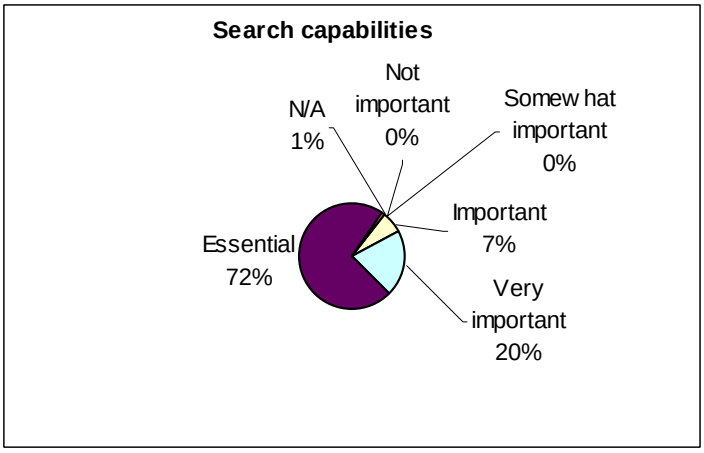
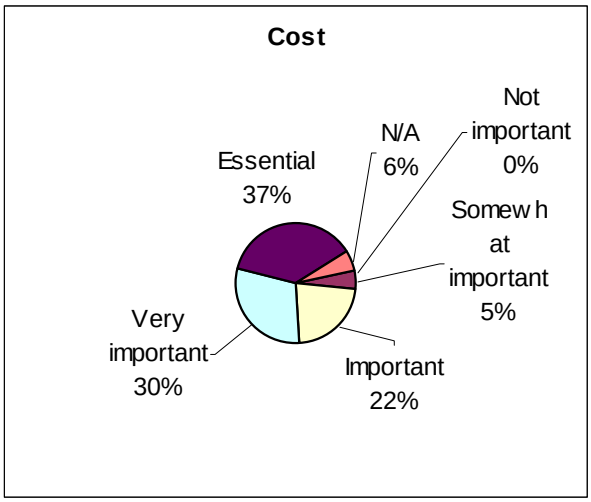


Cost:

Then:



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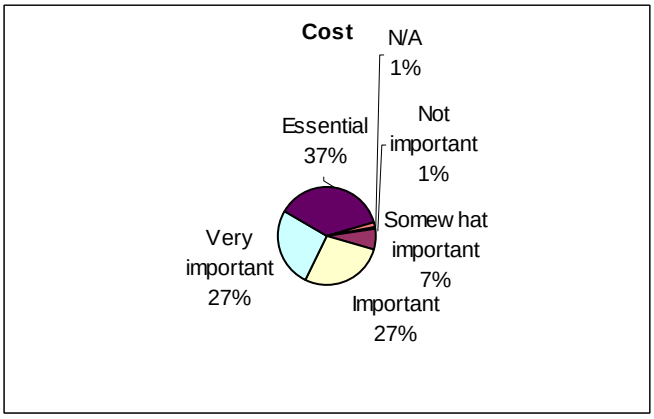
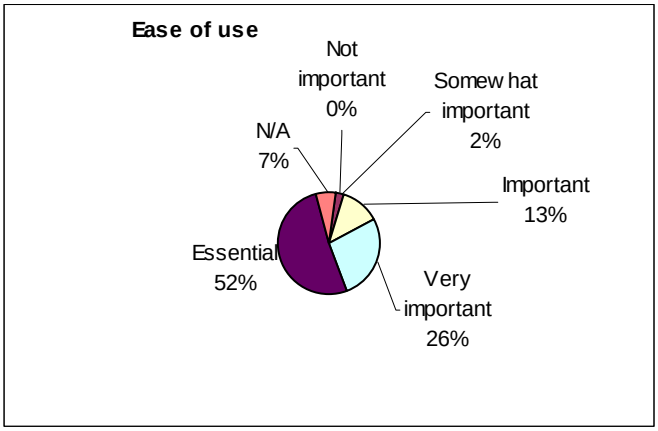


Ease of Use:

Then:



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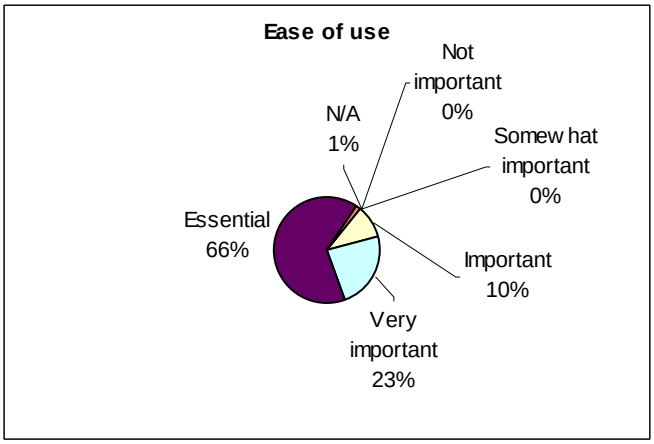
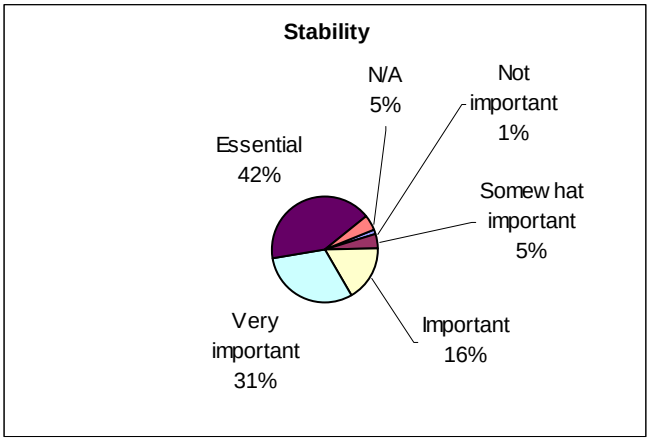


