WEB CONTENT AUTHORSHIP: ACADEMIC LIBRARIANS IN WEB CONTENT MANAGEMENT

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An increasing number of libraries and information centers are using content management (CM) applications to develop, redesign, and maintain their websites. The purpose of this research was to provide understanding of attitudes of academic librarians about how their utilization of CM technology influences the information services they provide at the academic library’s website and to examine their perceptions of how using CM affects the creation of the web content. This research applied a qualitative research design (electronic survey and in-depth semi-structured interviews of academic subject librarians) with elements of a quantitative approach. The study discussed the concept of web authorship and supplied fundamentals for future theoretical research about authorship in web content development at academic libraries. The study provided an overview of CM at academic libraries and explored characteristics of dynamic content and semantic web applications at their websites. It discussed librarians’ opinions about issues of migration to the new content management system (CMS), factors affecting its efficient employment, and roles of librarians in web content management. Results of this study will serve to future research on management behavior of academic librarians authoring web content with the help of CM. The findings about the difficulties observed in the use of CMS and solutions, influence of training and learning, importance of cooperation and communication, adjustment of the CMS to the users’ needs, qualifications and
skills needed in application of CM, distribution of responsibilities in the use of CMS, features of the CMS, and requirements to its functionality will have implications for academic and other libraries applying CM.
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Acknowledgements</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Tables</td>
<td>VII</td>
</tr>
<tr>
<td>List of Illustrations</td>
<td>VIII</td>
</tr>
<tr>
<td>Chapter 1 Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Theoretical Background</td>
<td>1</td>
</tr>
<tr>
<td>Information Technologies in Library Information Services</td>
<td>1</td>
</tr>
<tr>
<td>Library Information Services</td>
<td>4</td>
</tr>
<tr>
<td>Web Content Authorship</td>
<td>9</td>
</tr>
<tr>
<td>Subject Guide as Variation of Information Services</td>
<td>11</td>
</tr>
<tr>
<td>Summary of Theoretical Background</td>
<td>15</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>17</td>
</tr>
<tr>
<td>Significance of the Study</td>
<td>17</td>
</tr>
<tr>
<td>Research Questions</td>
<td>19</td>
</tr>
<tr>
<td>Purpose of the Study</td>
<td>20</td>
</tr>
<tr>
<td>Chapter Conclusion</td>
<td>20</td>
</tr>
<tr>
<td>Chapter 2 Literature Review</td>
<td>22</td>
</tr>
<tr>
<td>Introduction</td>
<td>22</td>
</tr>
<tr>
<td>Websites of Academic Libraries</td>
<td>22</td>
</tr>
<tr>
<td>Online Subject Guides</td>
<td>30</td>
</tr>
<tr>
<td>Content Management</td>
<td>35</td>
</tr>
<tr>
<td>Content Management and Academic Libraries</td>
<td>39</td>
</tr>
<tr>
<td>Academic Librarians Web Content Authors</td>
<td>44</td>
</tr>
<tr>
<td>Information and Content on Academic Libraries’ Websites</td>
<td>51</td>
</tr>
<tr>
<td>Chapter Conclusion</td>
<td>57</td>
</tr>
<tr>
<td>Chapter 3 Methodology</td>
<td>58</td>
</tr>
<tr>
<td>Introduction</td>
<td>58</td>
</tr>
<tr>
<td>Research Design</td>
<td>58</td>
</tr>
</tbody>
</table>
CHAPTER 4  DATA ANALYSIS AND RESULTS .......................................................... 83
Introduction ......................................................................................................... 83
Survey Analysis .................................................................................................. 83
Demographic and Descriptive Data ................................................................. 83
Content Analysis of the Survey Open-Ended Questions............................... 89
Interview Analysis ............................................................................................ 115
Discussion of the Project and the Use of CMS ........................................... 116
Discussion about Information Services and Content/Information ........... 128
Discussion about Role of Librarians in Content Management .................. 142
Chapter Conclusion ......................................................................................... 149

CHAPTER 5  CONCLUSION ...................................................................................... 150
Introduction ....................................................................................................... 150
Overview of Findings ........................................................................................ 151
LIS Field Implications ....................................................................................... 158
Future Considerations ...................................................................................... 161
Limitations of the Study .................................................................................... 161
Future Research ................................................................................................. 163

APPENDIX A  DEFINITIONS ...................................................................................... 166

APPENDIX B  CHARACTERISTICS OF PLONE CMS ............................................... 170
LIST OF TABLES

Page

Table 1   Buckland’s Model of Coping with the Users’ Task Complexity ......................... 8
Table 2   Subject Librarians Web Content Authors ....................................................... 16
Table 3   Features of Library Portals ............................................................................. 24
Table 4   Influence of Web 2.0 Tools ............................................................................. 26
Table 5   Summary of Webmasters’ Survey Results ..................................................... 48
Table 6   Characteristics of Dynamic Web Content ....................................................... 54
Table 7   Age Demographics of Survey Participants ..................................................... 84
Table 8   Degrees in Fields Other Than the LIS Field Subject Areas ............................ 84
Table 9   Number of Years of Experience as a Subject Librarian ................................. 85
Table 10  Number of Subject Guides Maintained at Time of Study .............................. 86
Table 11  Years of Experience in Web Development ................................................... 87
Table 12  Response Count of the Survey’s Open-Ended Questions ............................. 90
Table 13  Experts’ Ratings for Features of Dynamic Content ..................................... 141
LIST OF ILLUSTRATIONS

Page

Figure 1. Number of years worked in the LIS field (n = 24). ........................................ 85

Figure 2. Practical experience with software and programming languages (n = 24). .... 88

Figure 3. Average rating of factors for the efficient use of the CMS ......................... 89

Figure 4. Comparative rating of dynamic content features by the experts................. 142
CHAPTER 1
INTRODUCTION

Introduction

The chapter introduces the theoretical perspectives that directed the study and major theoretical constructs that framed the study. The chapter also provides problem statement, significance of the study, research questions that guided the study, and purpose of the study.

Through the text, the term “content management” (CM) was used to identify Web content management. The abbreviation CMS identifies “content management system.” See Appendix A for definitions related to the study.

Theoretical Background

This part of the chapter provides discussion of the theoretical considerations serving as a guiding agenda in this research. These considerations outline the following domains:

- The information technologies in library information services
- The ideal library information services
- Web content authorship in library information services

Information Technologies in Library Information Services

The research involved study of information management behavior of academic librarians applying new information technology instruments in the information services. Information behavior is “activities a person may engage in when identifying his or her
own needs for information, searching for such information in any way, and using or
transferring that information” (p. 249). Furthermore, Choo (1989) identified information
management as six closely related activities: “identification of information needs;
information acquisition; information organization and storage; development of
information products and services; information distribution; and information use” (p. 24).

This section of the chapter summarizes the theoretical reflections concerning use
of information technologies in information services. First, in any research studying the
activities of library/information specialists using new technologies to provide information
services, the “purposes of, and justification for, an information service should not be
confused with the techniques and technologies adopted as means for providing
services, even though the availability of techniques and technologies determines our
options” (Buckland, 1991, p. 205).

Second, in using information technologies, both library and information science
(LIS) and information and communications technology (ICT) professionals deal with the
“external memory” or with “the creation, organization, and use of messages or
performances stored in durable media other than the memories of living persons. In
other words, they are concerned with records” (White, 1992a, p. 250). However, the
librarians’ approach in application of technologies differs from the approach of the ICT
professionals. The librarians, employing their knowledge expertise and professional
qualifications, use technologies to process the “context of external memory” with the
purpose of answering the users’ questions, and help the users to acquire “power of
understanding” of information (White, 1992a, p. 268). White (1992a) predicted that the
expansion of information technologies, based on “partial union of external memory,
artificial intelligence [of the information systems], and time-honored human capabilities [of the information specialists],” will guarantee the “meaningful, new, complete, concise, and relevant to one’s requests” services to the end-users (White, 1992a, pp. 256-257, 268). It has to be noted that in academic library settings, the end-users are library patrons including students, faculty, and members of the community.

The recent developments in ICT brought up questions about redesigning library services and about the ways in which these technologies will influence the libraries of the future. The “shift to a digital environment brings the very identity of the librarian under question. Librarianship was built upon an ethos of service, but service, can no longer be delivered effectively without the application of technology” (Ross & Sennyey, 2008, p. 147). Buckland (2001) emphasized that in information services, the librarians usually act as early adopters of the new technologies. He stressed that information technology is the “driving force and the determiner of future functions of libraries and of the ‘information profession’” (Buckland, 1999, p. 973). In “Redesigning Library Services: A Manifesto,” Buckland (1992) discussed the libraries of the future and the changing constraints of library services and wrote that when offering the ideal information services using new technologies, libraries should

- Redesign library work, improve the existing information services and develop new types of services based on the newly available technologies
- Adjust new technologies to the library users’ needs, the culture of the served population, and the changing environments
- Facilitate the users’ access to information documents with the help of technologies
• Increase the remote access and “bring service to wherever potential users of library service happen to be”

• Introduce “standardized, intelligible procedure” in technology applications and educate the users to work independently and perform self-service tasks

• Guarantee “compatibility, linking, and interoperability through standardized protocols” in use of technologies (Buckland, 1992)

*Library Information Services*

There is an ongoing discussion in the LIS field literature about future of the libraries, and, particularly, the academic libraries, and the trends in development of library information services in the new technology environments. Numerous publications are available in print and online at the websites of professional organizations and online professional communities (Changing Roles, 2007; Kolowich, 2009a; Kolowich 2009b; Lewis, 2007; Lowry, Adler, Hahn, & Stuart, 2009; Mullins, Allen, & Hufford, 2007; Neem, 2009; Rausing, 2010; Ross & Sennyey, 2008; Sennyey, Ross, & Mills, 2009; Todaro, 2007; Wand, 2005). The findings of some associated to the area of this research publications were discussed in chapter 2. This section summarizes the applied in the research theoretical implications about the libraries’ information services from the point of view of the ideal library service.

The library information services undergo a constant process of evaluation, redesign, and improvement targeting to achieving the standards of “ideal library service as bibliography in aid of the reorganization and application of knowledge,” the service
“that explicitly recognizes the primacy of the need to bring knowledge to the point of use” (P. Wilson, 1977, p. 120). Buckland (2008) indicated that in the changing technology environment, there is an increasing necessity to discover the ways of “effective transition” of libraries and library services into this environment and to “empower the users in increasingly digital environment,” to explore the ways of employing the technologies with the purpose of getting closer to the ideal library services (pp. 81-83).

Based on P. Wilson (1977), a large part of the librarians’ job is “to assist the discovery of documents of potential use, and to facilitate physical access to such documents,” which he called “discovery and delivery functions” (p. 120). Buckland (2001) indicated that in delivering information services, librarians “organize the documents in the most meaningful way” related to the users’ information needs; assist in “creation, distribution, and use of knowledge,” “selecting and collecting,” “categorizing, indexing, and providing support for filtering and retrieval,” and provide guidance in finding the best relevant materials in different formats.

Performing information work either at a brick-and-mortar library or online, librarians “recognize the primacy of the need to bring the knowledge to the point of use” (P. Wilson, 1977, p. 120). However, an effortless delivery of information to a point of use could be compared to a simple delivery of a stockpile to a warehouse. An information professional is an “individual who promotes knowledge, culture, and power” and not the “one who merely transmits, stores, and retrieves physical objects” (Buckland, 1991, pp. 192-193). The ultimate information services include activities through which the information is “altered, evaluated, combined, and interpreted in a variety of ways,” and
become more valuable for the end-users (R. Taylor, 1986, p. 51). The librarians’ activities in evaluation and assessment of resources in any format added to a library’s collection remain fundamental to achieve effectiveness of information services (Hastings, 1998).

White (1992b) compared librarians with actors who “can ‘enter into’ a character more quickly than non-actors,” assuming that they have a precise knowledge about “what sources exist, their entry points, their typical services, and their functional relationships; they also have a much more developed cognitive map of where things are” (White, 1992b, p. 61). The librarians’ specialized knowledge is characterized by “an adequate grasp of the usable past of work” related to the area of specialty and an “expert familiarity” with the current work in this area and in the related fields (P. Wilson, 1992, p. 241). They search for and gather the needed information resources, combining fragments of knowledge and data. These information resources are directly related to the subject of patrons’ inquiries and potentially useful for them (Bates, 1992). Based on their knowledge of the sources of information, librarians help the users to find the needed information while “searching and browsing this wilderness” of the constantly growing information “stock” (White, 1992b, p. 77).

An important part of librarians’ work in delivering information to the point of use concentrates on confirming the cognitive authority of information examining credibility of the sources of information. In “setting questions of cognitive authority” of an information resource, the librarians look for additional data and facts “estimating the social standing of people and ideas and theories” presented in this information resource (P. Wilson, 1983, pp. 187-188). Hastings (1998) stressed that in virtual environment “authority
becomes a primary selection criterion” and that librarians have to apply traditional principles of “filtering” of information resources for authority and adjust these principles to the new environments to continue “verifying the validity and authenticity of materials” to provide a trustworthy information to the users (p. 111).

Traditionally, a significant part of the librarians’ work concentrated on instructing the patrons about the ways to use the information resources independently and as proficiently as the librarians do (Croft, 2001; White, 1992b). Kuhlthau (2003) wrote that when technologies begin to play more and more active role, the related to education libraries have to play a core part in teaching students how to use the “information-rich technological environment” in their learning process (p. 3). These days, when the applied technologies and the sources of information become more complicated, and the users’ information tasks are more complex, the instructional role of librarians, adjusted to the virtual settings, remains one of the leading in their work (Buckland, 1992; Rice-Livey & Racine, 1997).

In order to accomplish the variety of their information tasks independently, the users are supposed to have a certain level of expertise. Buckland (1992) suggested that with the development of electronic libraries and new technologies, the library services have to help the users to build up this sufficient level of expertise. Table 1 presents the discussed by Buckland (1992) libraries’ activities in assisting the users to improve their expertise in solving the information tasks under the new ICT.

The research explored how the subject librarians apply CM technology to create the content of the academic library’s website and provide information services to assist the patrons to cooperate with the complexity of their information tasks and to achieve a
higher level of expertise in employing of various information resources. Content management is defined as the “art of locating, selecting, acquiring, processing, managing, and disseminating content” (Srikantaiah, 2004, p. 23). A CMS supports a “distributed content model by separating the content [of a website] from the presentation and giving the content provider an easy to use interface for adding content … without requiring knowledge of HTML; it separates the layout and design of the Web pages from the content, and provides the opportunity for reuse of both content and the code running the site” (Black, 2011, p. 185).

Table 1

Buckland’s Model of Coping with the Users’ Task Complexity

<table>
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<tr>
<th>Activity</th>
<th>Definition</th>
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<tr>
<td>User education</td>
<td>The higher the users education, the higher the users’ expertise, and the higher are results of performing the information tasks</td>
</tr>
<tr>
<td>Advice</td>
<td>“The system could possibly be designed to offer helpful guidance or prompts”</td>
</tr>
<tr>
<td>Simplification</td>
<td>“If the complexity facing the users could be reduced, then the user’s expertise would become more adequate relative to the task”</td>
</tr>
<tr>
<td>Mediation</td>
<td>“Providing an expert human intermediary to provide assistance – a reference librarian, for example – is an obvious course of action”</td>
</tr>
<tr>
<td>Delegation</td>
<td>“It must be possible to shift some of the task complexity inside the system: Make the system itself smarter, more capable of determining what should be done next”</td>
</tr>
</tbody>
</table>

*Note: Buckland, 1992.*

The work of subject librarians over the subject guides is a variation of the pragmatic bibliography work discussed by P. Wilson (1992). He developed theoretical background of the librarians' bibliographic work. A building pragmatic bibliography
librarian is “engaged in a specific limited inquiry scholarly or scientific or purely practical,” and invests “time and effort to find materials that will be of help in the inquiry” (p. 240). As discussed earlier in this section, to carry on the pragmatic bibliography work, the librarians have to continuously “maintain a satisfactory degree of familiarity with the world of learning” in a specific discipline (P. Wilson, 1992, p. 241). This specialized profound knowledge on a subject accumulates through the process of a “constant monitoring activity, a sort of directed browsing” through the cognitive map of the resources in the subject area (P. Wilson, 1992, p. 242). In a primary research of the role of blogging in librarianship, Stephens (2007) suggested and tested a pragmatic biblioblogger model based on the works of P. Wilson (1977), P. Wilson (1992), and Buckland (1992), which described librarians as pragmatic bibliographers using the modern ICT and engaged into online professional blogging.