Stability:

Then:



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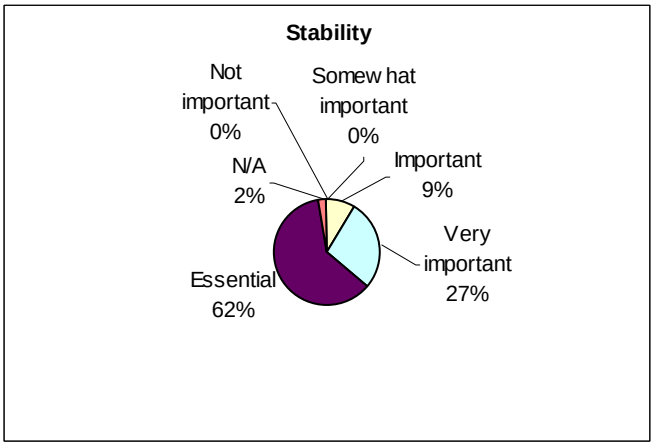
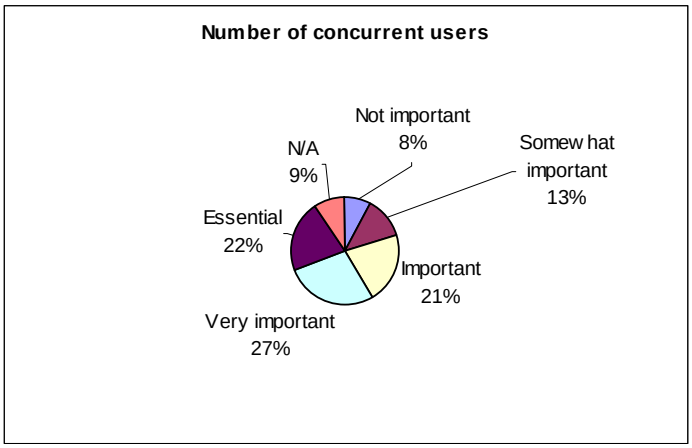


Number of Concurrent Users:

Then:



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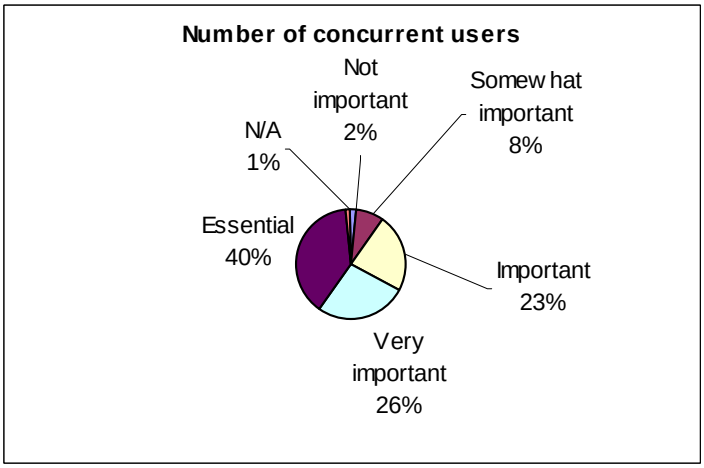
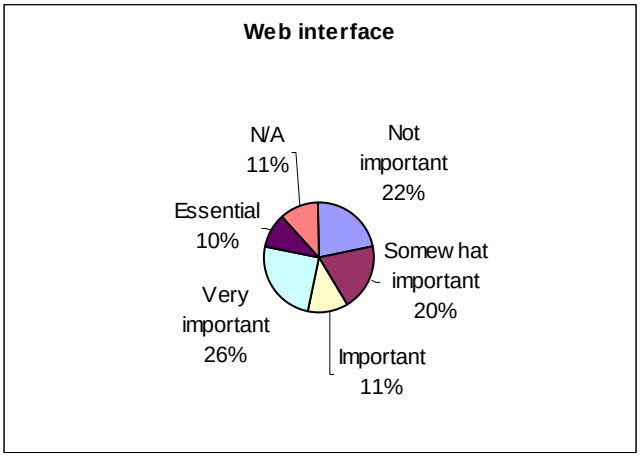


Ability of the CMS to Interface with the Web:

Then:



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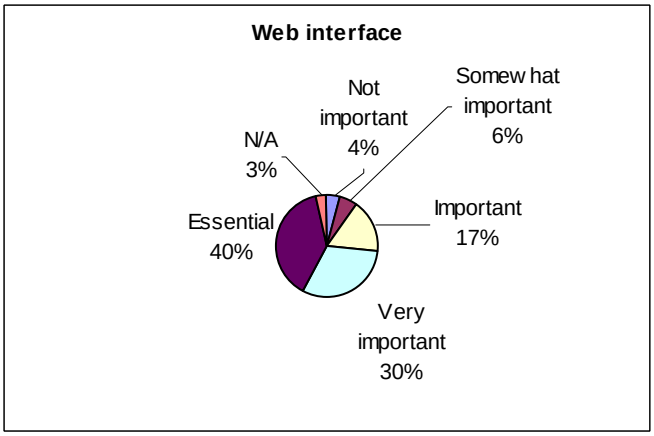
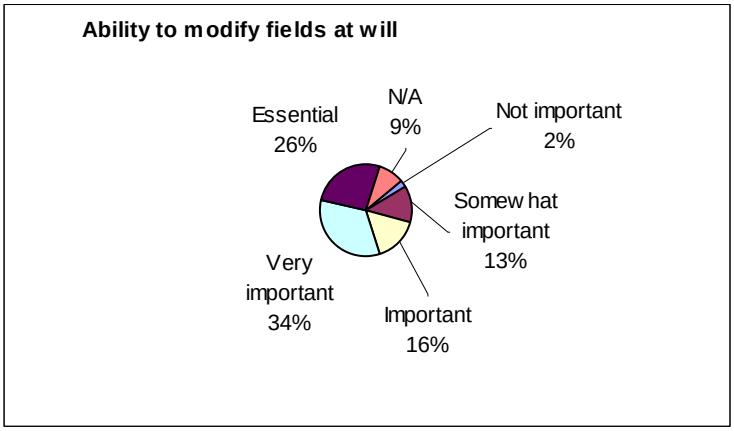


Ability to Modify Fields at Will:

Then:



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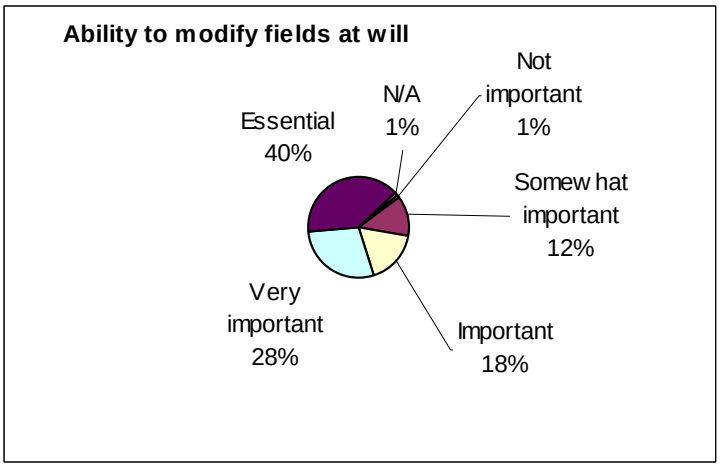
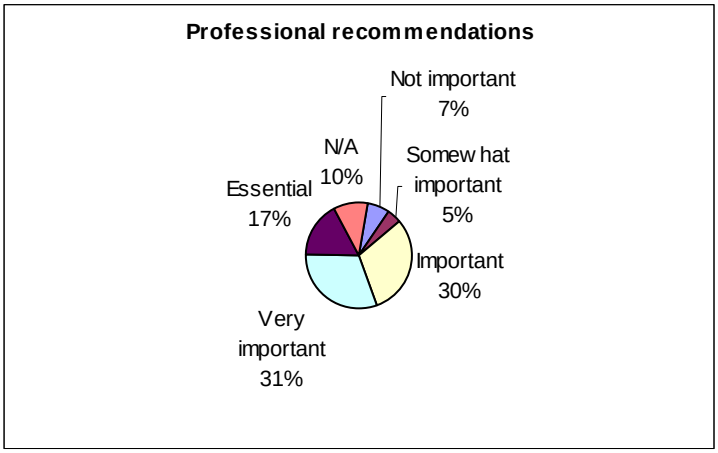


Professional Recommendations:

Then:



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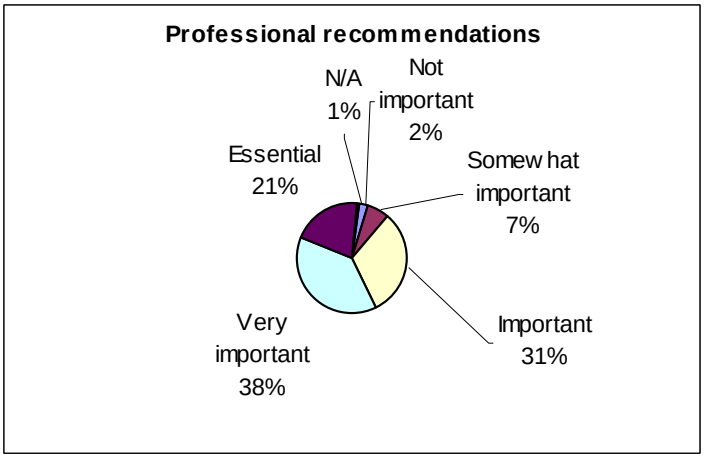
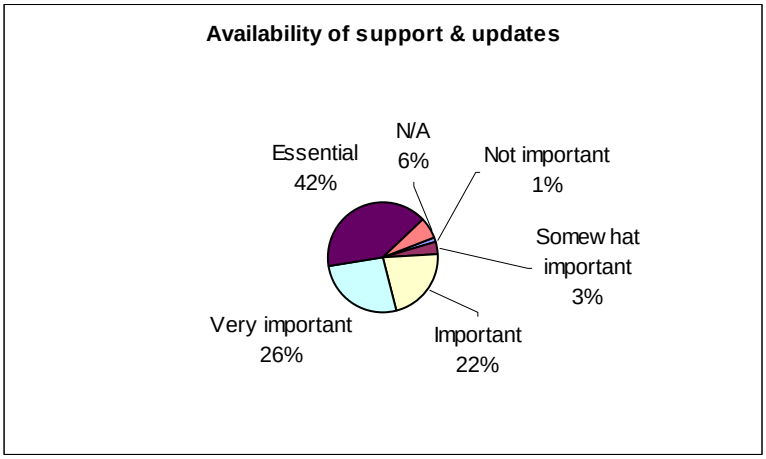


Availability of Support and Updates:

Then:



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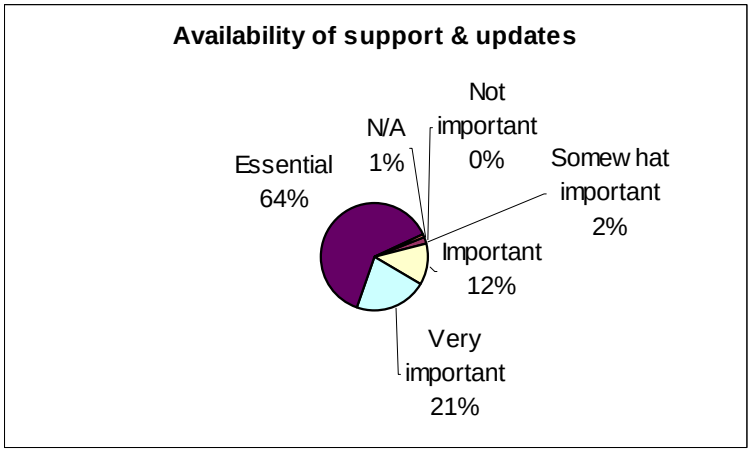