Web Content Authorship

The research was built into the idea of Web authorship. This makes it important to discuss the applied in this study approach to the concept of authorship. One of the origins of the noun “author” is the Latin noun auctor - “authorizer, responsible agent, originator, or maker” (“Author,” 2011), promoter, which are synonyms to source meaning “one that initiates,” “one that supplies information” (“Author,” 2010). The Oxford English Dictionary among others gives the following etymological significations of the word “author”: “(1) The person who originates or gives existence to anything; (2) He who gives rise to or causes an action, event, circumstances, state, or condition of things; (3) He who authorizes or instigates; the prompter or mover” (“Author,” 1989).
The term “author is often used in contexts where the person or people responsible for the text … did not actually write it themselves, and where the thing written is a report, article, or document, rather than a book” (Thomson, 1996, p. 59). Discussing the CM in Web development, the studied literature applied the terms “author(s)” and “authorship” to identify the processes of contributing to and editing of the online content (Boiko, 2005; Hackos, 2002; McAfee, 2006; Rockley, Kostur & Manning, 2003; Warr, 2008, and others). Following the literature examples, this research used the term “authorship” in its broader meaning, identifying any activities involved into bringing or organizing of the components together to create a functional structure. Some examples of the authorship in this meaning would be a director of an orchestra organizing the performance of many musicians into one sound music fragment, a construction manager directing the process of combining of many elements into a solid construction, or a librarian organizing information resources into the collection for a purposeful use by patrons. Boiko (2005) suggested that in the age of “electronic information, you can call almost anyone an author” (p. 609). In association with CM, he defined authors as “people who create original functionality for a CMS, as well as people who create original information” (p. 611). Thus, the terms “author” and “authorship” were applied in the literature in relationship with CM.

The discussed above definitions from literature and reference sources provide a recognizable validity for application of the term “authorship” in its broader meaning in this study of information management behavior of subject librarians - the authors of online content. Furthermore, in association with the topic of this research, the librarians’ authorship work was viewed as a process of bringing pieces of information to the point
of use (P. Wilson, 1992). A librarian, bringing information to the point of use at a library’s website with the help of a CMS, can be considered an author, a “source of some form of intellectual or creative work” (“Author,” 2011) acting as a prompter who instigates, originates or gives existence to an action, state, or condition of things (“Author,” 1989). Acting as the web content authors, librarians perform not only the announcement of documents/information but also carry out the synthesis and critical evaluation of information providing recommendation on a specific topic of interest (Cooper, 1982). Performing authorship activities in selecting and presenting the materials to patrons at library websites, librarians make information in these materials to flourish and to accumulate in the users’ information repository with the goal of converting this information into a purposeful knowledge.

Subject Guide as Variation of Information Services

The research concentrated on the activities of the reference librarians in the creation of web pages for subject guides with the help of CMS to facilitate for the end-users the access to purposeful information on different disciplines. Since the librarians began to build their presence on the World Wide Web, they are trying to find appealing ways to transfer their subject-specialized reference work into virtual settings. In the mid-1990s, some publications gave examples of information services maintained by academic libraries in online subject guides that were presenting the Internet and local resources in annotated and not annotated formats (Schneider, 1995).

Many different terms are employed in the library and information science (LIS) literature to identify the results of the bibliographic information work of academic
librarians who create listings of resources on a given subject to support the library users’ education and research. Among them are bibliographic guides, literature guides, guides to information sources, guides to reference materials, “how to find out about…,” pathfinders, subject gateways, research guides, and other (Hjørland, 2005). There are also newer terms like “webliography” that identify the bibliographies presenting resources available in electronic format and often supplying links to the listed resources through embedded URLs. Sometimes, the term subject guide is used to substitute the term “subject bibliography” which is defined as a “list of resources (books, articles, reports, etc.) on a specific topic, usually compiled by a librarian or researcher with specialized knowledge of the subject to acquaint other researchers with the existing literature” (Reitz, 2004). However, compared to subject bibliographies, subject guides carry out a more specific job. They concentrate on reference resources, are more selective, include annotated text additionally to bibliographic entries, and guide users in the management of the resources (Hjørland, 2005). It has to be noted that in the course of this text, the term “subject guide” is used to identify a source of resources both in print and in electronic format. Additionally, the term “subject guide” is used to categorize the subject guides in electronic format located at the academic library website. See Morris and Bosque, 2010, pp.186-187 for discussion of the terms commonly used to identify subject guides on the academic libraries’ websites.

Organizing the subject guides’ web pages, librarians apply their professional expertise about quality, reliability, and cognitive authority of information resources. As mentioned above, their work over the subject guides is analogous to work over the “pragmatic bibliographies” as described by P. Wilson (1992). The library users need
guidance at the beginning of search for information to satisfy their information needs, and the primary task of the subject guides is to serve as starting points that direct the users through a variety of information sources, “offering a few well-chosen introductory pieces for initial exploration” (Kuhlthau, 1999, pp.12-13). P. Wilson (1977) indicated that, in the selecting of new information sources on a specific field of knowledge, people tend to rely on advisers with knowledge competence about the field and look for the information sources organized to answer their queries and adapted to their interest.

Bates (1992) wrote that “bibliographies may be seen as a pre-selection devices, making it possible for users to meet their needs by searching only a tiny portion” of the vast amount of the resources available in different formats (p. 120). The main goal of the “rigorous systematic bibliographies” is to present to the users:

- Information resources directly related to the subject of the inquiries and potentially useful for the patrons
- A systematic description informing the users not only about the physical characteristics of the resources, but also about their contents
- Explanation on how to use the bibliography, indication of its subject and scope, the principles of selection of the resources, their organization, types of resources covered, and other
- Ease for the patron access to the items by explaining their location and the ways to access them (Bates, pp. 117-119)

Organizing subject guides, academic librarians:

- Help their users to “discover the cognitive map of the world of research” in the subject field
- Educate them about “where to look for usable materials and what kinds of materials are considered usable”
- Instruct the users on how to “discover the social standing of the ostensibly usable materials they find”
• Help the users find out how to get their own opinion “conform to that of the specialists” in the area of the inquiry (P. Wilson, 1992, p. 245)

The subject guides provide information services that are more precise, more accurate and relevant to the subject of the user’s potential inquiries. Their representation of the resources is a “topical, functional or evaluative representation” that informs the user not only about the access points of the resources, but also about their contents helping the users to evaluate the resources and make the most appropriate selection (O’Connor & O’Connor, 1998). In this regard, the subject guides make a significant step forward, as compared to a plain catalog or index listing of resources. Furthermore, while the regular bibliographies, catalogs, or indexes usually target a general audience, the subject guides at the academic libraries’ websites answer the academic goals of their users. They cover the specific subject matters in anthropology, business, engineering, chemistry, history, kinesiology, psychology, etc., and target the distinct groups of population, primarily undergraduate and graduate students.

Bates (1992) emphasized that work over “rigorous systematic bibliographies” requires greater sophistication and advanced skills in “seeking, selections and organization” of information about the resources presented for the patrons’ use (p. 117). The library specialists acquire an expert knowledge of information resources through education and professional occupation in the LIS field. To these days, the information specialists must develop a working knowledge of the growing amount of the library internal and externals resources, the information cognitive hierarchy, and use of the resources in all the available formats.
Summary of Theoretical Background


- Apply advanced technologies for improvement of information services
- Discover information potentially useful for the patrons’ inquiries
- Evaluate and organize the information resources applying their professional qualifications and subject expertise
- Deliver purposeful information to the point of use
- Help the users to overcome difficulties in using information resources and performing their information tasks
- Educate the users to enable performing information tasks independently

A relevant example of work on the pragmatic bibliographies is offered by the work of subject librarians authoring the content of subject guides for an academic library website. This research explored how subject librarians use the CMS tools to get closer to the ideal library information services and the lessons learned in the process of applying of the CM technologies from the point of view of the authorship.

The research design was organized within the framework presented in Table 2 summarizing the activities of the subject librarians providing information services with use of technologies in academic library environment. This research explored the information management behavior of academic subject librarians using CM technology and how, from their perspective, the technology helps them in performing the described
in the Table 2 information service activities to meet the users’ information needs. It also explored the perceptions of subject librarians about the lessons learned in this process.

Table 2

**Subject Librarians Web Content Authors**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Innovator/Innovation</td>
<td>investigates, practices, and gets proficiency in use of emerging technologies for the benefit of information services</td>
</tr>
<tr>
<td>Expert/Expertise</td>
<td>holds/demonstrates professional expertise in the LIS field (bibliographical, reference, cataloging, research, etc. work); serves as cognitive authority about credibility of information resources</td>
</tr>
<tr>
<td>Specialist/Specialization</td>
<td>develops knowledge in specific subject(s) area(s)</td>
</tr>
<tr>
<td>Author/Authorship</td>
<td>creates online content to provide information services to end-users</td>
</tr>
<tr>
<td>Manager/Management</td>
<td>manages/controls processes of receiving, organizing, and presenting of information to end-users</td>
</tr>
<tr>
<td>Facilitator/Simplification</td>
<td>selects potentially useful and relevant resources and facilitates access for users</td>
</tr>
<tr>
<td>Instructor/Instruction</td>
<td>educates users (to use resources, conduct research, apply Web 2.0 tools, and other technologies in their study and research process) so they can perform their information tasks independently</td>
</tr>
<tr>
<td>Coordinator/Coordination</td>
<td>connects the institution’s educational and research curriculum with information services; serves as a liaison to faculty department(s)</td>
</tr>
<tr>
<td>Team Participant /Cooperation</td>
<td>cooperates with other departments on development and application of technology; based on knowledge of the LIS field standards and professional experience, communicates the needs of the end-users</td>
</tr>
</tbody>
</table>

The term ‘Web 2.0’ was introduced by Tim O’Reilly and discussed further in his publications (O’Reilly, 2005; O’Reilly & Battelle, 2009). The issues related to the Web 2.0 concept, terminology, and definition are extensively discussed in the literature. See Holmberg, Huvila, Kronqvist-Berg and Widén-Wulff (2009) for more details about this discussion. For the purpose of this text, the shortcuts Web 2.0 and Web 2.0 tools are
used because they are widely applied in publications and literature to identify attributes of the current stage of web technologies. See a definition of Web 2.0 in Appendix A.

Statement of the Problem

The continuing rise in the application of new technologies provides for further redesign of academic library services and for concentration of a large part of these services in virtual environments. The enhancement in use of new technology tools brings up the necessity of studying the influence of application of these tools on library services. Web content management is one of the innovative technologies employed by libraries in building and maintaining of libraries’ websites. The major players in these processes are the librarians using CM technologies to bring information to end-users and to provide information services. The fact that a growing number of organizations in the librarianship field apply the CM tools increases the need for research about what effects, from the point of view of the librarians, the use of CM has on web authorship and on information services provided to the visitors of libraries’ websites. The research performed a novel study of the librarians’ attitudes and perceptions in the use of CM for authoring of content of libraries’ websites, developing innovations, providing professional expertise, performing information services, cooperating with other library team members and the environment in meeting the needs of the end-users. The research investigated the lessons learned in these processes from the authorship perspective.

Significance of the Study

Given the growing importance of virtual information services provided at libraries’
websites and the development of the concept of web content management, this study is among the first known in the LIS field literature to explore the perceptions and attitudes of academic librarians creating web content to deliver information services at academic libraries’ websites. The theoretical foundations about web content management are far from being completely defined and adequately organized. The results of this study supplied fundamentals for future research about authorship in web content development at academic libraries. Furthermore, this study provided a current overview of applying CM at academic libraries. This overview includes development of content of libraries’ websites and of roles of academic librarians in CM. This study also explored characteristics of dynamic content developing under the semantic web and application of CM.

In the current LIS field and other fields’ literature, the human information-seeking behavior in using technological applications has become a significant issue. That is, the majority of information behavior studies are concerned with information seeking behavior. However, this study is concerned with information management behavior. Moreover, LIS literature contains multiple examples of research about library administrators, software programmers, web developers, and other professionals who use ICT to maintain web pages. The significance of this study is in addressing the existing insufficiency of research devoted to the behaviors of academic librarians in creating web content by using CM technologies and in exploring the roles of academic librarians in development of web content to provide virtual services at academic libraries’ websites. Results from this study will serve to further research about information management behavior of academic librarians who author web content with
the help of CM. Black (2011) wrote about the necessity of selecting the best CMS for content providers, IT specialists, and other participants because the system becomes a “critical part of the web infrastructure” and the importance of investigating the potential users’ requirements to the system (p.187). Fulton (2010) indicated that under the observed increase in the use of CM, “librarians could develop a platform to share their perceptions of CMS software more openly” and that a “consensus of preferred features and implementation could spark development for the more perfect” systems. Results from this study may inform creators of CMSs about the needs and requirements of the academic librarians-users of the systems.

Finally, this study is also significant in that its results may inform academic library professionals entering the path of reorganizing their websites based on CM solutions about lessons learned and about the first-hand experiences of academic librarians using CM technology in information services to answer the end-users’ information needs. Thus, the results of this research will have practical applications for higher effectiveness of information services delivered to the point of use at academic libraries' websites.

Research Questions

The following questions structured the research:

1. What are the perceptions and attitudes regarding the use of a CMS among web content authors, specifically subject librarians?

2. How does, in the opinion of web authors, the use of a CMS affect information services?

3. What are the lessons learned in the process of creating content with a CMS from the perspective of authorship?
Purpose of the Study

The research was to explore how the discussed above theoretical constructs and dimensions are expanded to information work in virtual environments, when academic librarians apply their expertise, accomplish the discovery and delivery function, and develop their instructional role with the help of CM applications. Using qualitative research tools with elements of quantitative analysis, the study investigated the perceptions of subject librarians about the following issues:

- What differences the use of CMS brings into the delivery of information services compared to the previously applied modes
- How the use of CMS provides for better information services to visitors of subject guide web pages
- What benefits the use of CMS brings to end-users of the subject guides, or how the use of CMS influences the users' process of solving information tasks
- What effects the use of CMS may have on the content/information presented in the subject guides
- What impact CMS may have on application of Web 2.0 tools
- What lessons were learned, from the perspective of subject librarians, in the application of CM and web content authoring

Chapter Conclusion

This chapter introduced the theoretical background of the study and discussed the basic concepts utilized in the study. This chapter discussed the statement of the problem, the significance of the study, the research questions that guided the study, and the purpose of the study. Chapter 2 presents an overview of the literature associated with the topic of the conducted research. Chapter 3 provides a description of the
method and research design for the study. Chapter 4 presents data analysis and results. Chapter 5 furnishes conclusions of the study.
CHAPTER 2
LITERATURE REVIEW

Introduction

This chapter introduces the encountered in literature findings about information services performed at the academic library websites with special attention to the online subject guides. It gives an overview of the LIS field-related aspects of CM and application of CM by academic libraries. It also discusses changing roles of academic librarians under the new Web technologies, and the place of the Web authorship in this. The chapter is concluded by the discussion of the new features of the Web content/information introduced by the emerging technologies.

Websites of Academic Libraries

As indicated above, at present, the academic libraries continue to develop concepts and practices of information services provided at their websites. Transferring the increasing volumes of their reference work online, the libraries face a growing need for a higher efficiency of library work in the new settings. Academic libraries approach their work online “as an extension of the services they already provide” and make an effort to allocate the adequate resources for their maintenance and improvement (M. Taylor, 2000, p. 123). They treat an online library resource “like any other - a carefully selected, subject-accessible resource, ‘shelved’ near other like resources” (Block, 1998, p. 59).

Blummer (2007) said that academic library websites are well represented in the literature and performed a comprehensive overview of the studies on academic library
websites within three broad groups: studies on (a) design, (b) usability and navigation, and (c) content. Connell (2008) grouped the literature about academic library websites into (a) studies of websites of individual libraries, (b) studies of websites of a number of libraries grouped by common characteristics, (c) studies based on the interviews and surveys of the academic libraries’ Web developers.

For the purpose of this research, several major themes were identified in the literature about information services at academic library websites. First, the reviewed literature revealed an increasing trend to offer the users access to the internal and external resources from one location - the library website making it a gateway to the content of all the available resources (Croft, 2001; Detlor and Lewis, 2006; Wisniewski & Stenström, 2007). The State of America's Libraries Report, 2011, stated, “Students and faculty are using academic libraries more than ever” and during the “typical week, academic libraries had more than 31 million searches in electronic databases.” (“ALA Press Release,” 2012, para. 8).

Second, the modern academic libraries’ websites initiate new advanced forms of information services based on the emerging technologies with personalization and customization of information with “speed and convenience” valued by the end-users (Raish, 2000, p. B5). They target to achieve accuracy and comprehensiveness of information and to follow the LIS field standards. The academic libraries try to enable the end-users to personalize the selection and presentation of the collections of the online resources, to “channel the delivery of value-added services, to engage in two-way communication with library staff, and, in some cases, to even collaborate with other library users” (Detlor & Lewis, 2006, p. 251). The academic libraries’ portals become
extended with features of federated searching, patron authentication, link resolution, and other value-added tools that supplement content of the sites and go beyond the content (Boss, 2008, p. 1). Table 3 presents developed by Boss (2008) characteristics of the libraries’ portals.