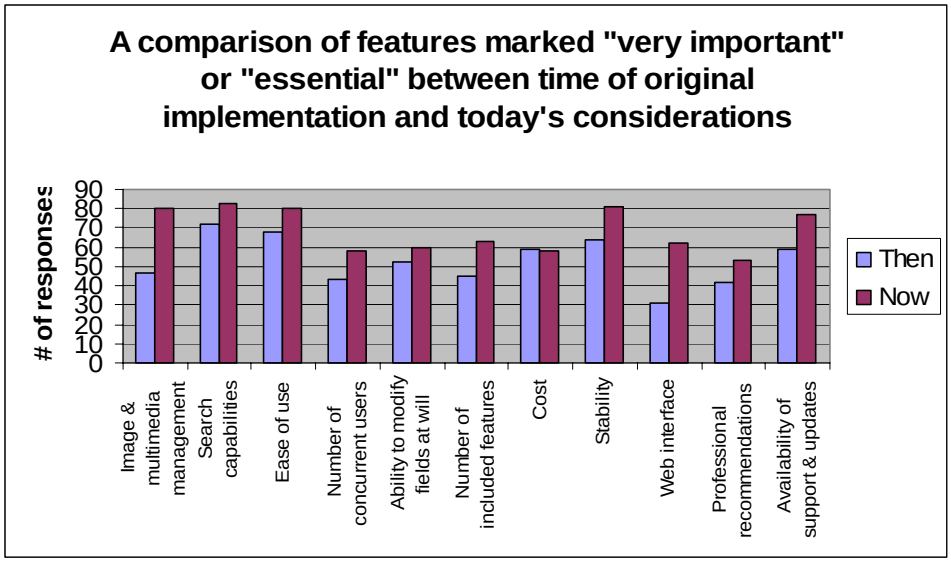

Appendix L – Selected Comments About CMS From Survey Responses:

What, if any, additional features would you wish to see created for CMS in the future?

I would like to be able to arrange the screen layout for my convenience. It's not a big deal, but often they have information up front that our museum tends to consider secondary information.

Exhibition management module for non-artifact/art collection (exhibition panels, etc...)

Expanded use of forms that can be formatted to fit the needs of individual institutions. Expanding the possibilities to track condition and movement of objects.

Perhaps integration with environmental tracking software to be able to view an object's environmental history.

More default forms, or ease of creating forms.

We are a pretty small institution and the software we have currently does pretty much what we need. I don't even use all the features I could. There are a few glitches in report writing that come up regularly that I wish were

easier to fix, but that's about it. I think just adding the Web module so that we can put our collection online will be a great improvement.

I think the major software vendors for CMS are already working on the wishlist or have already accomplished them. The most important thing today is to be able to make the system accessible to others outside the registrar's office but at different levels of accessibility: researchers, casual Web browser, students, professors and general scholars.

A complaint that I hear from many people is about how difficult it can be to develop reports (or, basically, develop good ways to get the information out of the database and into a useable printout or format). Many CMS manufacturers seem to set up their system with a certain number of pre-made reports. Then, when the museum wants or needs new reports/forms/layouts, the CMS vendor requires the museum staff to pay for the development. That is a system that can probably be improved, to the benefit of the museum user.

Authority list loaded by software creator with trademark of china manf., silver and goldsmiths Ability to select parts of report to print in the research tab. It is print all or none right now.

Ease to use barcode readers to input data.

Easier report writing system. An easier way to view and print out data from all of the various files without having to make a report.

1. ability to control levels of access different views for public or researcher use versus collections staff use 2. improved report capabilities 3. tracking of researcher or curatorial notes 4. tracking of record modification

full service library component

Ability to share data with fundraising/membership software (Raiser's Edge). Ability to handle and search both collections, archives and library data in an appropriate format and easy for end users.

What challenges do you have with your current system?

While looking at systems I found that there were an awful lot of them these days. I found the technical language frustrating, too. But I don't know that that can be helped. We chose Past Perfect because it was simple, I often felt the more expensive systems did much more than what our museum needed it to do.

Reports. With our system reports must be written in Crystal reports, which often creates problems with data output, images, etc, when you are using the wrong version of Crystal. Proprietary report software built into the system would be great.

Museum staff sometimes want access to the database, but it's really R/W & not R/O, so I'm not comfortable with giving them access to it. Whenever they ask for something, I can usually provide it to them in the format they want almost immediately.

The fields for archives does not really match how archives are cataloged.

Trying to connect our high resolution scans and information with the computer records.

Adding images without slowing down the functions too much (size of images).

Reports feature is less-developed than it could be for easy customization. Right now, few of the report templates are usable as is, and it's time-consuming to customize them.

Some searches are complicated to ask. It is difficult to change a large group of records at one time if you are making the same change. The forms or reports built into *** are not modifiable and many are not useful. We had to hire a report writer to get many of the reports we needed, specifically receipts and loan agreements.

Not enough time to learn its full capabilities and use it properly.

Maintaining clean authority files.

When certain software errors occur - there is no written explanation to refer to... Have to call for advice which is costly....

It's a program that had to be built from scratch. The Collections Manager who designed the database is no longer with the museum, which leaves the current collections staff with just knowing the basics of the program and how to make changes.

Report writing.

Although *** is an excellent and powerful relational database program, it is difficult for many to use properly. It also has a high learning curve to use to its fullest extent. It is far too easy for others to accidentally cause damage to the data.

We still have some data clean-up to complete from the original conversion.

Two users can not work on the same record at the same time and that has proven a bit 'annoying.'