Table 3

*Features of Library Portals*

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User interface</td>
<td>Easy to navigate, customized design, personalization</td>
</tr>
<tr>
<td>Federated searching</td>
<td>One-time log-in access to multiple library and external online resources from any location</td>
</tr>
<tr>
<td>Patron authentication</td>
<td>Centralized password protected log-in to all the portal internal and external resources</td>
</tr>
<tr>
<td>Link resolution</td>
<td>Links from a record to other related resources and tools to access content or information service</td>
</tr>
</tbody>
</table>


Third, applying the ICT in the online information services, the academic libraries target the diversity of members of the users’ audience and follow different levels of their bibliographic work (Kuhlthau, 1999). The LIS field literature accumulates multiple examples of studies about the needs of the end-users of the academic libraries websites and of usability studies of the websites. For further discussions on the usability of academic libraries’ websites see, Mack, Manoff, Miller, Smith (2004); Thomsett-Scott (2005 and 2006).

Fourth, relocating the information services to the online environment, the academic librarians consult with specialists in ICT, Web design experts, educators, instructional design professionals, and other specialists. They also follow the available
high-quality examples from other libraries and the professional field standards ("Information Literacy Competency Standards for Higher Education" (2000); “Standards for Libraries in Higher Education” (2011), and other).

Fifth, the academic libraries face growing competition from the side of the advanced search engines and other providers of online information services. Many authors emphasized the necessity to enhance the value of the libraries' virtual information services for they could successfully compete with the other information industry players (Detlor & Lewis, 2006; Curran, Murray, Norrby & Christian, 2006; Jackson & Pellack, 2004; Rieger, 2009; Ross & Sennyey, 2008; Saracevic & Kantor, 1997; Sennyey, Ross, & Mills, 2009; A. Wilson, 2004). Libraries seek to create a more compelling web presence, market, and brand their online services to attract the users to their sites (Commings, 1997; Croft, 2001; Ross & Sennyey, 2008). A. Wilson (2004) suggested that libraries have to use websites to supports libraries' public relations and apply marketing tools for promoting the library services and collections. In creating a brand, it is essential to build communication, trust, and transform services into “something larger than the product itself” (Busby, 2010). Cooperating and communicating with the website visitors, librarians create vision of the library brand and enhance patrons' trust adding value to the brand (Busby, 2010).

Sixth, the advancements in ICT provided for broader engagement of the library employees into use of these technologies (Gross & Leslie, 2008). The generation of Web 2.0 tools and their applications by academic libraries were discussed in multiple studies (Detlor & Lewis, 2006; Gross & Leslie, 2008; Maness, 2006; McManus, 2009; and other). The integration of Web 2.0 tools into libraries’ information services is a
continuous process and academic libraries try to find a perfect fit between the Web 2.0 tools and “their vision of services in order to keep up with their users” (McManus, 2009). Gross and Leslie (2008) described the impact of Web 2.0 technologies on the participants of the academic libraries’ information services (see Table 4).

Table 4

Influence of Web 2.0 Tools

<table>
<thead>
<tr>
<th>Participants</th>
<th>Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional library</td>
<td>New technologies start to interfere with the existing technologies</td>
</tr>
<tr>
<td>technologies</td>
<td>demanding their upgrade and adjustment to the new Web 2.0 settings and</td>
</tr>
<tr>
<td></td>
<td>to the vendors’ and users’ requirements</td>
</tr>
<tr>
<td>Vendors</td>
<td>Developers and vendors supply the products oriented towards the</td>
</tr>
<tr>
<td></td>
<td>specifications and needs of the Web 2.0 tools</td>
</tr>
<tr>
<td>Users</td>
<td>Students and other users started to apply Web 2.0 technologies using</td>
</tr>
<tr>
<td></td>
<td>library resources in different formats</td>
</tr>
<tr>
<td>Librarians</td>
<td>Started to utilize the Web 2.0 technologies in providing information</td>
</tr>
<tr>
<td></td>
<td>services</td>
</tr>
</tbody>
</table>


Kozel-Gains and Stoddart (2009) addressed the experiences of academic library liaison in using blogs, personalized faculty research Web pages, and Wikis to achieve a “more dynamic, interactive, responsive, service-oriented design” of information services to faculty (p. 131).

Seventh, various studies discussed administrative and organizational aspects of the academic libraries websites and their evaluation. In designing and evaluating of libraries’ websites, Croft (2001) suggested employing the Ranganathan’s Five Laws of Library Science and discussed from this point of view an ideal academic library website.
A. Wilson (2004) covered many issues on planning, building, and administering a library web presence, explained the procedures, and gave examples of the best practices. Davidsen and Yankee (2004) wrote that design of a new or redesign of an existing library website requires a conceptual model defining the library patron groups and their potential interests. Hendricks (2007) performed a survey of 60 academic libraries' webmasters about the libraries' web policy. The results showed that only half of the libraries had web policies and that a libraries' web policy has to be developed in a “collaborative way involving librarians, library administrations, and the campus community” (Hendricks, 2007, pp. 143-146). Detlor and Lewis (2006) analyzed the design of websites of 123 academic libraries members of Association of Research Libraries (ARL) from the United States and Canada, pre-tested a codebook of factors to consider in evaluating of the library websites, and presented research results about websites’ functionality characteristics. In the study of development and management of the academic libraries websites, Bundza, Vander Meer, and Perez-Stable (2009) presented results of the survey of web services and reference/public services of 149 academic institutions (with 118 respondents). The purpose of survey was to “identify key issues, determine best practices,” and to look at “library Web re-design, Web committees, usability testing, content management tools, and the methods libraries used to solicit input from both staff and users” (p. 242).

Liu (2008) examined websites of 111 Association of Research Libraries (ARL) libraries and summarized the results by major content, page layout/design patterns, and innovative features. The author developed conceptual model for future academic library website incorporating Web 2.0 tools and suggested features of a future academic library
website: (1) User focused by “presenting library resources in a targeted and customized manner,” (2) Personalization by giving the users “opportunity to configure their own library interfaces and to select tools and content based on personal needs,” (3) User engagement by encouraging library users in “content creation and exchange,” (4) Online communities through “online publishing and sharing tools such as blogs, wikis, podcasting, and tagging,” (5) “Remixability: employ a mashup approach to aggregate current and emerging technologies” to provide the library users new possibilities of information-related work (Liu, 2008, p. 14). Coombs (2007) said that the “remixable content is content and/or data that is accessible to be repurposed in other applications,” and added that typically this is performed “via an application programming interface (API)” (p. 18).

Kim (2010) surveyed web designers from forty-nine academic libraries in the United States and abroad about factors that affect web design of an academic library’s website. The factors discussed included institutional forces, supervisors’ technical knowledge and support, input from secondary sources, and input from end-users. The study also discussed website success evaluation by web designers and end-users. The findings of the study demonstrated that in developing a university library web presence, “website designers typically aggregate information from the secondary sources rather than from [end-] users” and recommended that web designers “primarily need to consider the ability of the website to meet users’ needs” (Kim, 2010, p. 105).

Eighth, many elements of the Web 2.0 platform can be observed at the academic libraries’ websites and issues related to application of Web 2.0 tools at the academic libraries’ websites receive continual attention. Nesta and Jia (2011) looked at the effect
of implementation of Web 2.0 applications by academic libraries and examined library websites in New Jersey, USA, and Hong Kong, China. According to the results of the study, as of January, 2010, instant messaging (IM) is used by the majority of the 52 New Jersey academic libraries (n=38) (Nesta & Jia, 2011, p. 88). From the observed 57 New Jersey libraries, 17 had on their websites blogs, 14 had RSS, 9 had subject guides, 7 had Facebook, and 6 had Twitter. The study suggested that Web 2.0 “seem to be adopted without any true evaluation on place” and stated that “libraries must drive technology, not be driven by it” and have to “survey, quantify, question, and measure anticipated impacts and results” of application of the new technologies (Nesta & Jia, 2011, p. 95).

The results of an exploratory study by Mahmood and Richardson (2011) of large academic libraries demonstrated a high degree of acceptance of variety of Web 2.0 applications. From October to December of 2010, the study surveyed websites of 100 academic libraries in the United States included in the ARL list. The same population that was used in the study of Liu (2008) (see earlier in the text). From 100 academic libraries, 99 libraries used really simple syndication (RSS), 89 used social networking sites, 86 used blogs, 71 used mashups, 72 used vodcasts/video sharing, 65 used podcasts/audio sharing, and 40 used wikis (Mahmood & Richardson, pp. 370-373). The authors stated that the results on the type of Web 2.0 tools used were consistent with the previous reported in the literature studies: “blogs, microblogs, RSS, instant messaging, social networking sites, mashups, podcasts and vodcasts are found to be widely adopted, while wikis, photo sharing, presentation sharing, virtual worlds, customized webpages and vertical search engines are used less” (p. 373). For a broad
review of the literature on academic libraries’ websites, see Mahmood and Richardson (2011).

Online Subject Guides

The observed in the literature research about online subject guides followed several major themes: (1) usability-related studies; (2) instructions and recommendations about organization, design, and maintenance; (3) software used to organize and maintain subject guides.

The majority of authors stressed the importance of the academic libraries’ work on subject guides and suggested that there is a continuing necessity to create and maintain subject guides adjusting them to the changing environments. Strutin (2008) described Santa Clara University libraries project on making the subject guides more usable. Courtois, Higgins, Kapur (2005) performed research of the users’ perceptions about the guides. Some authors stressed the importance of usability tests of the guides’ templates and getting a feedback on layout, structure, labeling, navigation, and other features (Goans, Leach, Vogel, 2006; Green, 2008). Staley (2007) described the results of exploratory study of use of subject guides through a survey of students that revealed the necessity of library instructions and other measures to promote the guides. The need of promotion of the guides was among the findings in the other studies (Jackson & Pellack, 2004; Strutin, 2008). For more detailed discussion on the subject guides’ usability see Stanley (2007).

There are numerous studies on the use of technologies and on the specific software to organize subject guides. Smith (2008) wrote about evolution of web
technologies from the static HTML subject guides’ web pages to the database platforms with simplification and standardization. Strutin (2008) compared MediaWiki and LibGuides solutions and discussed the characteristics of the LibGuides platform. The LibGuides from SpringShare, Inc. (“LibGuides - Share Knowledge,” n.d.) is a commercial software platform that is currently applied by many academic libraries to maintain the subject guides. For more detailed description of the LibGuides, see Kroski (2007). Many publications discussed different attributes of the subject guides under the current ICT and advantages and alternatives in their use (Smith, 2008; Tchangalova & Feigley, 2008).

Morris and Bosque (2010) reviewed websites of 21 academic libraries. Twenty of these libraries had subject guides; only 11 libraries had guides that “followed a consistent layout” (p. 186). Twenty libraries had guides in HTML format and nine libraries were using PDF format (Morris & Bosque, p. 187). The authors tracked how eight Web 2.0 tools (Chat, RSS, Tag Clouds, Tagging, User Reviews, Wikis, and YouTube) used on the libraries’ websites and in the guides and stated that the above Web 2.0 were “more commonly placed on the Web site versus within subject guides” and that on the whole, the “use of Web 2.0 features on guides was lower than the use of Web 2.0 on library websites in general, with nineteen Web 2.0 features included overall on subject guides versus 54 features included on the general website” (Morris & Bosque, pp. 187-188).

The literature review did not yield a significant number of publications on the use of CM in organization of the subject guides’ web pages. Wales (2005) discussed lessons learned in designing and pilot tests of the CMS at the Open University Library,
UK. Dupuis, Ryan & Steeves (2004) wrote about development of the CMS to manage subject guides at York University Libraries in Toronto, Canada, using an open-source application, e-resources database, and other Web development tools. The authors indicated that the librarians’ feedback about the new system showed that it facilitated building of the new and maintenance of the existing guides. Goans et al. (2006) provided an overview of CMSs and their advantages and described migration of subject guides of the Georgia State University Library from Microsoft Front Page to the in-house built system using MySQL and Active Server Page (ASP). The research examined the development of the website standards and workflow. It discussed the approach used in selecting of the CMS, the directories and functions of the applied CMS, and the methods of integrating of the system into the library’s technological infrastructure. Green (2008) wrote about changes made to the design and management of subject guides at the University of Nevada Libraries through implementation of an SQL server database and ASP.Net scripts.

The reviewed literature employed various study techniques. Many performed observations of academic libraries' websites. For example, Dunsmore (2002) conducted qualitative content analysis with observation of business subject guides at 10 Canadian and 10 American academic libraries’ websites. Goans et al. (2006) studied other libraries’ research, subject, and course guides and listed four common elements: journals, books, databases, and websites. Jackson & Pellack (2004) examined the guides to electronic resources at the websites of 112 academic libraries. They collected data on the number of links per guide, organization and presentation of resources, types
of resources, and the number of broken links. Strutin (2008) described methodology of collecting data through observing the trails in the users’ online search.

In some cases, the researchers collected data from the creators of the guides. These were mostly qualitative data about the guides’ organization, interface, modes of presentation, and specifications of the employed software. The performed literature review revealed a scarcity of studies about experiences, attitudes, and perceptions of librarians or other professionals creating the subject guides. In 1999, Morris & Grimes carried out research to explore how many libraries maintained the Internet-based subject guides, how librarians make choices about including websites into the guides, and how librarians maintain the subject guides web pages. They distributed a survey among the members of two listservs and the United States Southwest libraries’ employees. Eighty eight percent of the survey respondents answered that their libraries’ websites had subject guides. The 56 survey respondents were from public, special, international, community college, and academic libraries. Only 33% of the librarians felt satisfied with the resources they were finding for their guides and faced the “challenge of finding new and reliable sites while surfing through ever-growing, ever-changing Internet” (Morris & Grimes, 1999, p. 216). Almost all the participant saw the guides as a helpful instrument for the patrons looking for high-quality, reliable information resources. Jackson and Pellack (2004) performed a survey of the heads of information services of 112 libraries. The majority of survey respondents confirmed that the guides continue to assist “variety of purposes, both for users and staff” and remain one of the integral parts of the libraries’ information services (Jackson & Pellack, 2004, p. 326).
Goans et al. (2006) emphasized that while migrating to a new CMS there is a need to study not only the technology-related issues but also the issues of internal and external usability of the system. They described the results of their survey of liaison librarians conducted at Georgia State University Libraries to identify the prospective changes in CMS and its application. The results showed a need of improvement in training and documentation of CMS. Their study revealed what features to be added to CMS to facilitate the librarians' work over the guides (Goans et al., 2006). Among the pros of CMS, the librarians named standardization, ease of use, templates, and opportunities to concentrate on content instead of on formatting. Among the cons, the librarians specified problems in formatting of the content of the old guides to fit it into the new template as well as insufficient technical and clerical support. The librarians also requested more instructions on information architecture and additional training in the use of advanced features of CMS (Goans et al., 2006). Green (2008) stressed the importance of getting users' feedback at every stage of the process of implementation and application of CMSs and the need of preliminary practice for subject specialists in the use of new systems. Furthermore, based on the findings of the case study of University of Maryland Libraries, Tchangalova and Feigley (2008) indicated that academic librarians must have a profound knowledge of web design and of Web 2.0 tools to employ them for the benefits of the end-users of the guides' web pages. The authors suggested that there is a need of further research into how librarians apply new technologies to create subject guides and what factors motivate them to incorporate new formats and instruments into the management of subject guides.
Many studies emphasized the complex character of the librarians’ work in the creation and maintenance of subject guides saying that, in addition to the regular bibliographic reference tasks, this work also involves studies of existing practices, new technologies, usability studies, and other activities (Arnold, Csir, Sias & Zhang, 2004; Jackson & Pellack, 2004; Smith, 2008; Tchangalova & Feigley, 2008). Furthermore, work on Internet-based guides requires cooperation with other departments inside and outside of the library, more time, and additional training in the use of technology (Morris & Grimes, 1999; Tchangalova & Feigley, 2008).

For a thorough overview of the literature on history of librarians’ subject-specific work, the use of subject guides, and the guidelines for this work (see Smith [2008] and Vileno [2007]). For more details on the technology platforms used in the design of online subject guides, see Strutin (2008).

The review of the literature about subject guides at the libraries’ websites brought the following related to the topic of this research outcomes:

(a) The application of new CM technologies significantly changes librarians’ work on online subject guides

(b) There is a need for more in-depth studies of the experiences and the attitudes of librarians using new CM technologies in the creation and management of subject guides

Content Management

Application of web CM and formatting of its conceptual framework began at the end of the 1990s, when CM solutions were introduced by many corporate businesses as a practical response to manage and organize large-scale websites and e-business operations (Vidgen, Goodwin & Barnes, 2001). In the first decade of the twenty-first
century, the CM applications become one of the most important components in
information design and development. As stated by Srikantaiah (2004), “over the last
few years, content management (CM) has emerged explosively with an interdisciplinary
approach dealing with all aspects of CM, including creation, codification, organization,
sharing, and application” (p.150). According to Hackos (2002), “content management is
about organizing, categorizing, and structuring information resources so that they can
be stored, retrieved, published, and reused in multiple ways” (p. 9). CM applications
became vital in many areas of organizations' work with information.

According to Johnson and Fowler (2009), a complete definition of CM was not
formulated and observed in the current literature. For a large extent it can be explained
by the fact that the “meaning of the term ‘content management’ is still evolving,” and CM
“is truly something new” that has “become necessary due to our increasing use of
computers, the consequent explosion of data, and our need to sort and control the data”
(Johnson & Fowler, 2009, pp. 44-45). Furthermore, they defined CM as “the method
whereby an organization stores and distributes data and information” and suggested
that “finding the theoretical bases for content management systems is complex” and
requires more attention (Johnson & Fowler, 2009, p. 45).

There is a broad range of publications devoted to CM in different fields and
settings. For the historical background and the origins of CM, see Vidgen et al. (2001).
In 1998, Kartchner identified the conditions for a publishing organization to initiate
implementation of CMS and provided a short overview of the major components of CM
and the benefits of use of CMSs (Kartchner, 1998). Hackos (2002) gave
recommendations for the CM activities in corporate environments with examples from
supply chain, support services, e-commerce companies, and others. Hackos (2002) suggested treating the quantitative and qualitative business content/information as a corporate asset that needs to be managed. Arnold (2004) wrote that because of the growing amount of online information in different formats and the increasing need for convenient access to archived information, there is an increased demand for more efficient management of web content. Johnson and Fowler (2009) studied CM aspects in relation to the concept of knowledge and to the activities of technical communicators and said that “content management systems should be built to facilitate knowledge transfer and generation” (p. 45). In Content Management Bible, Boiko (2005) covered many practical aspects of web content management. The book was addressed primarily to business managers and ICT specialists who use or who plan to use CMSs.

The concept of CM is closely related to the concept of knowledge management (KM) that is widely discussed in the literature. Koenig (2008) summarized the attributes of the four stages of evolution of knowledge management and the features of the emerging content management:

- The first stage concentrated on how to employ new technologies to perform “knowledge coordination and sharing” (p. 10)
- The second stage was characterized by “adding the recognition of the importance of the human and cultural dimensions” (p. 10)
- The third stage brought “awareness of the importance of the retrievability and therefore of the importance of the arrangement, description, and structure of the content” (p. 11). At this stage, the CM concept came into view based on emerging technologies, demand for simplification of web design, and evolution of the semantic web. See Feigenbaum, Herman, Hongsermeier, Neumann, and Stephens (2007) for discussion of semantic web
- The fourth, and the present KM stage, demonstrates that information, knowledge, and CM concepts become integral parts of organizations’ structures and cultures and bring an increased “awareness of the importance
of the external information,” which is supported by the expansion of different Internet applications (pp. 12-15)

The analysts of CM technologies Real Story Group (former CMS Watch™), MD, USA, listed 200 major vendors of various CMSs available at the market (“Vendors Evaluate,” n.d., para.1).

CMSs can vary by authority (commercial product provided by ICT companies, open-source software, in-house created systems), content function (organization websites, digital collections, learning management systems), content formats (text documents, images, audios/videos, etc.), provider/vendor of software, fields of application (business, commerce, education, etc.), and many other characteristics.

In general, CM applications serve as a “collection of policies and technologies,” which allow users to “author, edit, publish, track, archive, and reuse content in electronic or printed form,” and they guide organizations in creating and sharing of “dynamic, trusted content within and among organizations” (Arnold, 2004, pp. 158-163). The following are the essential characteristic of a classic CMS:

- Consists of two elements: a database containing data and metadata and a Web template that controls the “look and feel” of information
- Provides “consistency of brand and control over navigation”
- “Enables information sharing and rapid republication in new formats and different contexts”
- “Simplifies tracking changes to a piece of information” (Pullman & Gu, 2009, p. 2)

One of the distinctive features of the new CM tools, opening broader opportunities for their use, is effortlessness in learning and employing not only for ICT professionals, but also for the entire community of potential user, including web content authors (Beesley, 2001; Goans, et al., 2006; Leiserson, 2003; McAfee, 2006).
Introducing collection of case studies about usability and usability testing of academic libraries’ websites, Lehman and Nikkel (2007) wrote that in creating their websites, libraries typically lack the technical expertise to carry on web development tasks. New CM technologies are addressing this problem as more and more academic libraries migrate their websites to CM platforms.

Content Management and Academic Libraries

As indicated earlier, currently, many academic libraries are reorganizing their websites and expanding their online information services. A growing number of organizations in the librarianship field apply CM instruments to organize information into content presented on their websites. Bundza et al. (2009) stated that applying CM tools to the “ever-increasing amount of work” for design and re-design of websites for academic libraries raises many issues that need further research (p. 257). The reviewed literature indicated that CM technologies at academic libraries go through initial stages of implementation (Bundza et al., 2009; Fennell, 2007; Goans et al., 2006; Yu, 2005). These processes are far from complete, display multiple modifications, and involve different participants. Academic libraries use various approaches in web design and CM and utilize a range of web CMSs (Fennell, 2007). Yu (2005) noted that many libraries still apply the Webmaster model, which “has been proven to be insufficient in an environment where a team of developers and editors contribute to the website” (p. vii). However, CM technologies, which help to “streamline the process of creation and publication of library Web pages, thereby reducing the time and cost,” are gaining popularity (Yu, 2005, p. vi).
The literature review did not provide sufficient statistical data about what number of academic libraries are using CMSs and what types of system are being used. In 2008, Fulton (2010) surveyed Association of Research Libraries (ARL) institutions and reported that from 40 respondents, 28 libraries used a CMS. From this number, 11 libraries used commercial system, 10 used an open-source system, and six used a home-developed system (Fulton, 2010). Additionally, from the 12 libraries that did not report using a CMS, 11 were planning to use one. At the time of the survey, 18 of 28 libraries were considering another type of CMS (Fulton, 2010). Bundza et al. (2009) indicated that almost half of the 118 respondents to their academic libraries’ survey reported using CMSs (p. 252). Answers to the questions “Do you use a content management system (CMS)?” and “If yes, what do you use it for?” demonstrated “diversity in systems mentioned” and “defined CMSs very broadly;” more than three-quarters of the respondents used CM to manage Web pages (p. 252).

Some of the authors pointed out a close relationship between the LIS field and the concept of CM. For instance, Boiko (2005) wrote that one of the essential qualifications of the librarian profession is the ability of “structuring the body of information” and applying “hierarchies, indexes, and cross references that comprise much of an access structure” (p. 165). Koenig (2008) stated that many of the tools employed in web CM, like taxonomies and classificatory structures, are “natural and long established domains of librarians/information scientists” (p. 12). Furthermore, the “reference librarian is expert at turning a vague question into a firm strategy for access,” which means applying “conceptual categorization of information and very practical
strategies for finding the right content" for online end-users (Boiko, 2005, pp. 165-166; p. 647).

In the introduction to the collection of case studies about different applications of CM in the librarianship field, Yu (2005) summarized the characteristics of CM processes at libraries:

- “Libraries are increasingly aware of the need” to find solutions to manage a growing amount of web content (p. vii)
- Inadequate funding and limited library web CM models are the main obstacles for purchasing commercially available CMSs
- Alternatives for CM methods are “database-driven methods to manage portions of a library website” (p. vii)
- CM solutions are “developed to resolve a particular challenge existing in library website development” (p. vii)
- There is a lack of technical expertise in building in-house web CM platforms

Academic libraries utilize CMSs primarily to construct and manage their websites and digital collections. In these processes, librarians usually act as authors and create content to publish on web pages. Black (2011) saw one of the main advantages of CM in giving “web content authors direct access to maintain their content without burdening them with the requirement of technical expertise in HTML” (p. 189). The publishing process might include ‘editors’ who approve further changes and edits to the web pages and system administrators who format the pages and make changes to the structure of the websites (Benzing, 2006). Many publications indicated that the design of a CMS for a library environment has to follow the requirements of the library and its service/business model (Black, 2011; Bramscher & Butler, 2006; Goans et al., 2006). In selecting a CMS, libraries must consider “common content management system features, such as workflow, content conversion utilities, metadata management
features, or templates,” and the needs of the libraries’ and the website’s end-users (Fennell, 2007, p. 160).

The reviewed literature discussed the advantages of applying CM to the design and maintenance of academic libraries’ websites. Summarizing the literature findings, it can be suggested that employing CMSs helps academic libraries to

- Manage large amounts of information and content
- Avoid coding the information used in HTML
- Transform work on the projects from one system user to another
- Customize the websites to enforce the libraries’ and websites’ branding
- Keep consistency in the pages of the website
- Support the participation of different authors
- Maintain uniformity of design and other features
- Keep the websites centrally-managed (Seadle, 2006)
- Transform the content into new suitable formats
- Adopt other recent technology applications (Benzing, 2006)
- Coordinate the work of all library departments in web publishing (Goans et al., 2006; McAfee, 2006)
- Reuse content by adding new features
- Modify templates without changing the content
- Perform multiple updates of URLs and other information through a single operation (Goans et al., 2006)
- Maintain a protected access for the group of employees who can upload, process, and publish web content

The majority of literature publications on the use of CM by academic libraries concentrated on the administrative and technological aspects of these processes. For example, many studies described technical characteristics of the applied systems, their
structures, attributes, and advantages, ways to choose the most suitable software, and
other features. Benzing (2006) described the process of migrating the website of
Rensselaer Research Library of Rensselaer Polytechnic Institute to a developed, in-
house CMS. Bramscher and Butler (2006) discussed the development of the University
of Minnesota Libraries’ open-access LibCMS that was created using the PHP scripting
language and the MySQL database, allowing for its further customization and
improvement. Fennell (2007) defined web CM instruments, briefly described the results
of the interviews of staff at the University of Minnesota Health Sciences Libraries
regarding the functionality and tools of different types of CMSs, and presented criteria to
select an appropriate CMS.

Besides the technology-related issues, implementing CM solutions involves other
important issues that do not receive sufficient attention in the literature. Many authors
stressed the necessity for further research into different aspects of CM processes in the
librarianship field. Iglesias (2008) wrote about the need to focus not only on the final
product and the results of the work, but also on the processes of creating websites with
the help of CMSs and of developing workflow measurement tools. Srikantaiah (2004)
stated that to use CM, organizations must consider five basic principles: “understanding
users’ needs; acquiring the essential content; selecting the appropriate content; storing
and managing the content; and disseminating the content” (p. 150). In library settings,
these basic principles require the ongoing participation of librarians or web content
authors. Content authors play a leading role in “selection, capture, representation,
transformation, review, editing, versioning, translation, and formatting” of information
presented in the content of websites (Bedford, 2004). Their active participation in the
organization and management of libraries’ online presences benefits users (Hendricks, 2007). The review of literature revealed that no adequate and sufficient attention was devoted to researching librarians’ participation in the development and maintenance of web content, especially with the application of CM tools.

Academic Librarians Web Content Authors

Contemporary society transforms the mainstream of its labor force to information-related services by building up a new “knowledge elite” who understands how to “work with data, knowledge, information systems, simulation, and related analytical techniques” (Dutton, 2005, p. 19). Librarians and other information specialists represent integral parts of the knowledge elite. They are its major players because they use new ICT to organize information services and to create knowledge from information.

In their study of skills, knowledge, and attributes required by LIS filed professions under Web 2.0, Partridge, Lee, and Munro (2010) indicated, “Technology or the ability to engage with and use technology to meet client and community needs is frequently included within the various lists of competencies or abilities. Other traits frequently mentioned include teamwork, project management, research, information access, and information management” (p. 318). Their study organized focus groups of six-to-ten participants with a total number of eighty-one participants; all the participants were LIS field professionals in Australia with an average of 17 years spent in the industry. The participants of the study acknowledged that these days, the “level of competence for each skill, knowledge, and attribute had become higher” and that “speed with which
things are changing in the Web 2.0 world is having a significant impact” (Partridge et al., 2010, p.330).

The changing roles of academic librarians in this epoch of technological change require further studies of “how they cope and adapt to change,” how they “search for a fit” in changing information environments, and how they “reinforce, and adjust their” work (Rice-Livey & Racine, 1997, p. 31). The current generation of ICT introduced new ways to produce content in which technology users become co-producers in managing and designing information services generated with the help of these technologies (Pascu, Osimo, Ulbrich, Turlea, & Burgelman, 2007). A contemporary librarian “must understand the entire information ecology: the sources of information, the different media of information, methods of information transmission, findability, information architecture, information systems, and telecommunications” and must have a sufficient knowledge of many other related areas (Milone Hill, 2008, p. 23). “After having been barely visible on the campus for decades, librarians are now finding themselves sought after for their expertise in finding information and navigating the Web” (Raish, 2000, p. B5). Following changes in the librarianship field and its external environments, academic librarians carry more responsibilities that have been introduced by new ICT.

In the in-depth study of the roles and functions of academic reference librarians, Rice-Livey and Racine (1997) discussed the “turning-points in the evolution of the role of academic librarianship” and included examples of landmark changes in ICT that influenced the LIS field (pp. 32-39). After an extensive literature review, they performed a two-stage research through focus groups and individual interviews with students and faculty. Their study summarized the participants’ opinions about the “technical,
cognitive and behavioral” skills of librarians and showed that the “changing nature of the environment demands a commitment to life-long learning with academic librarian being more self-directed and self-motivated to develop new skills that will enable the fullest use of new technology and resources” (Rice-Livey & Racine, 1997, p. 35). Their study revealed that academic librarians must be “translators, guides, and teachers for the users” to encourage “collaborative experience between the information professionals and the users,” to develop “knowledge, and appreciation of the values, culture, and traditions of the profession,” to “assist students in learning to think critically and relatively,” and to cooperate with other information professionals in their work (Rice-Livey & Racine, 1997, p. 36). Moreover, as was stated by Block (1998), the process of creating web content and information is the job of librarians because they are the professionals who have the required knowledge, experience, and qualifications.

It was discussed in many publications that specialists who create web content and put CMSs into service, experienced the shift toward new skills “encompassing such areas as management, programming, graphic design, usability, and information technology in addition to the rhetorical skills of document design” (Pullman & Gu, 2009, p. 9). In the recent years, the “boundaries between IT professional and LIS professional were rapidly narrowing and that the skills and knowledge required by successful LIS professionals were becoming more complex and plentiful” (Partridge et al., 2010, p. 326). Because new web development technologies significantly influence the work of involved participants, it is essential to study the issues related to the information management behaviors of those who create and publish web content (Iglesias, 2008).
It is noteworthy that the development of the Standardized General Markup Language (SGML), the Extensible Markup Language (XML), and the focus on semantic content brought revolutionary changes to web content authoring. “Semantic content refers to the meaning of the information, its significance for authors and users,” and XML has become a “powerful tool for labeling information according to the nature of its content rather that labeling it by its format” (Hackos, 2002, p. 69). Compared to earlier programming languages, XML is more flexible and combined with standardized metadata and organized taxonomy, facilitates text processing and becomes one of the most powerful tools for presenting and sharing information online and for improving CM (Beesley, 2001; Sturdy, 2004).

The study of Evans (1999) that was conducted over 10 years ago on the qualifications of authors of academic libraries’ websites is one of a few examples of research into the qualifications and web development training of academic librarians. This study was based on a survey received from 124 colleges’ and universities’ libraries (Evans, 1999, p.310). According to the results of the survey, librarians took an active part in authoring web content of libraries’ websites. The findings also demonstrated the importance of special training in web design and the necessity to allocate sufficient time and resources for this training. Other authors also stressed the importance of training (Commings, 1997; Iglesias, 2008; M. Taylor, 2000).

M. Taylor (2000) conducted a survey of webmasters from 82 institutions members of the Association of Research Libraries (ARL) and suggested that most of the traditional librarians’ work responsibilities can be transferred to virtual environments. Table 5 presents a summary of this survey’s results. In answer to the survey question
about librarians’ participation in web development, 50% of respondents said that librarians must take part in classifying and structuring information; additionally, 46% of respondents said that librarians must participate in creating web content (M. Taylor, 2000, p. 122).