It was set up rather poorly, and there has not been a lot of time, attention or resources dedicated to fixing the problems. So now we have a very clunky system, with limited relational capabilities (ie, we have one database for inventory, one database for loans, one database for exhibitions, and there is almost no relativity between the databases, so employees waste a lot of type retyping the information or having to export from one database and import into another).

Very time consuming to train new staff because it is not very user friendly. Report features are particularly hard to use. Annual support contract is expensive. Upgrades are very expensive. Imaging component is very clunky.

Being able to record a collection that have components without recording each component, but at the same time being able to have multiple locations simultaneously with being able to list components for different locations. For example, I have 33,000 artifacts in accession number 205, but I do not want to list each netsinket, flake frag., etc. Obviously, with a collection that large it will be in multiple locations. So I want to be able to say the collection is in units, A, B, and C, and 205.2 and 205.6 are in the gallery. No package system I have looked at, and I have I think looked at them all, will allow this. ALSO, very important, reporting. Hello, quick reports - why have none of these 20,000 CM systems heard of these, yet, a

200.00 dollar program, i.e., Corel's Paradox, has this feature. Reporting should be built into the CMS, supported by that company, and the quick report feature is essential.

Inability to use the diacritical marks when entering Hawaiian name and terms.

Very basic, hard to control the modifications of past users, hard to control access privileges for large number of users, must have good technical knowledge of program in order to utilize more advanced features, not enough field control, no lexicon/thesaurus functions, problems with stability and data transfers when upgrading structure, too easy to loose data through automatic saves.

I can't automatically move quantities of images from one accession to another. I work with old accessioning systems, and as images are added and refined, records need to be updated easily.

I am the designer and do the necessary programming for our database -- and I have no background in this.

1. extremely limited image management capabilities 2. no control over levels of access 3. concerns about stability of outdated software 4. complex searching is extremely difficult 5. limited report capabilities.

A very basic thing to know - which we did not learn about for several years - was the importance of the 'authority field'. You need to use that every time you are entering so that you always call an apron an apron (unless of course it is a pinafore....); that location code is always entered the same way. You have to use the authority files or you cannot find 'all of it' later!

poor customer service awkward design poor security controls.

Doesn't export data well. Customizing reports requires 3rd party software and specialized training. Doesn't handle shipping well. Doesn't handle exhibition planning easily. No place to input text panels that aren't related to objects. Don't like the Web module, I think the search is clunky and hard for the general public to understand. It was hard for us to install and modify and we gave up on the product after purchase.

Need robust audit trail log Need to be able to handle histories (e.g., location)

What do you value most about your current software?

User friendly.

Its ability to use in multiple places.

Its flexibility. I can make new databases and customize them easily.

Ease of use especially getting between modules; short learning curve; comprehensiveness; easy interface with report writer; quick, great tech support from ***

Ease of accessing essential information quickly.

Speed and ease of use.

It has numerous fields and modules for information, more than we use. It has images. It is relatively easy to use and to change/update individual records.

The tech support is outstanding and the cost is manageable. It is user-friendly and the search features are powerful.

That I am able to program it and customize it to our own specifications. We have flexibility to adapt to whatever projects / or situations arise.

The fact that we can design and create any field we want is great. However it is also a challenge at times to figure out how to make a change to the database. For the most part though, being able to set up the database for how it meets our needs is good.

Image capabilities. It helps so much in identifying objects.

Support is great!

I never really worked in this field when some type of database **wasn't** available, so I probably take this stuff too much for granted. It is already hard to keep up with things, but I can't imagine doing it without this db.

Especially location tracking. And having images linked. Those are two of the most helpful.

Not much! In fairness, ***'s greatest strength is also its greatest weakness. It is very easy to set up new databases, forms, etc. This flexibility is GREAT if the person knows what they are doing... and can be catastrophic if they don't.

The ability to execute complex searches and create and save groups of records based on searches.

Ease of use in generating reports, entering data, retrieving data

ease of operation - good support- user friendly - lots of usable reports - great imaging program

Ease of use, easy to do simple programming.

Ease of use. Little need for outside training - all self-taught.

It's not great, but it's still miles better than the various card systems I've used in the past.

lexicon controlled vocabulary--allows you to search for 'ceramic' and get ceramic, earthenware, porcelain, etc.

Highly flexible, allows us to create new cataloging fields and customize them to our needs. We love that ability, but in the future will be willing to sacrifice it to have a system that is easier to use, easier to export data from, etc. Also find the support to be responsive and helpful. We would consider keeping the system, but are worried about long term health of the company and feel it is prudent to switch before it goes under.

ease of creating reports using input from any field.

Additional comments about CMS?

When I started as a registrar 18 years ago, CMS were in their infancy. I can't imagine doing my job without one now.

We share *** with the Archive and the Cultural Properties divisions here at *** and there has been a much greater level of access to collections information through the use of this program. At the same time, I can control access to the data. Other divisions can see my records, but do not have access to my locations nor can they update fields over which I have control.

Any collection database needs one person who knows it inside out to handle problems and make modifications or it becomes obsolete or it not very functional for daily office work.

We use Macs. There are very few database programs that can run on Macs. It would be nice to have a few more options available.

I would like to see one program eventually developed that incorporated all of the features needed in various museums, but which offers the ability to turn them off easily. Art museums need different database facilities that history, etc. At this point programs are marketed to certain museums, but in the future it would behoove programmers to be more inclusive.

Folks thinking about purchasing CMS need to also consider the staff time needed, especially if digitizing the collection. While I love my system, I've discovered that we need at least one more full time person to help.

'CMS' can be considered a 'Collections Management Software' or a 'Collections Management System.' Very different meaning, as software is merely one tool in a larger system.

It's better than the cards. When you go to do an exhibit and you need to select a 'whatsit' it gives you all the whatsits and you can choose from there instead of looking in every nook and cranny for a particular whatsit.

We're in the process of deciding whether or not it would be worth moving to CMS from ***.

Because of the volume of information we'd like to store (which seems to be increasing exponentially), systems often are cumbersome. I wish I were more able to specify limited customized versions for various groups in the institution that would make the information each group needs readily available and easy to access.

PRODUCT - ***Beyond Access:***
A Resource Guide for Museum Staff Beginning a Collections or Content Management System Project

Distributed to Registrar's Committee of the American Association of Museums and Museum Computer Network listservs in PDF format.

Beyond Access:
A Resource Guide for Museum Staff Beginning a Collections or Content Management System Project

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About this Guide

The purpose of this resource guide is to provide an introduction about collection or content management software (CMS), offering brief answers or directions to resources for some of the questions that come up when a small or mid-sized museum decides to purchase or update its software. There are a number of different ways museums would like to use software to manage their collections, but choosing one system from the many options and implementing it is a time-consuming and confusing process. This guide is intended to be a beginner's resource, to help those starting out with new projects to gain a basic grasp of some of the different factors involved: identifying the people who will be using the software, what features are most important for fulfilling your tasks, where to go to get funding, and where to go to get extended information once your project is past the planning stages, and other miscellaneous considerations.

In this resource guide, I will address some frequently asked questions about CMS, distill the information available into short answers in plain English, and provide helpful links for answering these questions in depth.

What is a Collections or Content Management System (CMS)?

In order to choose the best option, it is important to understand the difference between a database, a database program, and a CMS. Simply put, a CMS is a type of database program developed specifically for museum use. However, not all museums use CMS.

On the most basic level, a database is the software that organizes a set of data. In the case of organizing collections, this data includes accession numbers, valuations, titles, dimensions, etc., arranged in a way that makes sense to the computer. The information is broken down into chunks so that the computer can organize and rearrange it as needed.

On the other hand, a database program is a piece of software that helps *humans* organize and run the database. The most familiar database programs are Microsoft Access, 4D and FileMaker Pro. These programs are designed to be flexible enough for a user to customize the way information is input into and retrieved from the database. They are something of a blank slate and require customization to make them functional for a museum to use.

CMS are database programs especially designed by software companies for the special needs of museums. They were developed as robust tools for managing collections information. They are often flexible enough to be fine-tuned, but generally require a vendor to make those changes for the museum. Despite that limitation, CMS offer a multitude of features desirable to museums, and many CMS today also manage most interpretive content available about collections, such as video, curatorial essays, exhibition labels, and interactive software programs. The shift towards managing content as well as collections inventory details is a recent development but is becoming more important to many museums.

Some museums may decide that no CMS or database package commercially available will fit their needs. They will hire a private company to develop software for their unique needs. This in-house method of CMS development is usually more expensive than simply purchasing a commercial one and modifying it to suit. However, a custom program does have the advantage of being written to a museum's specifications. Unfortunately, that programmer is probably not going to understand museum needs, and more time and money may be spent trying to optimize the software than would buying a CMS. Also, a commercially

available CMS will have updates which will keep your software up to date and relevant. On those grounds, I recommend purchasing a CMS over developing your own.

CMS vs. Database Programs

A Comparison of the Pros and Cons of CMS vs. Database Programs:

CMS	Database program
Pros	**Pros**
Rich with features specifically targeted to museums	Initial cost is inexpensive
Can control levels of access	Easy to modify
Backend database designed for museums	Numerous support forums by other users
Customer support is usually very good	Most are relatively simple to learn
Ability to use authority lists to help keep data input consistent.	Stable for small collections
Stable for collections of all sizes	Once set up, often user-friendly
Can handle larger quantities and types of data	
Can be modified by software developer	
Able to create relationships easily between different types of data (i.e. it can link the same donor file to multiple object files)	
Most museums remain satisfied with their CMS for long periods of time	
Some CMS can hide unneeded features from users, to make more user-friendly	
Can store multimedia files and interface with the Web	

Cons	Cons
More robust programs have a high initial cost	Requires major modification to be useful
Larger programs have a high learning curve	Unstable for large collections or when adding too many different types of data (such as multimedia files)
Not all museums use all features, so extraneous features can clutter the interface	Cannot track changes easily or create authority lists for data input consistency
Often requires a tech-savvy staff person dedicated to overseeing the program	Backend database not designed to link relationships between different types of data (important when linking one donor file to many different object files, for example)
Can't modify or move fields without vendor programming	Often costs more over the long run due to costs of programming and fixing problems

CMS features range from very simple to very complex. As they are designed to manage collections information, they provide fields to store accession numbers, titles, descriptions, dimensions, donor names, condition, loan information, locations, etc.

Many newer CMS packages go above and beyond managing collections information and store content information as well. These CMS store multimedia files, such as Word documents, images, or programs. In addition, they track bibliographies, connections between persons associated with an object (donors, artists, authors, etc.), and put collections information on the Internet, with appropriate controls over which information is displayed.

Two common misconceptions favoring a database program like FileMaker Pro or Access over CMS, is that database programs are less expensive than CMS and more customizable. Database programs are often less expensive initially, but the time spent to make them work properly often offsets any initial cost savings. One popular CMS, PastPerfect, is less expensive than database programs, designed with museums in mind, and is usable immediately. A database program *must* be customized to be

functional, which determines the underlying structure of the database itself. This places limitations on its effectiveness. For smaller database programs, as information is added to a database program, the program has difficulty managing it and more errors occur. More expensive programs are, of course, designed to manage very large amounts of information, but they require dedicated staff and programmers to maintain. My research revealed that most museums that have database programs are unhappy with them, eventually abandoning them for a CMS. However, having used FileMaker Pro in a small museum successfully in the past, I will say that for small museums with small budgets, limited needs and a knowledgeable intern or staff person, a database program may be a suitable solution.