Table 5

Summary of Webmasters’ Survey Results

<table>
<thead>
<tr>
<th>Questions</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Webmasters’ qualifications</td>
<td>78% had MLIS degrees, 10% had degrees in computer science, information technology, or telecommunications. Over 80% “reported teaching themselves computer science and HTML skills”; 31% worked in ICT, and 18% worked in reference services.</td>
</tr>
<tr>
<td>Webmasters’ responsibilities</td>
<td>More than 80% performed HTML coding, “designed graphics and layout, wrote materials for their Web pages, [and] participated in editorial decisions.”</td>
</tr>
<tr>
<td>Web committees</td>
<td>81% &quot;worked with Web committee or team.” Almost 90% “preferred to work with committee,” and “over 50% reported problems with committee.”</td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>37% were very satisfied, 46% were satisfied, 12% were neutral, and 5% were dissatisfied. The survey also collected data about the most/least-liked aspects and favorite/least-liked projects of their job.</td>
</tr>
<tr>
<td>Role of librarian in web development</td>
<td>100% of respondents said that “librarians should have some role in website development.”</td>
</tr>
</tbody>
</table>


Another survey of web designers of 288 educational institutions was conducted by Connell (2008). In answer to the survey’s question about what the most important skills for library web designers, 63.7% of respondents said that library web designers must organize information effectively and must have web authoring and graphic design skills (p. 125). According to the results of the aforementioned survey of Bundza et al. (2009), authoring the websites of academic libraries is “handled mostly by subject librarians, web librarians, and individual library departments” (p. 249). It was indicated
that “comments throughout the survey suggested that [the] authoring of content can be particularly challenging and [is] not always handled consistently” (p. 250). Thus, ability for effective organizing of information and obtaining consistency in presentation are essential skills in web development.

A number of publications discussed different issues related to application of web development technologies by library staff. Gross and Leslie (2008) studied the outcomes of a pilot Web 2.0 training program for academic library staff and emphasized the need for staff to learn and implement Web 2.0 tools and the need to teach patrons how to apply these tools in their research processes. Leiserson (2003) suggested that library web authors consider the following when creating and selecting web authoring software: availability of support, server characteristics, size of website, applied standards, accessibility, and coding languages. Fenell (2007) looked at the functional characteristics of the Drupal CMS that can facilitate the authoring process. Sandle (2006) stated that applying CMSs makes it easier for content authors to use their subject expertise.

The reviewed literature revealed a relatively large number of studies describing how information architects, web designers, IT specialists, and other professionals apply CM in library environments. However, there is an obvious lack of research into the roles and activities of reference subject librarians who apply CM to provide information services at academic libraries’ websites. Evans (1999) emphasized the need for further research into the participation of librarians during the development of academic libraries’ websites. Yu (2005) indicated that an increasing volume of web-published content generated “a roster of authors, including professional librarians, staff members, student
assistants and interns” and increased the need to use CM solutions to assist in creating and publishing content and to achieve its uniformity (p. vii). Fennell (2007) suggested that libraries’ presence on the web will continue to benefit from applying CM and will result in a higher degree of involvement of library staff in these processes. Simard (2008) developed an organizational framework for a service organization. This framework included the following dimensions that are essential for managing content/information: people, organization, technology, and process. The leading components of this framework are people who create content/information. Librarians operating as web content authors gather information, develop knowledge and expertise, and create, adapt, and share content. They act as the key participants in CM processes, often making decisions about “what slice of the object/event space to consider and for what purpose and by what means” (O’Connor, Kearns, & Anderson, 2008, p. 53). Black (2011) saw one of the main advantages of CM in giving “web content authors direct access to maintain their content without burdening them with the requirement of technical expertise in HTML” (p. 189). This author presented qualification criteria given to the content providers participating in the CMS project at Ohio State University Libraries using Drupal, ModX, and SilverStripe as well as the the CMS requirements by five categories: content creation and ownership, content management, publishing, presentation, and administration/technical (Black, 2011, pp. 186-188).

On the other hand, the reviewed literature did not pay adequate attention to the expectations of subject librarians about how using CMSs can improve information services and what their perceptions are about how end-users may benefit from applying
CMSs. To some extent, this lack of attention can be explained by the relative novelty of the CM concept and by the fact that, at present, many academic libraries find themselves in the initial stages of implementing CM innovations. Therefore, there is a need for research into how the use of CM by librarians influences the pragmatic bibliography activities of the librarians discussed in chapter one. This study of attitudes and perceptions of academic subject librarians in CM processes provides for a better understanding of managing web content/information and delivering it to end-users of academic libraries’ websites.

Information and Content on Academic Libraries’ Websites

The questions of CM were discussed in the reviewed literature along with the concepts of information and knowledge. Defining information, Davenport and Grover (2001) wrote that "data is classified, summarized, transferred or corrected in order to add value, and become information within a certain context" (p. 6). Cleveland (1982) defined knowledge as the “result of somebody applying the refiner’s fire to the mass of facts and ideas, selecting and organizing what is useful to somebody” (p. 34). To organize the content of libraries’ websites, librarians present information to end-users and support the process of generating of knowledge. With the help of information services, patrons’ knowledge “is created and organized by the very flow of information, anchored on the commitment and beliefs of its holders” (Nonaka, 1994, p. 15). In developing web design models, libraries constantly look for ways to “make content more usable to the user community” (Yu, 2005, p. vi).
P. Wilson (1977) discussed the features and attributes of information provided by libraries to their users. This information

- Answers users’ queries
- Is accurate
- Is relevant to the subject of search
- Is accessible to all groups of users
- Requires “small amounts of expert effort at documentary research” to begin use
- Is “immediately apparent”
- Provides for “diffusion of knowledge”
- Is supported by a bibliographic advisory service
- Is presented in an available-for-use form (P. Wilson, 1977, pp. 111-112)

Hastings (1998) discussed the criteria that libraries must consider to evaluate resources presented in their online collections: “authority, scope, content, design and format, purpose and audience, ease of use, and cost” (p. 111). These criteria are analogous to those applied in the evaluation of print resources but have to be modified according to the demands of online environments (Hastings, 1998, p.111). The factors to be included in the evaluation of resources’ content include

- Accuracy of the presented information, ensuring that it reflects a particular point of view, is free of biases, and correlates with other resources available online
- Authority of the resources providing data about sources of information, authors, and their affiliations, ensuring that information about the resources is “verifiable”
- Currency of information with frequent revisions and updates of the included information
- Uniqueness of the content features and the format of presented resources
• Exactness in links to other sites and URLs to other references
• Quality of text descriptions, ensuring that “content [is] communicated clearly” (Hastings, 1998, p. 114)

The research explored how applying CMS to create subject guides helps librarians present information to end-users and follow standards of ideal library service in the creation of web content. Describing web content, Rockley et al. (2003) wrote that it “moves through various phases of development: creation, review, management, and delivery. These phases are collectively known as the content life cycle”; the phases can vary from organization to organization, but these four are the most common (Rockley et al., 2003, p. 81). Each stage involves different activities. The “content creation phase can include planning, authoring, and revision,” in which “authoring involves creating new content and revising existing content” (Rockley et al., 2003, pp. 82-83). To plan a CM process, it is important to examine all of these stages.

Starting from the establishment of the dynamic or semantic web model with the development of Web 2.0 technologies, WWW content went through a core transformation process. Semantic web technologies brought multiple instruments for the dynamic delivery of content and the improvement of online customer service. According to Hackos (2002), dynamic content is

   easy to find, accurate, up-to-date, and continuously refreshed, complete enough for users’ needs, well organized for quick search and retrieval, readable in the right language, linked to other relevant content, [and] targeted to each person’s needs and levels of experience and knowledge. (p. 8)

Table 6 presents an overview of the characteristics of dynamic web content encountered in the literature.
Table 6

**Characteristics of Dynamic Web Content**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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<tbody>
<tr>
<td>Customized</td>
<td>The “practice of developing subsets of information directed towards particular user communities to meet the needs of one company or a particular group of users within the customer’s organization” (Hackos, 2002, p. 262).</td>
</tr>
<tr>
<td>Personalized</td>
<td>The “ability to present different users with different views and different data depending on, e.g., preferences, access profiles, role, and previous accesses;” adjust to the users’ levels of experience and knowledge (Vidgen, et al., 2001, p. 473; Wisniewski &amp; Stenström, 2007).</td>
</tr>
<tr>
<td>Updated constantly</td>
<td>Content is accurate, up-to-date, and continuously refreshed.</td>
</tr>
<tr>
<td>Enriched content</td>
<td>The “organizations provide enriched representations of their collections” (O’Connor &amp; O’Connor, 1998); “enrichment materials are added to library catalogs . . . . This feature can be contracted directly from its source or, in some cases, through strategic alliances that an ILS vendor has established” (A. Wilson, 2004, p. 69-70), “e.g., author biographies, book reviews, tables of content, book covers” (Detlor &amp; Lewis, 2006, p. 251).</td>
</tr>
<tr>
<td>Interrelated with other content</td>
<td>Content interconnects with other units in the organization system, links to other content on the WWW, and incorporates the content of other library internal and external sources of information. “Remixable content … and/or data . . . . is accessible to be repurposed in other applications” (Coombs, 2007, p. 18).</td>
</tr>
<tr>
<td>Variety of formats</td>
<td>Information is presented in different available formats.</td>
</tr>
<tr>
<td>Incorporation of Web 2.0 tools</td>
<td>Content includes instant messaging, email, chat, discussion board, shoutboxes, wikis, podcasts, blogs, RSS, social networking tools, social tagging, video and images hosting, and other tools.</td>
</tr>
<tr>
<td>Interactive</td>
<td>User contribution and feedback to site content add value to the site (Hastings, 1998); includes a designated visitors’ space to submit content and feedback, tools to add tags and reviews to materials in the library catalog, tools to allow faculty to contribute content and to “deposit learning objects” to a central repository (Coombs, 2007, p. 18-19).</td>
</tr>
<tr>
<td>Collaborative use</td>
<td>“broadcast search tools, electronic reference services” (Detlor and Lewis, 2006, p. 251); “co-browsing, file-sharing, screen-capturing, and data sharing and mining of previous transcripts;” librarians and patrons can cooperate in the virtual reality (Maness, 2006); “user-generated content&quot; and available “through network for reuse” (Liu, 2008, p. 10).</td>
</tr>
</tbody>
</table>
To provide virtual information services, libraries follow current ICT trends and add dynamic features to their websites to deliver current and frequently updated information to end-users (Yu, 2005, p. vi). Arnold (2004) suggested that CM applications support “authoring, routing, updating, publishing, disseminating, archiving, and security functions for different types of content” and will bring “new and more sophisticated features” to the dynamic Web content (Arnold, 2004, p. 157).

According to the State of America's Libraries Report, 2011, the “U.S. libraries of all types continue to make increasing use of social media and Web 2.0 applications and tools to connect with library users and to market programs and services,” while “Facebook, Twitter and blogging tools are the favorites.” (“ALA Press Release,” 2012, para. 8). As discussed earlier in this chapter, academic librarians improve their skills in the use of Web 2.0 tools and integrate these tools into their work activities. Furthermore, a growing number of academic libraries perceive ways to increase the effectiveness of their online information services by incorporating Web 2.0 tools into the content of their websites. The developments in the mobile computing technologies and mobile communications increase the necessity to deliver information to the users’ mobile portable devices. (See The Year in Review [2011] for examples of mobile apps used by academic libraries). Some academic libraries make use of QR barcodes that “link the user to audio or video enhancements of library exhibits, orientation tours, signage, and video tutorials.” (The Year, 2011).

Kozel-Gains and Stoddart (2009) observed that “as the value of some of these new technologies has been proven, it is only recently that many of these web tools are being taken more seriously and finally being hosted on library and campus servers” (p.
In a survey of subscribers to the Information Literacy Instruction Discussion List, 84% of respondents said that they used Web 2.0 tools in their information literacy classes to “publish content for students to access and interact with, or involve students in using the tools to complete coursework collaboratively, or enhance interaction”; 38% of respondents used Web 2.0 instruments to exemplify information literacy concepts (Luo, 2010, p. 37). In a survey performed by Bundza et al. (2009) of academic libraries and in answer to a question about using Web 2.0 tools to involve users in the site, 84% of participants said that they used instant messaging, 78% used online suggestion boxes, 61% used blogs, and some used wikis’ and LibGuides’ interactive features (p. pp. 254-260). Other tools mentioned by respondents were “online room reservations; Primo, for My Bookshelf functions; Skype . . .; surveys; tagging; [and] virtual tours and widgets for Facebook and Google” (Bundza et al., 2009, p. 255). The majority of this survey’s respondents recognized a “need for these types of features” (Bundza et al., 2009, p. 255). Liu (2008) observed 111 academic libraries’ websites: 30 websites employed RSS, and 4 websites provided personalized library space, “aggregating into one spot access to library user accounts, course reserve materials, library alerts, databases, citation tools, and/or search preferences/results” (p. 8). Furthermore, 10 library homepages had search boxes/links to Google Scholar, and reference chat was offered on almost all of the libraries websites (Liu, 2008, p. 8). Many authors stressed the importance of further research into applying Web 2.0 tools on library websites (Detlor & Lewis, 2006; Gross & Leslie, 2008; Kozel-Gains & Stoddart, 2009; Maness, 2006; McManus, 2009). (See Rogers [2010] for more data on use of Web 2.0 tools by American libraries).
Although numerous articles discuss the content and functions of academic library web pages, not a sufficient number of studies examine newer types of content, ways of incorporating of new technologies, and methods of integrating new content (Blummer, 2007).

Chapter Conclusion

This chapter reviewed the literature related to the topic of CM, the current trends in the development of academic library websites, the employment of CM by academic libraries, and the authorship, as well as main characteristics and changes in the web content and information services brought to academic library websites by semantic web and Web 2.0 tools. The following related to the topic of this research themes emerged from the reviewed literature:

(a) Academic libraries continue to use new CM technologies in the development of their websites

(b) Academic librarians play leading roles in the creation and management of online content with the use of CMSs

(c) There is a necessity for more in-depth research into how academic librarians apply CMSs to add value to information services, to create dynamic web content that interests end-users, and to understand the lessons learned in this process from the authorship standpoint
CHAPTER 3

METHODOLOGY

Introduction

Information management behavior related to applications of CM in academic library environments is part of a new area of information science research that involves the novelty concepts related to CM technologies and the CMSs. This chapter reviews the research methodology used in this study to answer the research questions. This chapter describes this study's settings, sample population, and methods and procedures in data collection and data analysis. It also describes the issues of validity and reliability as well as the organizational and ethical considerations of the research and the generalizability of the findings and conclusions.

Research Design

The nature of this research was exploratory and descriptive, applying qualitative research methods with elements of quantitative analysis. Maxwell (2005) indicated that the “ability to elucidate local processes, meanings, and contextual influences in particular settings or cases” is a main strength of qualitative research (p. 90). Bates (1999) emphasized that to solve information science problems, there is a need to combine different types of methodologies, and information science research needs multiple methodological approaches. LeCompte and Schensul (1999) suggested that the “features of qualitative and quantitative designs can compliment and strengthen each other” (p. 92). Creswell (2003) indicated that collecting diverse types of data supports a better understanding of the research problem and supplies more detailed
information about different aspects of the research topic. Strauss and Corbin (1998) stated that qualitative research appeals to “nonmathematical process of interpretation, carried out for the purpose of discovering concepts and relationships in raw data and then organizing these into a theoretical explanatory scheme” (p. 11). Warwick (2009) emphasized the importance of qualitative aspects of research related to the operations of academic libraries to explore the requirements of people about the systems and processes applied in management of these operations because users’ “behavior within the system is often influenced by their perception of the system” (p. 182). A qualitative study would be interested in “(1) how people interpret their experiences, (2) how they construct their worlds, and (3) what meaning they attribute to their experiences” (Merriam, 2009, p. 23). Therefore, this research employed the strength of qualitative research methods and enriched them with select elements of quantitative analysis.

This study incorporated the major components of qualitative research suggested by Strauss and Corbin (1998):

- Data must be collected from various sources
- Procedures must include interpreting and organizing data, which usually involve “conceptualizing and reducing data, elaborating categories in terms of their properties and dimensions, and relating through a series of prepositional statements” (p. 12)

To achieve comprehensiveness in understanding the issues of the research inquiry, this research applied the phenomenological form of the research strategy of inquiry. The purpose of the phenomenological approach in qualitative research is to understand a phenomenon from the viewpoint of individuals who experience that phenomenon and to understand how those individuals define that phenomenon,
The following are the main attributes of the phenomenological research strategy that this study employed:

- The researcher gained personal experience by assisting subject librarians in migrating their subject guides’ web pages to the new CMS and then in managing the new subject guides.

- The study conducted two rounds of in-depth, semi-structured interviews with subject librarians based on profound inquiries. Merriam (2009) indicated that phenomenological interviews serve as primary instruments to examine the dimensions of the studied incident. Data collected in the interviews produced an all-encompassing inkling of the studied phenomenon and provided for an understanding of the issues related to the research domains.

- Analysis of the results of the subject librarians’ survey, especially of its open-ended questions, assisted in getting a more profound knowledge about the librarians’ experiences and opinions of the categories of the research analysis.