The other misconception is that CMS are not as flexible to design as database programs. It is true that a computer-savvy museum staff person is probably not going to be able to flip fields around in a CMS like they can in a database program. Still, that same ability to change fields at will may mean that some intern or staff down the road may make an inadvertent change and cause unintended problems. A CMS vendor, on the other hand, will be able to make almost any changes needed by the museum and make sure that those changes work with the flow of the underlying database structure. As a result, a museum's specific CMS layout will look radically different than when they first saw the software. In other words, when looking at CMS, remember that most things are changeable.

Note too that changing software often provides an opportunity for the museum to clean up collections information that is outdated or incorrect.

I Need a CMS! How do I get Support from my Boss?

One common problem that many collections professionals have when their old, tired software isn't working anymore is getting support from above to purchase new software. Most museum mission statements are devoted to education and caring for collections. Since a CMS can help a museum organize educational content as well as tracking and caring for collections, collections staff can make a strong case for new software.

Collections staff will need to:

- outline what isn't working with the current software
- define how it needs to be used
- explain how new features can support the mission

The key terms in use today to promote these ideas are *access* and *interpretation*. The idea of providing access to the public is not new, but the mandate to do so has built momentum. Today, a major goal for many museums is to provide interpretive materials along with collections information. Since these materials are often created by museums in their day-to-day activities, it is not a stretch to expect that those materials also become publicly available.

Many museum directors are interested in putting collections on the museum's website. Promote your CMS project as a way to inventory your collection while providing access and interpretation. A CMS will help you provide public access to collections. Larger CMS packages will take it one step further and allow you to provide interpretive materials along with the collection information. These are issues that are important to the museum community as a whole and will also help you secure funding.

Defining Users and Needs

The most important step for deciding which software package to purchase is defining your users and their needs. Some museums will only have collections staff using the CMS, while others will have a wider set of users. Since each CMS offers different features, it's critical that you find the best match for your users' needs.

Possible users could include

- Collections managers, who track collections information
- Exhibition and loan registrars, who manage loan and exhibition details
- Curators, who perform research and input their knowledge
- Software administrators, who oversee the CMS for use by other stakeholders
- Records administrators who use it to input records and information
- Conservators, who need to see conservation and environment history
- Preparators who create exhibition lists and identify objects
- Interns and volunteers who input collections data or do research for other departments
- Docents who could use CMS to prepare their tours
- Rights and Reproduction staff who track bibliographic records, reproduction requests, and store and access images
- Education staff who use it for any educational programming using collections objects
- Development staff who track and store donor information
- Administrative staff who prepare board reports or learn about the collection from their desks
- Museum visitors who browse the objects not on display through in-museum kiosks
- Researchers and scholars who can see all information the museum has produced about an object without staff oversight
- Online visitors who are able to access the collection remotely and see other informational materials

Once you have defined who will be using the CMS, talk to each of those persons and ask them how they would like to use it. Does your curator need access to all of the subject fields? Does she need access to the

donor records? Will your collections manager also be responsible for setting up accounts, so would he need administrative access? Which fields will interns be allowed to type into and make changes to and which ones will they only be able to view? Will online visitors be able to see provenance information on the website, or will they only see the title, material, artist name and dimensions? Define which features are critical and which would just be nice to have. Listen to your user's concerns about the software and find a solution which address those concerns.

Of course, there will be much time spent defining needs. It is not uncommon for a museum to take two years or more to choose and customize a software package. Think about your CMS as being useful to the whole institution and not just for collections staff. Even though CMS projects often start with the collections staff, the CMS will be important museum-wide.

A good CMS will allow whoever is designated as the person in charge of the software to define levels of security on both a group and individual level. You may decide that you only want your development staff to have access to the donor information while your registrars have access to the entire thing. Plus, by being able to define levels of security, you won't be publishing sensitive information on the internet, should you choose to make your collections available online.

Miscellaneous Considerations

During the planning process for your CMS project, keep the following topics in mind:

- Nomenclature – Are you going to use preexisting terminology and subject categories for defining each object in your collection? Nomenclature schemas are a type of metadata (discussed below) and they include Chenhall's Nomenclature and Getty's Art and Architecture Thesaurus (AAT). Library and archives often use different subject systems. Nomenclatures have the advantage of allowing your data to be easily cross referenced between different institutions.

- Lexicon – For ease of searching for specific objects and to ensure consistent terminology, consider the use of a category, subject, and preferred term lexicon. The curatorial staff will usually be responsible for developing or updating this. A consistently used lexicon is useful for researchers to find the objects they're looking for. Some museums will use a nomenclature system exclusively in place of a lexicon, or will use both.

- Metadata – Some CMS offer metadata organization functionality. Metadata is important for tagging your data and disseminating it across electronic systems. Some of the most highly-used metadata schemas are Dublin Core and VRA Core. The book, Introduction to Metadata published by the Getty Information Institute is a good primer for metadata issues.

- Digitization – Photographing your collection for preventative conservation, identification, and Website purposes is another major project, often closely related to CMS topics. The Getty Information Institute also produced Introduction to Imaging, a guide for constructing an image database.

Choosing the Right CMS or Software Package

Once you have gathered data about which stakeholders need what features, start researching software vendors:

- Look at their websites (a list of current vendor websites is provided in the Resources section of this guide).
- Download CHIN's Collections Management Software Review (http://www.chin.gc.ca/English/Collections_Management/Software_Review/evaluated.html) for lists of specific features provided by each package, keeping in mind that some features may have been added since the last CHIN review, so it's good to check with a vendor if there's something important that their package is missing.
- Write them and ask for a demo and specification sheet. Most will come on-site or will do an internet presentation to show you the features of their product.
- Talk to other museum professionals and ask them how they like their CMS. If there's a similar institution using a package, sometimes it may be a good idea to order the same CMS, as you may get a discount from the vendor by using the same template. For example, my museum purchased the same package as a similar institution and didn't ask the vendor to change the layout much. We saved upwards of $3,000 in this way.

Funding

Once you have decided that you need a CMS and you've started looking at packages, those needs will determine how robust a program you will purchase. The more robust the program, the more expensive your startup costs will be.

Depending on your type of institution, the National Endowment for the Humanities and the Institute for Museum and Library Services have grants available for digitization and collection inventory projects although only one grant by the IMLS, Museums for America, provides funding for purchasing the CMS. Some collections care grants have made a strong case for purchasing CMS in order to keep track of collection conditions. Most of these funders, however, will expect that the museum use its funds for making collections accessible to the public.

Private grants and donations are another important source of funding for CMS projects. Like governmental funders, private funders are usually interested in how a museum's collections can become visible to the public, increase awareness, and extend learning beyond the immediate location of the museum.

Resources

Software vendors and packages (not a complete list)

Commonly used database programs by museums (as of May, 2006)

Microsoft Access: http://office.microsoft.com/en-us/FX010857911033.aspx

FileMaker Pro: http://www.filemaker.com/

4D: http://www.4d.com/

Oracle: http://www.oracle.com

Microsoft SQL: http://www.microsoft.com/sql/default.mspx

CMS vendors (as of May, 2006)

ADLIB Museum: http://www.adlibsoft.com/

ARGUS: http://www.questorsys.com/index.htm

Artsystems Collections: http://www.artsystems.com/software/col_index.html

Cuadra STAR: http://www.cuadra.com/products/collections-management.html

EmbARK: http://www.gallerysystems.com/products/embark.html

iO: http://www.willo.com/io/

KE Emu: http://www.kesoftware.com/emu/index.html

M3 – MINISIS Management for Museums: http://www.minisisinc.com/

MIMSY XG: http://www.willo.com/mimsy_xg/default.asp

Multi MIMSY 2000: http://www.willo.com/mimsy/

MuseumPlus: http://www.zetcom.com/index.php?id=7&L=1

PastPerfect Museum Software: http://www.museumsoftware.com/

Re:discovery: http://www.rediscov.com/

The Museum System: http://www.gallerysystems.com/

The Visual Archiver: http://www.chrml.com/archiver.html

Vernon: http://www.vernonsystems.com/

Recommended reading

Canadian Heritage Information Network:
http://www.chin.gc.ca/English/index.html
The Canadian Heritage Information Network (CHIN) has published numerous resources about CMS projects. Although their information is targeted to Canadian institutions, most of the information provided is applicable worldwide. Their Collections Management Software Review, Criteria Checklist (of commonly found features), Collections Management Software Selection training course, and digitization guides are comprehensive in scope. Unfortunately, CHIN is no longer updating the Collections Management Software Review, so some newer software and features are not represented. This is the main source of information about CMS projects.

Museums on the Web conference papers:
http://www.archimuse.com/conferences/mw.html
The Museums on the Web conference papers devoted to CMS are available online and in book form. Many of these papers discuss case studies and considerations for museums starting CMS projects. However, the majority of these papers were written about and by large institutions with easier access to resources than do most small or mid-sized museums. Still, this is a great information resource.

FirstMonday.org: http://www.firstmonday.org/
This peer-reviewed journal about issues pertaining to the Internet, although not always specific to museum topics, has a special emphasis on cultural heritage institutions and their interactions with the Web. This

journal is worth reading for understanding larger topics about CMS and the Web.

American Society for Information Science:
http://www.asis.org/digitallibrary.html
This journal is also not specific to museum topics but does cover libraries and archives as well. It focuses on a broad range of issues about organizing information, including CMS.

Musematic blog: http://www.musematic.net/
Launched in early 2006, this blog contains thoughts about museum information by influential field leaders, including Peter Samis, Amalyah Keshet, Nik Honeysett, and Holly Witchey.

Assessment of End-User Needs in IMLS-Funded Digitization Projects:
http://www.imls.gov/pdf/userneedsassessment.pdf
This study, funded by the IMLS, discusses how to evaluate users' needs at cultural heritage institutions and how to develop user needs assessments.

Museum Data Collection Report and Analysis:
http://www.imls.gov/pdf/Museum_Data_Collection.pdf
Another study by the IMLS, this paper focuses on how museums collect data about all departments within the institution, particularly how data sharing pertains to collaborative efforts of collections sharing over the Internet.

IMLS National Leadership Grants:
http://www.imls.gov/applicants/grants/nationalLeadership.shtm

and

IMLS Museums for America Grants:
http://www.imls.gov/applicants/grants/forAmerica.shtm
These are links to the IMLS Leadership Grant and Museums for America Grants information pages. Museums for America Grants are more appropriate for actually purchasing a CMS, but Leaderships Grants will assist with digitization projects, particularly if educational materials will be provided as well.

NEH Grants to Preserve and Create Access to Humanities Collections: http://www.neh.gov/grants/guidelines/pcahc.html
These grants may not be used to purchase a CMS, but they may be used to support putting information into the CMS.

Baca, Murtha, ed. Introduction to Metadata: Pathways to Digital Information (Los Angeles: Getty Information Institute, 1998). Version 2.1 can be found at the Getty's website, http://www.getty.edu/research/conducting_research/standards/intrometadata/pdf.html (Accessed July 23, 2006). This guidebook provides a handy introduction to metadata formats and explains why metadata is an important topic for the dissemination of today's digital information.

Besser, Howard & Jennifer Trant. Introduction to Imaging: Issues in Constructing an Image Database (Los Angeles: Getty Information Institute, 1995). The most updated version is available at the following website, http://www.getty.edu/research/conducting_research/standards/introimages/ (Accessed July 23, 2006). This book covers the basics for digital photography, and explains standards, tools and terminology used in the field.

Mintz, Ann & Selma Thomas, eds. The Virtual & the Real - Media in the Museum (Washington D.C.: American Association of Museums, 1998)
This book contains a selection of essays about computer use within museums.

Chenhall, Robert G. & David Vance. Museum Collections and Today's Computers (New York: Greenwood Press, 1988)
An interesting and influential early book on computer use for collections management.