Therefore, to identify “the ‘essence’ of human experiences concerning a phenomenon, as described by participants of the study,” this research applied the phenomenological method and combined different research tools with the researcher’s personal experience and knowledge of the studied phenomenon (Creswell, 2003, p. 15).

Research Settings

This study was conducted at the University of North Texas (UNT) Libraries, which migrated their website to the open-access software Plone CMS (see a description of the system in Appendix B). This section provides an overview of the Libraries’ project for the development of their website and of the subject guides’ migration project and describes the sample population for the study. The practice of organizing qualitative research in original settings is widely employed and offers opportunities for closer exploration of the research environments and the peculiarities of individuals’ behaviors (Creswell, 2003). Often, qualitative research implies that the researcher visits the
natural settings of the research and gets acquainted with the experiences of participants. As indicated above, the researcher had practical experience with the project of redesign of the website based on the new CMS and was familiar with its processes and procedures.

Libraries’ Website Redesign Project

In the summer of 2006, the UNT Libraries (see more details about the libraries in Appendix C) started a project to redesign their website based on a customized CMS. This project included the redesign of information and technology architecture and the interface of the libraries’ website. The project maintenance plan included “site review, regular usability testing, and a schedule for future redesign” to provide a “mechanism for continuous assessment and improvement of the website” (Annual Report, n.d., p.1). See Appendix D for details about the UNT Libraries’ website redesign project.

Subject Guides’ Redesign Project

In the summer of 2008, the UNT Libraries started migrating content of the web pages of existing subject guides to a new CMS platform based on the Plone software (see the main characteristics of the Plone CMS in Appendix B; see highlights of the subject guides’ redesign project in Appendix E). Various forms of training were organized for participants in the project. See Appendix F for a description of the forms of training.

As discussed earlier, one of the main benefits of a CMS is the template function, which significantly improves the design and organization of web content. A CMS allows
users to customize the structure of their websites. At the beginning of the UNT Libraries’ project, the Subject Guides Subcommittee developed a standard template for subject guides with unified tabs for the sections of the guides. The default tabs (guides’ sections) included Introduction, Articles, Books, Reference Sources, and Websites. During the migration, the content of the existing subject guides was distributed among the new tabs. Some individual subject guides have additional sections (tabs), like class pages, quick guides to finding information, and others. The Introduction section of the guides informs visitors about the topic of the guide and its content, use, and scope of coverage. The Introduction also gives URLs to department(s) in the subject major. Specifications and descriptions in the introductory section help to integrate different bibliographic units into a universal structure and to create consistency among the guides in different subject areas, making them easy to navigate for diverse users (Bates, 1992). The rest of the four sections of the guides support users in performing their information tasks on a particular subject major. Collard and Tempelman-Kluit (2006) suggested that adjusting guides’ sections to the most common types of users’ tasks, grouping these tasks, and linking them to topical resources significantly helps users complete their specific information tasks. The new UNT Libraries’ subject guides have improved design and navigation. The guides’ web pages are searchable by pre-determined categories, keywords, and tags and provide related links.

Croft (2001) suggested that academic library websites must offer attributes encouraging “human contact, when needed” (p. 80). The subject guides at the UNT Libraries offer various ways of contacting librarians. Each subject guide has a picture of
the subject librarian and his/her contact information. The pages also have Meebo widgets for instant messaging.

Sample Population

Maxwell (2005) indicated that sampling is problematic because in qualitative research, sampling “implies the purpose of ‘representing’ the population sampled,” and a common way of selecting settings and individuals in this type of research is “neither probability sampling nor convenience sampling” (p. 88). He compared the characteristics of random and purposeful sampling and brought up the four most important goals achieved with a purposeful selection of a study’s participants (Maxwell, 2005, pp. 89-90). Merriam (2009) wrote that to initiate a qualitative study, the researcher “knows what the problem is and has selected a purposeful sample to collect data in order to address the problem” (p. 171). This research used the purposeful sampling approach with a typical sample and selected the subject librarians who were authoring the content of the UNT Libraries' website with the use of the CMS and who were capable of providing “valuable insights into the phenomena of interest” to “discover common properties of or patterns” (Wildemuth & Cao, 2009, p. 129). As indicated by Merriam (2009), in a qualitative research, the “typical sample would be one that is selected because it reflects the average person, situation, or instance of the phenomenon of interest” (p. 78). Presented in Appendix G, descriptions of the responsibilities of subject librarians (content creators and contributors) helped to establish inclusion criteria for selecting this survey’s participants.
As opposed to a “large, random, representative” sample for quantitative research, a sample selected for qualitative research is usually “small, nonrandom, purposeful, theoretical” (Merriam, 2009, p. 8). Furthermore, an adequate sample size in qualitative research is one that permits—by virtue of not being too large—the deep, case-oriented analysis that is a hallmark of all qualitative inquiry, and that results in—by virtue of not being too small—a new and richly textured understanding of experience. (Sandelowski, 1995, p. 183)

This research recruited 30 participants for an electronic survey of subject librarians. Subject librarians serve as library liaisons for different colleges and departments on the UNT campus. The UNT Libraries’ website provides information about the Library Liaison Program that is “a collaboration between librarians and the academic departments, schools, and colleges of the University of North Texas. Its purpose is to fulfill the Libraries' Mission of providing library services, information access, and collection development in support of the university's teaching and research” (Library, n.d). Furthermore, 3 participants from this group were recruited for 2 rounds of interviews. There were several criteria in selecting the participants for the interviews. These participants must have been involved in the migration project from its start and must have participated in all stages of the migration of subject guides to the CMS. They must have been responsible for migrating at least one subject guide and must have maintained at least one guide at the time of data collection. The above conditions ensured that the interviewed librarians had broad and first-hand experience of the issues related to the study and could supply the most comprehensive data on the phenomena of the study (Wildemuth & Cao, 2009). It was also important that interview participants were “familiar with patterns and characteristics of the population to be surveyed” (LeCompte & Schensul, 1999, p. 71). Hereafter in the text, the interview
participants will be identified as ‘experts.’

Additionally, this research recruited 5 library employees to participate in the pilot electronic survey.

Data Collection

The data collection process of this research incorporated the following steps:

1. A first round of interviews with experts
2. A pilot survey of subject librarians
3. A survey of subject librarians
4. And a second round of interviews with experts

Prior to the first round of interviews, this research received the approval of the UNT Institutional Review Board (IRB) for the use of human subjects. The survey instrument was modified after the first round of interviews and pilot tests and was submitted to and approved for the use of human subjects by the UNT IRB (see Appendix H).

Survey Instrument

The survey of subject librarians was conducted from February to March of 2011 in electronic format using the survey-creating software SurveyMonkey. The survey URL was open for 3 weeks. To increase the effectiveness and validity of the survey instrument, the survey questions were discussed with experts in email correspondence and during the first round of interviews. The experts’ input helped to ensure that the “concepts and ideas used in the study are meaningful to the participants,” that the survey language and vocabulary are familiar to them, and that the survey was “couched
in the same meaning system and frame of reference used by the people who are to answer the questions” (LeCompte & Schensul, 1999, pp. 69-71). For example, following an expert’s suggestion, comment boxes in which participants could leave comments were added in Questions 16 and 17. Following another expert's suggestion, the answer choice “Quarterly” was added to the choices in Question 18. Indeed, this answer option was chosen by 64% of survey respondents who answered the question. Another expert suggested clarifying the meaning of the term ‘Information Services’ used in several survey question as “reference, instruction, liaison duties.”

In January of 2011, after the first draft of the survey went through review and revision based on the experts’ comments and suggestions, the researcher conducted a pilot test of the survey. The pilot survey was distributed among the library employees who resemble the qualifications of people to whom the survey was distributed (de Vaus, 1995). They participated in migration of the libraries’ website to the CMS. They used the CMS regularly and created online content for different sections of the libraries’ website. Therefore, the qualifications of the pilot survey participants were comparable to those of the research target group, ensuring the likeness of their approaches to the survey questions. The pilot test procedures mirrored the procedures that were used afterward to produce the survey and helped to identify and address any potential problems and to minimize the possibility of nonsampling measurement error (Rothgeb, 2008). The pilot survey provided respondents’ feedback about the survey’s questions, design, layout, effectiveness of consent form and instructions, length of time it took to complete, and software used to arrange the survey’s electronic format (O’Leary, 2004). The pilot survey participants made general comments, including:
This is an EXCELLENT survey! I did not find any errors, and I thought each question was thoughtful and clear. I had two minor quibbles, [but the] questions seemed appropriate, the sections were logical, and your scales seemed suitable for testing.

There were several constructive suggestions: “Does every subject librarian have a degree? Are there some that do not have an MLS AND they are not a library science student? I didn't think so, but I just wanted to check.” There were also several changes in spelling and wording. Changes were also applied to survey design because a respondent said that the “dark grey on light blue is a bit difficult to read.” Changes were made to the organization of the survey instructions after one pilot survey respondent suggested changing the wording in the titles of the sections and in the instructions.

The first section of the survey included demographic questions and questions about qualifications and skills that subject librarians utilize to author web pages with CM. The second section included multiple-choice and ranking questions. In some questions that offered answer choices, participants were asked to explain a prior answer, which allowed additional details about why that particular answer choice was selected (Ballou, 2008). The types of questions in sections one and two included closed questions, in which the participants had to choose one response from two responses or a list of responses, rank-and-ordering response questions, and Likert-type scale questions. Data received from the responses was processed by applying instruments of quantitative analysis. The third section of the survey included open-ended questions, in which respondents were not limited by any given answer categories and provided answers in their own words (Ballou, 2008). The responses to this section brought data in textual format and were analyzed using the technique of content
analysis. Content analysis technique applied in this study is discussed in the next section of this chapter.

To achieve a higher rate of survey participation and to motivate participants, the researcher applied the survey recruiting tactics recommended by Ye (2007):

- Recruiting introduction message to the survey
- Sending follow-ups after initial survey requests
- Setting a deadline for closing the survey web page
- Setting clear guidelines for recipients
- Improving survey design, content and length of the survey
- Addressing issues about protecting the respondents' privacy

The survey URL, the copy of the consent form, and the recruiting introduction message were sent out using the UNT Libraries' Microsoft Outlook Express electronic mail. At the time of the survey, the Outlook Express system went through a regular maintenance update to a new version. After the update, the survey URL embedded into the recruiting introduction email message did not open in some web browsers. As soon as the problem became obvious, a message instructing to copy and paste the survey URL into the Internet Explorer browser to access the survey was sent to participants by email. The message also informed that survey was extended for one more week. During this additional week, five more participants took part in the survey and submitted their responses.

To organize and conduct the online survey, the research applied ethical principals recommended for online surveys (see Gurău [2007] for a more detailed
discussion of ethical principles in organizing surveys). See the list of survey questions in Appendix I.

Semi-Structured Interviews

As indicated earlier, the research design included two rounds of semi-structured interviews with experts. The first round of interviews (three interviews) took 3 hour and 40 minutes. Three interviews in this round took place in December of 2010. The total time of the interviews in the second round was 4 hours and 15 minutes. Three interviews in this round were conducted in July of 2011. The first round of interviews helped to “establish general directions” in conducting the survey and in specifying domains for survey questions according to the “specific topics” brought up by the experts (Babbie, 2001). Additionally, during both rounds, the researcher obtained more information about the project, experts’ opinions about the topics of the study, descriptions of their experiences in the project, clarifications of different issues that arose during data collection, development of categories, and data analysis.

The semi-structured format of the interviews allowed the researcher to keep conversation in the frames of research inquiry while simultaneously maintaining its flexibility, enhancing the efficiency of this method of data collection. The interviews were “guided by a set of questions and issues to be explored” with no predetermined order and wording because if “interviewing in qualitative investigations is more open-ended and less structured,” respondents “define the world in unique ways” (Merriam, 2009, pp. 90-114).

Furthermore, after the second interviews, experts were asked how the utilization of CMS assisted them in adding dynamic elements to web content. Prior to this, the
researcher agreed with experts about terminology. The definitions of dynamic web content and its features were furnished to the experts by email prior to the interview. This helped to reach uniformity of collected data and provided for more reliable and relevant data. In addition, the consistency in terminology helped at the stage of data analysis to accurately categorize the interview answers and to achieve a higher precision in the results of the study. See the interviews' framing questions in Appendix J.

During the interview discussions, the researcher made all possible efforts to keep a neutral and objective position and to encourage experts to share their opinions, achieving the desired validity of information and sufficient insight into the discussed phenomenon. With this purpose, the researcher

- Asked additional questions to clarify unclear statements and to get more explanation (“Please clarify . . . .” “How would you explain . . . ?” “You said that . . . . Please provide more details.” “What does this mean?” etc.)

- Clarified questions (“You’ve already mentioned the features of the CMS . . . , now I am asking you to describe . . .”)

- Directed conversation toward the points of research interest (“and from the point of view of the information, the content itself”)

- Encouraged participation in the discussion (“Anything else you would like to add on the question three?” “Could you please give an example?”)

Data Analysis

The quantitative part of the data collected in survey and observations was analyzed by using statistical methods to obtain descriptive statistics (variable frequencies, averages, ranges of data, etc.).
The process of qualitative data analysis provides for "making sense out of text" and "involves preparing the data for analysis, conducting different analysis, moving deeper and deeper into understanding the data, representing the data, and making an interpretation of the larger meaning of the data" (Creswell, 2003, p. 190). The interview conversations were audio recorded. The researcher transcribed the interviews to convert their content into textual format. The textual data was classified, categorized, and coded by the researcher with the help of the qualitative analysis software ATLASi. This software is a practical tool to work with large amounts of text. It supports interactive and automatic coding of textual and audio data.

The majority of the collected data was in textual format and was analyzed using content analysis. Content analysis is a set of techniques for making "replicable and valid inferences from texts" about "sources, content, or receivers of information" (Krippendorf, 2004a, pp. 18-25; Schamber, 2000, p. 735). To perform content analysis of the textual data of the interviews and open-ended survey questions, the researcher arranged the data into well-structured, interrelated content categories and sub-categories that are "content bearing units . . . identified in the text" to evaluate, contrast, correlate, and organize them and to obtain broader themes (Schamber, 2000, p. 735). Content analysis of the collected textual data followed the guidelines of a phenomenological approach. The collected textual data was coded by the researcher to produce "descriptive and interpretative narrative," to summarize the "range of experiences related to the phenomenon itself," and to identify "themes that reduce unimportant dissimilarities and integrate the essential nature within various descriptions" (O'Leary, 2004, pp. 124-125).
The researcher followed the procedures suggested by Hinds (2000) and Hernon (1991) for content data analysis:

- Perform initial exploratory data analysis to clarify any questions, to reduce any correspondence biases and non-answers, and to perform other adjustments, ensuring the accuracy of data recording
- Decide on recording unit (word, phrase, characters, etc.) to apply, when needed, to observe the context
- Construct information clusters for analysis
- Code the units to determine the categories, including all relevant units
- Write descriptions explaining the categories identified by the codes
- Count the frequency of the units (Henron, 1991; Hinds, 2000)

Performing analysis of the texts, drawing inferences, and interpreting the results every effort was made for “recognizing meanings,” making the results meaningful to people other than the analyst and keeping the results “relative to particular contexts, discourses, or purposes” in the frames of the research problem (Krippendorff, 2004a, pp. 22-24). As stated by Aldridge & Levine (2001), to generate and analyze responses, “well-chosen quotes” from study participants can “convey the flavour of responses far better than any other rhetorical device” (p. 102). Accordingly, the presentation of results and of the data analysis in chapter 4 provided multiple direct quotations from the survey and interview participants.

Furthermore, as indicated by de Vaus (1995), development of concepts and indicators in research has to be viewed as a continuous process that starts before data collection and continues during data analysis. To ensure a sufficient level of data analysis and its consistency, the researcher performed an ‘ongoing analysis’ of data to make them “parsimonious and illuminating,” shaping the “final product” (Merriam, 2009,
p. 171), maintaining a “chain of evidence,” and following it from the beginning of the study to its conclusions provided for reliability of this study (Yin, 2009).

To accomplish the required consistency, the researcher followed recommendations for analysis of textual content based upon organizational, substantive, and theoretical categories. Maxwell (2005) furnished the following definitions of these categories:

- **Organizational categories** are “broad areas or issues . . . established prior” to the data collection process.

- **Substantive categories** are categories that are “primarily descriptive, in a broader sense that includes description of participants’ concepts and beliefs” and that originate from the collected data.

- **Theoretical categories** “place the coded data into a more general or abstract framework” and “usually represent the researcher’s concepts . . . rather than denoting participants’ own concepts” (Maxwell, 2005, p. 97-98).

At the opening stage of this study, the researcher drafted major themes. These themes were based on the theoretical concepts presented in chapter one and were validated in the literature review. In line with these themes, the researcher developed major categories that were later combined and defined in the codebook. In the next stages of inquiry, the research codebook, the categories and their definitions, and the formulating of the themes went through multiple revisions and changes.

Another important feature of the performed data analysis was that, with the categorizing instruments described above, the data analysis used connecting strategy to draw relationships between identified categories and sub-categories of textual data. Bringing together categorizing through connecting strategies not only focuses research on “similarities” of categories and sub-categories but also allows the researcher to “look for relationships that connect statements and events within a context into a coherent
whole” (Maxwell, 2005, p. 98). Krippendorff (2004a) noted that drawing inferences is a ‘centerpiece’ of a content analysis. This consistent content analysis strategy and well-organized categories allowed the researcher to draw inferences and resulted in a conceptual framework organized into themes supporting the research findings. Various sections of chapter four provide more insight into the evolution of the study’s data analysis and the organization of its results.

**Validity and Reliability**

In a qualitative study, validity and reliability do not follow the same patterns that are practiced in a quantitative study. Maxwell (2005) specifically stressed the validity’s importance in qualitative research and said that, compared with quantitative research, this type of research rarely gives to the researchers the available in quantitative research “benefit of previously planned comparisons, sampling strategies, or statistical manipulations that “control for” plausible threats” (p.107). In qualitative research, researchers must “rule out most validity threats after the research has begun, using evidence collected during the research itself,” by identifying “specific” threats, and by addressing those “validity threats” (Maxwell, 2005, p. 107). Merriam (2009) addressed validity and reliability and discussed different opinions that exist in the literature. The author said that with the range of types of qualitative research, there are “bound to be differences in criteria for validity and reliability” (p. 211). Creswell (1998) discussed the qualitative and methodological approaches to validity, or “verification,” that he observed in the literature. He indicated that validity should be seen as strength of a qualitative research and that researches have to follow procedures and techniques
to establish the credibility of their qualitative research (Creswell, 2003). This author also stated that although generalizability (discussed in the next section of this chapter) and reliability play not that significant roles in qualitative inquiry, qualitative research needs to follow procedures to ensure the accuracy and reliability of the findings (Creswell, 2003). To support the study’s internal validity and reliability and its results, the researcher carefully observed the following reflections:

- Preliminary to “embarking” on the study, the researcher examined personal assumptions and biases about the research phenomenon to get it “bracketed or temporarily set aside,” to “isolate phenomenon in order to comprehend its essence,” and to examine “consciousness itself” (Merriam, 2009, p. 25-26) and to achieve objectivity in the “conclusions based on observable phenomena; not influenced by emotions, personal prejudices, or subjectivities.” (O’Leary, 2004, p. 58)

- The researcher “spent prolonged time in the field” that helped to develop “in-depth understanding of the phenomenon under study” and permitted the researcher to “convey detail about the site and the people” that increased the credibility of the study. (Creswell, 2003, p. 196)

- The researcher applied theory triangulation that can serve as a supporting strategy to obtain validity (Tashakkori & Teddlie, 2003). The study employed a combination of discussed in chapter one theoretical concepts and tested in the literature models of creating research domains and categories.

- Triangulation was also employed in data collection and data analysis. Different data collection techniques combined quantitative and qualitative tools, obtaining fuller information and clarifying the segments of data received through one
technique with the help of another technique, thus performing ‘complimentarity,’ gaining information redundancy on a target phenomenon, and drawing conclusions about the validity of results (Sandelowski, 2000). Employing more than one source of data helped to confirm the “authenticity of each source” and to explore the “commonalities and divergences” (O’Leary, 2004, p. 51). A combination of several data collection tools allowed for more in-depth study of the research problem. Multiple sources of evidence supply strength to the study, allow to address a broader range of issues, and develop “converging lines of inquiry” with “multiple measures of the same phenomenon.” (Yin, 2009, pp. 115-117)

- The survey and interview questions were organized by utilizing selected elements from previously tested questionnaires and from survey instruments encountered in the scholarly literature related to the research topic.
- The research performed a pilot survey test. Furthermore, during the first round of interviews, the experts expressed their opinions and suggestions about the survey questions that were furnished to them ahead of time of the interview. Following the pilot survey and the experts’ comments, corrections and edits were inserted into the final survey protocol.
- The received to open-ended survey questions answers that were unclear and required further explanation and interpretation were submitted to experts after the second interviews. The experts provided their comments and opinions in writing about the meaning of those answers. If two or all three experts commented “no idea,” or “no clear idea about answer,” or “I’m not sure what this means,” the answer was eliminated from the textual data under analysis. Use of peer debriefing enhances the accuracy of
qualitative studies (Creswell, 2003). The experts’ explanations were furnished, when appropriate, within the results of the survey content analysis.

- To ensure internal validity of the results of the data analysis, the researcher applied, through the course of the study, member checks or respondent validations. To perform member checks, the researcher solicited feedback on findings that emerged from the data collected during the two rounds of interviews (Merriam, 2009). The experts provided their comments on the findings in verbal and written form. Some examples of the received comments include the following: “This is an accurate transcription, I was indicating that …”; “This answer is referring to …” “accurate quote, indicating that …”; “I am not sure about this quote.” The experts’ comments and clarifications helped to rule out the possibility of the researchers’ misinterpreting the meaning of the collected data and to capture better the attitudes, perspectives, and standpoints of the study’s participants.

- The researcher utilized a neutral approach to “critically evaluate the nature and credibility of the knowledge produced, given named agenda and subjectivities” and to eliminate any subjectivity” (O’Leary, 2004, p. 59). Every possible effort was made to ensure that the researcher followed recommendation of the ethical treatment of respondents and of authenticity in data collection. (O’Leary, 2004)

To establish the reliability of the measures of the content analysis, the researcher developed the following procedures to obtain the finalized themes and categories:

- The researcher’s study of the textual materials of the survey’s open-ended questions and interview transcripts included multiple testing, re-codings of, and changing of the coding scheme that resulted in editing of the categories’ definitions,
adding to new categories, splitting and combining categories, etc. Thus, the researcher achieved high consistency to increase intracoder reliability or “reliability within a single coder” (Johnson & Christensen, 2000, p. 428);

- After the second round of interviews, the categories and their definitions were discussed with experts and revised according to their recommendations. For instance, an expert suggested changing the name of a category from Collaboration and Communication to Cooperation and Communication and supported the suggestion with definitions of the terms ‘cooperation’ and ‘collaboration.’ Another expert recommended adding the word ‘Qualifications’ to the category Responsibilities and to make this category “Qualifications and Responsibilities” because this better reflected the description included in the definition of this category. All the experts agreed that there was no need to separate ‘Content Management and Technology,’ ‘Difficulties,’ and ‘Suggestions’ into separate categories;

- Furthermore, as suggested by Neuendorf (2002), to establish the reliability of the content analysis measures, there is a need to assess the “amount of agreement or correspondence among two or more coders” (p. 141). “Agreement looks at whether or not coders agree as to the precise values assigned to a variable across a set of units” and looks at similarities and disagreements in the coders’ results (Neuendorf, 2002, p. 144). Employing more than one coder and measuring intercoder agreement is essential to demonstrate that the results of the analysis are not “skewed by a single coder’s subjective judgment and bias” (Spurgin & Wildemuth, 2009, p. 301). Accordingly, the researcher performed an intercoder reliability test of a random sample of 40% of the responses to the open-ended questions of the survey. For this test, the researcher and
an independent coder worked independently of each other and applied the same coding instructions to the “same set of units of analysis” (Knippendorff, 2004b, p. 414). The independent coder was recruited from former GLAs, was employed in the migration to the CMS, and used the CMS at the next stages of the project. This ensured that the coder was familiar with the research settings. Prior to coding the textual data of the survey’s open-ended questions, the coder received comprehensive training, and instructions, and a detailed description of the coding scheme and categories. The minimum acceptance level of the reliability agreement coefficient was chosen following the guidelines from Neuendorf (2002), who stated that “reliability coefficient of 0.90 or greater world be acceptable to all and 0.80 or greater would be acceptable to most situations, and below that, there exists greater disagreement” (p. 143). The overall intercoder reliability agreement was calculated at 98.56%. The highest intercoder agreement (100%) was observed for the categories of Cooperation and Communication, Consistency and Standardization, Flexibility, Information Services, Learning, Time, and Web Design. The lowest intercoder agreement was recorded for the category Qualifications and Responsibilities (92.95%). A detailed matrix of intercoder reliability data by categories is presented in the Appendix K.

Generalizability

As indicated by Neuendorf (2002), generalizability relates to “whether the results of a measure can be extrapolated to other settings, times, and so on” (p. 115). This author also stated that it is “important to ensure replicability, the ability of others to repeat the study with a different set of messages” (Neuendorf, 2002, p. 115). This
statement was supported by Merriam (2009) who said that it is important to “enhance the possibility” of “transferring” of the results of a qualitative study to other settings (p. 227). Maxwell (2005) discussed encountered in the literature characteristics of the qualitative research design that provide credibility to the generalization of qualitative studies (pp. 115-116). This author noticed that none of the attributes of qualitative research “permits the kind of precise exploration of results to defined populations that probability sampling [applied in quantitative research] allows” (Maxwell, 2005, p. 116). Furthermore, Maxwell (2005) stated that “external generalizability is often not a critical issue for qualitative studies” and is a “separate issue from validity proper” (p. 115).

In this research, generalizability or external validity of the research was supported with several measures. Following the described by Merriam (2009) strategies for increasing generalizability, this study:

- Provided a “highly descriptive, detailed presentation of the settings.” Chapter three gives a description of the research settings, which is supported by the original materials retrieved from the libraries’ and the university’s websites and other sources. Some of these documents are presented in the appendixes.
- Organized a comprehensive description of the study sample with demographic data from the survey (age, education, years of experience in the LIS field, years of work as a subject librarian, web development experience, and other characteristics), description of the participants’ job responsibilities, and other descriptions.
• Provided a “detailed description of the findings with adequate evidence” that was presented in the form of quotes from the survey’s open-ended questions, the participants’ interviews, email correspondences, and others (Merriam, 2009, p. 225).

• Furthermore, the meaningful survey and interview protocols were constructed based on the theoretical constructs, literature findings, and elements of research design instruments applied in the observed literature studies. Additionally, the researcher concentrated on the similarities and differences between the findings from the literature and the results of data analysis obtained in this research. The above considerations were targeted to enable compatibility with a potential research context and to provide sufficient information to determine if the research findings can be “transferred” to other settings.

**Ethical Issues**

Last, but not least, this section of the chapter discusses ethical considerations. The study was organized in strict correlation with the ethical guidelines for a qualitative study. These considerations were applied in the research design at all stages of this study to follow the required procedures and adjustments and to “take account of legitimate concerns about the interests” of the participants of the study (Gorman, Clayton, Shep, & Clayton, 2005, p. 44). The research was guided by prerequisites of confidentiality. For qualitative research, these prerequisites mean “concealment of individual identity” and treating of all the “lists of names and places” related to the research as “confidential documents,” keeping them no “longer than is necessary” (Gorman et al., 2005, p. 44). Because the research required data about human objects
and consistency with federal regulations, as it was indicated earlier in this chapter, the study applied for the approval of the UNT Institutional Review Board (IRB) prior to the data collection stage.

Chapter Conclusion

This chapter provided a description of the method and the methodological instruments used in this study. This exploratory research applied a phenomenological approach and employed various techniques described in this chapter to achieve validity and reliability. As indicated in this chapter, this study applied well-documented data collection and analysis techniques for exploring the authors’ attitudes about organizing information services with CM (Babbie, 2001; Creswell, 2003; Krippendorf, 2004; Merriam, 2009; Maxwell, 2005; Strauss & Corbin, 1998, and others). The chapter also presented an overview of ethical and organizational issues associated with this research. The research design and methodology described in this chapter contributed to a better understanding of the perceptions of subject librarians in authoring web content with CM technology.
CHAPTER 4
DATA ANALYSIS AND RESULTS

Introduction

This chapter presents the results of the online survey of subject librarians and the two rounds of expert interviews. The section Survey Analysis provides the demographic characteristics of the sample population from the demographic section of the survey of subject librarians, descriptive statistics, and discusses the results of the content analysis of the open-ended questions of the survey. The section Interview Analysis discusses the results of the content analysis of the two rounds of interviews. In some places, the results of the content analysis of the open-ended survey questions and the interviews are accompanied by the corresponding results from the quantitative section of the survey. The qualitative data is presented by themes and categories of content analysis.

Survey Analysis

Demographic and Descriptive Data

The survey was distributed among 30 subject librarians of the UNT Libraries. The response rate was 77.4% (n = 24). Table 7 demonstrates how the group was divided by age. There were no participants who did not answer the age question. 46% survey participants were 55-64 years old; 20.8% of the participants were 26-34; 20.8% were 45-54, and 12.5% were 35-44. There were no participants in the age groups 18-25 and 65+.

All of the survey respondents (n = 24) have a master’s degree in the LIS field (MLS or equivalent). Additionally, 88% (n = 21) of the participants have a degree in
other subject areas. Table 8 presents data about education in other fields besides the LIS field. Ten participants have Bachelor’s, 8 have Master’s, and 2 have Doctoral degrees.

Table 7

Age Demographics of Survey Participants

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-25</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>26-34</td>
<td>20.8%</td>
<td>5</td>
</tr>
<tr>
<td>35-44</td>
<td>12.5%</td>
<td>3</td>
</tr>
<tr>
<td>45-54</td>
<td>20.8%</td>
<td>5</td>
</tr>
<tr>
<td>55-64</td>
<td>45.8%</td>
<td>11</td>
</tr>
<tr>
<td>65+</td>
<td>0.0%</td>
<td>0</td>
</tr>
</tbody>
</table>

answered question 24
skipped question 0

Table 8

Degrees in Fields Other Than the LIS Field Subject Areas

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currently student</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Bachelor’s</td>
<td>47.6%</td>
<td>10</td>
</tr>
<tr>
<td>Master’s</td>
<td>38.1%</td>
<td>8</td>
</tr>
<tr>
<td>Doctoral</td>
<td>9.5%</td>
<td>2</td>
</tr>
<tr>
<td>Certification</td>
<td>4.8%</td>
<td>1</td>
</tr>
</tbody>
</table>

answered question 21
skipped question 3

The group under study had extensive work experience in the LIS field. Figure 2 presents the distribution by number of years worked in the LIS field. 8.3% of the respondents worked for 3-4 years, 25% worked for 5-9 years, 25% worked for 10-19
years, and 42% ($n = 10$) worked for over 20 years. None of the survey participants worked in the LIS field less than three years.

![Pie chart showing distribution of years worked in LIS field](chart.png)

*Figure 1. Number of years worked in the LIS field ($n = 24$).*

Table 9 presents data on the number of years of experience working as a subject librarian. Almost 30% of respondents ($n = 7$) worked as subject librarians for 10-19 years, and 17% ($n = 4$) of respondents have over 20 years of experience as subject librarians.

Table 9

<table>
<thead>
<tr>
<th>Number of Years of Experience as a Subject Librarian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answer Options</td>
</tr>
<tr>
<td>Less than 1 year</td>
</tr>
<tr>
<td>1-2 years</td>
</tr>
<tr>
<td>3-4 years</td>
</tr>
<tr>
<td>5-9 years</td>
</tr>
<tr>
<td>10-19 years</td>
</tr>
<tr>
<td>20+ years</td>
</tr>
<tr>
<td>Response Count</td>
</tr>
<tr>
<td>8.3%</td>
</tr>
<tr>
<td>8.3%</td>
</tr>
<tr>
<td>16.7%</td>
</tr>
<tr>
<td>20.8%</td>
</tr>
<tr>
<td>29.2%</td>
</tr>
<tr>
<td>16.7%</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

answered question: 24
skipped question: 0
Table 10 demonstrates that at the time of survey, 22 survey participants maintained at least one subject guide. 75% of respondents ($n = 18$) said that they maintained two or more subject guides at the time of the survey. Seven participants from those maintained four or more subject guides.

Table 10

**Number of Subject Guides Maintained at Time of Study**

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>One subject guide</td>
<td>18.2%</td>
<td>4</td>
</tr>
<tr>
<td>Two subject guides</td>
<td>27.3%</td>
<td>6</td>
</tr>
<tr>
<td>Three subject guides</td>
<td>22.7%</td>
<td>5</td>
</tr>
<tr>
<td>Four or more subject guides</td>
<td>31.8%</td>
<td>7</td>
</tr>
</tbody>
</table>

*answered question: 22  skipped question: 2*

Furthermore, 74% of respondents had worked with older formats of the guides. 53% of these respondents worked with both print and online formats of the guides, 12% worked only with print format, and 35% worked only with online guides in the old format. Additionally, 26% of respondents worked only with the new format of the guides’ web pages.

Table 11 shows the diversity of the survey group in years of experience in web development, with the number of respondents distributed evenly among the number of years. Slightly over one-fourth of respondents ($n = 6$) had 1-3 years of this experience, and the same number of respondents had over 10 years of this experience.
Table 11

*Years of Experience in Web Development*

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3 years</td>
<td>26.1%</td>
<td>6</td>
</tr>
<tr>
<td>4-6 years</td>
<td>26.1%</td>
<td>6</td>
</tr>
<tr>
<td>7-9 years</td>
<td>21.7%</td>
<td>5</td>
</tr>
<tr>
<td>10 or more years</td>
<td>26.1%</td>
<td>6</td>
</tr>
</tbody>
</table>

answered question 23
skipped question 1

The survey respondents informed the researcher about their knowledge of web design and development tools. 38% \((n = 9)\) of respondents \((n = 24)\) said that they are beginners in web development, and 62% \((n = 15)\) of respondents characterized their level as intermediate. Figure 3 demonstrates that 80% of survey participants had practical experience with MS FrontPage and 63% with HTML. 42% of respondents had experience with Dreamweaver or Cascading Style Sheets (CSS). Only 13% of respondents \((n = 3)\) had experience with XML.

Finally, 80% of survey participants did not have any experience with a CMS before migration to the Plone CMS platform. At the time of the survey, one-third of the survey participants used the CMS once per week, and another one-third used the CMS once every couple of weeks. Additionally, 13% of participants used the CMS once per month, and 26% of the participants reported that they used the CMS once or twice per year. Furthermore, 14% of respondents update the subject guides monthly, 63% quarterly, and 23% annually.
In answer to the survey question about which factors they consider in selecting the resources to be included in the content of the subject guides, all 22 respondents to this question said that they take into consideration usefulness of the resources for the purpose of the subject guide. Eighty-six percent of respondents said that they consider current course curriculum, 82% consider requirements of academic departments, and 77% said they take into account reference questions they receive from patrons.

When asked to rate factors by importance for the efficient use of the CMS, the survey participants who answered to this survey question (n = 23) gave the highest rating to training in the CMS provided at the libraries and to cooperation with other library employees (see Figure 4 for the factors’ average rating).
Figure 3. Average rating of factors for the efficient use of the CMS. (Values based on a 5-point scale where 1= unimportant and 5= very important.)

Content Analysis of the Survey Open-Ended Questions

The last section of the survey included open-ended questions. Table 12 represents the response count of the open-ended questions. The level of participation in the open-ended questions was high. In average eighteen participants or 75% of survey participants (n = 24) answered each of these questions. Some of the answers were not valid and were excluded from the data under analysis. Table 12 demonstrates that Questions 28 and 32 brought the highest numbers of valid responses.

In addition, Table 12 demonstrates that the number of responses dropped from 20 to 17 in Questions 29, 30, and 31. The decreased number of responses to Question 29 can be explained by the fact that Question 29 looked relatively more complicated and required more time to answer. The decrease observed in the number of responses to Questions 30 and 31 can be explain by the nature of these questions, which
expected a predictive, exploratory, or analytical approach and some general knowledge of CM and its applications.

Table 12

Response Count of the Survey’s Open-Ended Questions

<table>
<thead>
<tr>
<th></th>
<th>26</th>
<th>27</th>
<th>28</th>
<th>29</th>
<th>30</th>
<th>31</th>
<th>32</th>
<th>33</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Response Count</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of valid answers</td>
<td>19</td>
<td>17</td>
<td>20</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>Number of respondents who skipped the question</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>4</td>
<td>12</td>
</tr>
</tbody>
</table>

Some responses to Questions 30 and 31 support the above inference: “I don’t feel like I have enough experience yet to answer this” or “I can’t think of specific improvements.”

A significant drop was observed in the number of responses to Question 33, which asked survey participants to share additional information they wanted to provide on CM and CMSs.

The next section of this chapter presents the results of the content analysis of the open-ended question of the survey by item/question. Each item starts with the list of categories used to code the answers to the question. See Appendix L for the definitions of categories. As indicated in chapter 3, the answers to the open-ended questions that caused doubt in interpretation were clarified with the experts. These clarifications are presented in the following section in the appropriate survey items. In the section below, each heading represents a survey question and lists the categories applied in the analysis of that question’s responses. The categories are listed in the order they appear in the text of the narrative and, where possible, from most to least frequently used. See
report on category frequencies by survey question in Appendix M. The category *qualifications and responsibilities* was identified by the highest overall number of frequencies in the answers to the open-ended survey questions, i.e., 42. It was followed by the category, *system*, with 39. The lowest frequencies number was generated by the category *speed* (4); this was preceded by the categories *information services, learning,* and *web design* at 9 each.

How the CMS Assisted Maintenance Differs from the Previously Used Process

**Categories:** Consistency and standardization, system, flexibility, ease of use, qualifications and responsibilities, web design

The respondents’ valid answers to this question (n = 19) were divided into four distinctive groups: 26% of the responses (n = 5) allowed implication respondents’ positive attitudes, 21% (n = 4) of the responses expressed clearly negative attitudes, 37% (n = 7) showed both positive and negative attitudes, and 16% provided a statement without expressing any attitude. One participant worked only under the new CMS system (“I only have used Plone”), and another participant just started working at the department and had not created or maintained a subject guide at the time of the survey. The above two responses were excluded from the count.

Consistency in look and feel of the site and quality of layout and content reflected in the coherence of the style and design are one of the assets commonly brought by CM into a site’s strategic value (Vidgen, et al., 2001). More than half of the survey respondents to this question (n = 10) said that CMS brought with it more Consistency and Standardization and “allows for standard organization of guides,” characterized by one respondent as “more uniform appearance.” Under the new system, “everyone must
use the same format.” One respondent stated that Front Page permitted “less uniformity,” which was clarified by another respondent saying,

We now have templates for subject guides instead of each librarian creating guides with a different design. The result is consistency in headings, font size, and color, spacing, and other design aspects. Our subject guides now look much more professional.

One survey respondent stated, “The guides look the same, which provides consistency for the users and a unified look for library.” Another participant said that the new subject guides’ “consistent look and feel” is “beneficial for the users.” The CMS’s “standard organization of content and tabs” makes the web pages of the subject guides “more structured.”

The survey participants expressed their opinion about the applied system. One participant thought that Plone (the CM platform applied by the Libraries) is “very clunky as a CMS.” A participant expressed a certain degree of frustration about how the process differs from the previous one and said, “Must struggle with awkward and poor features of Plone system.” After the introduction of the CMS, a librarian found it “difficult to do things we were able to do in the past.” One more librarian thought that “it can be difficult to get the pages to do what you want.” One librarian discussed a specific issue with adding assets to a webpage within a subject guide, specifically a PDF file uploaded to Plone, and expressed dissatisfaction that the process is lengthy and complicated. Another librarian noted that the new system’s attributes allow dividing of information into “easily indexed chunks of information (if thought out correctly by the librarian when the guide was made).”

More than three of the valid answers to the question about how CMS assisted maintenance differ from the previously applied process used the term “flexibility” in
some context. Flexibility of a system is defined by R. Taylor (1986) as the “capability of the system to provide a variety of approaches for working dynamically … in a wide variety of ways useful to the client” and adapted to his/her needs and styles (p. 66). One participant said that with the new system, there is “little flexibility.” Another participant indicated that the previously used software MSOffice Front Page “permitted greater flexibility,” which correlates with the answers of other participants who said that under the new system, maintenance of the subject guides is “less flexible” and that there is “less freedom in the page design.” Additionally, two survey responses to this question expressed opposite opinions about differences observed in their work with the content of the web pages. One indicated that the CMS provides “better flexibility of content design”; it was noted by another that there is “less flexibility in adding content” under the new system.

Cooper (1982) named ease of use as one of the prime considerations in evaluating the effectiveness (defined by Cooper as user satisfaction) of an automatic system. In R. Taylor’s (1986) user criteria of choice and value added in information systems predicting user benefits and costs, ease of use of a system is related to “physical accessibility” but also describes the “perceived comfortableness of use” and has to deal with “system elements which, in physical, human, or software terms, tend to reduce difficulty in using the system” (pp. 52-55). The survey respondents said that the CMS simplifies the process of maintaining subject guides and makes this process faster and easier. The respondents named some specific CMS features that made the process easier. For example, use of CMS makes it “easier to update” the subject guides. Another respondent added, “I like the idea of updating one piece of information,
and all the other places the information appears; the CMS updates it automatically.”

One more respondent said, “Now, when I spot a typo, I can fix it.” Survey participants connected their answers with qualifications and responsibilities. They discussed the need of HTML knowledge to use the CMS. Although one respondent stated that, generally, there is no need to know HTML, another respondent referred to Web Design and said that compared to the previously used system, the “CMS templates are harder to work with” and that one has to “know HTML to do any formatting that's different from basic.”

Difficulties in Migration to the New System

**Categories:** Learning, time, ease of use, qualifications and responsibilities, system, flexibility, content, consistency and standardization, cooperation and communication

According to Cooper (1982), the effort involved in learning an automatic system and the time spent by the system users in performing various operations are among the important criterion for evaluating the effectiveness (user satisfaction) of the system. Learning the new system was a prevailing category in the survey participants’ answers about difficulties in migration. This category appeared in 35% of valid answers. Qualifications and responsibilities was another category frequently discussed by the respondents (35% of valid answers). Time was one more frequently discussed category (29% of valid responses). Furthermore, two answers stood out because they reported no difficulties. One of them said that the migration was “pretty easy” and another stated that “nothing” in the migration to the new system was difficult.
For many respondents, the most difficult aspect of the CMS was “learning how to get it to do what I want it to do” or “learning the mechanics of a new system” and “trying to figure out the functionality of the system while migrating,” as indicated by three different respondents. It can be implied that learning was difficult because of the “myriad rules of the CMS” mentioned in one answer.

When discussing difficult aspects of migration, librarians also addressed issues related to qualifications and responsibilities (35 % of all the valid answers). One respondent noticed, “Workload related to other job duties did not decrease during the migration.” Another participant commented, “Some subject librarians have a variety of duties and tasks to perform on a daily basis; to migrate the info was done around these other tasks/duties.” Subsequently, integrating the migration activities into the overall workload was challenging. One participant saw problems in migration when the content of the web pages had to be reduced and he or she had to perform operations for the content that would be “extensively weeded.” For another survey participant, the most difficult part of the migration was “stripping all content down,” which could mean that it was difficult for this librarian to distribute the existing content among the tabs of the new template. Survey participants also mentioned distributing responsibilities in migration. One participant said that GLAs “actually did most of the migration.” Another participant added that GLAs were “incredibly helpful with doing the raw copying and pasting over to the CMS,” thus saving the librarians’ time.

One librarian provided a generalizing opinion about features of the new system characterizing them as “all those poor features.” Additionally, another respondent saw the most difficult aspect of the migration process in “creating graphics” in the new
system. One participant mentioned flexibility of the new system because he or she was having difficulties with the “lack of flexibility in fonts and layout” in the new CMS.

Almost thirty percent of the answers mentioned time. The survey participants clarified what challenges they had with time. For one participant, the difficulty was in “finding the time to move content over. I work best with several free hours to do web things.” Another participant said, “Finding the time for training is always difficult. The Multimedia Development Lab staff did provide several class training opportunities and tutorials” and added that finding time to “train the graduate library assistants … was more challenging.” Furthermore, one participant also said that he or she had to find “time” to perform the migration process and to “fit it in” their busy schedules as the “workload related to other job duties did not decrease during the migration” thus referring to qualifications and responsibilities involved into the process. As stated by another, the migration brought “just more busy work.” Furthermore, the librarians maintained different numbers of guides that contained different numbers of pages and had to migrate these to the new CMS. Subsequently, “some librarians quickly moved their content and some did not.”

The above survey participants’ comments correlate with the statement by Morris and Bosque (2010) who said that “scholarship indicates librarians perceive maintaining online guides as an additional burden to their busy professional lives” and suggested that new technologies “specifically Web 2.0 tools, offer the chance to reduce this burden” (p. 190).

A participant noticed that there was more content on the previous web pages than could be accommodated in the new template. Another stated that his/her major
problem was in “deciding my own guide structure” that might be because of the necessity to follow the requirements for consistency and standardization in the web pages.

One participant associated difficulties in migration to the new system with cooperation and communication. To organize the content of the subject guides, the librarians used the template developed in the CMS. The participant informed that “agreeing (among all the subject librarians and reference staff) on a template flexible enough for all of us to use” was one of the most difficult aspects of the migration to the new CMS platform.

Benefits Introduced by the CMS

**Categories**  
Ease of use, qualifications and responsibilities, consistency and standardization, speed, cooperation and communication, system, content

In general, the answers to this question (85%) were positive with a brief or more detailed discussion of the observed benefits. Some answers not only listed the benefits but also expressed the need for improvement on both the work on the guides and the guides themselves. Two negative answers were recorded: one participant answered “none,” and another said, “Busy work, time wasted trying to figure out why it’s saving [after exiting the edit mode] weird.” This answer did not seem to address the survey question directly. Additionally to the mentioned above negative answers, one answer expressed some frustration or dissatisfaction: “The ONLY benefit is searchability, and, like I said, if the content was not thought out by the librarian and cut into reference chunks and indexed with the right keywords, then chances are searchability fails also.”
In coding the answers to this question by the categories of content analysis, the categories consistency and standardization and ease of use had the highest outcome. The category consistency and standardization yielded 40% of the responses. Furthermore, forty percent of responses to the question related the benefits of using the system to simplicity or straightforwardness and were coded in the category ease of use. Twenty percent of respondents that talked about the advantages brought with the CMS into their work activities, the distribution of responsibilities among the librarians and other employees using the CMS, and the skills evolved in utilization of the CMS were coded under the category qualifications and responsibilities. Additionally, out of the 20 total answers to this question, three named speed as a major benefit that the CMS brings into their work on the subject guides. This prompted to create a new category, speed. It has to be noticed that the tendency to mention speed and making the processes faster or quicker was traced in the answers to Question 26 but was not distinct enough to create a separate category.

Further, discussing the benefits brought by the CMS into their work different, participants commented about the ease of use of the system in general, saying that, “overall,” the CMS “makes things easier,” that the “production is much easier,” and that the system has “ease of use.” Finally, one participant indicated, “I find, as far as the basics go, it is very easy to use.” The survey respondents named particular attributes of the system that are easy to use: “updating can be done as needed,” “very easy to update and edit” and to “make a single update, like adding or deleting an item” and “changing links throughout is easier.” In the study of Black (2011), the content providers saw the “intuitive user interface, the system ease of use, specifically the ease of
previewing and publishing content” as major advantages of a CMS. (p. 188).

Furthermore, survey participants discussed consistency and standardization as one of the benefits brought by the system. One respondent gave a one-word answer – “standardization.” Another participant said, “Some people would say uniformity was a plus?” One expert said about the implied meaning of the former answer, “The question mark indicates that this person doesn’t necessarily agree that uniformity is an improvement.” Another expert added, “Consistency is good, but the inability to really customize the subject guide, to make it unique, means that users [end-users] are not reading what we think is important.” Two other survey participants gave more details in their answers, saying that the CMS had “defined the format of the subject guide and the categories of information to include” and that it “ensures I am completing work consistent with library standards.” Furthermore, two respondents saw the benefits of the template because “all the pages look alike” with the template, and the template helps “with library liaisons to present consistent info. Related to the academic areas.” It was also noticed that “working with folders can make the process more logical,” which refers to the folder structure used within the system to organize the content. The participants of the Black’s (2011) study also mentioned consistency of design across all the website’s pages as an advantage of CM.

According to several respondents who discussed qualifications and responsibilities, the CMS helps them to concentrate on their primary tasks and to divide responsibilities among the members of the work team. It also requires new qualifications to work on the web pages. Several respondents appreciated that the CMS allows them to concentrate on the authoring of the content “without being
distracted by formatting issues.” One librarian noted, “I don’t have to think about the page design and can concentrate on the content, which is my expertise.” The benefits are seen in that the “subject librarians can update their own pages, so that librarians can independently work on content in a timely manner. Besides, there is no “need to remember so much on the formatting issues” when working with the CMS. The librarians can also “have someone else check links.” The survey participants saw benefits in the distribution of responsibilities and the qualifications needed to work with the CMS and stated, “People preparing simple pages don’t have to know FrontPage or HTML; those preparing more advanced pages need to know HTML.” Furthermore, some duties can be delegated not only to other employees but also to the system, for instance, the “automatic updating.” One respondent described librarians’ responsibilities to improve the system’s “searchability,” which he or she named as the only benefit brought by the CMS into the work on the subject guides. It was stated that librarians have to correctly organize content and to cut it into “reference chunks and indexes with the right keywords” to ensure a sufficient use of the search tool.

When discussing benefits brought by the CMS to their work, survey participants also gave answers coded under the categories speed, cooperation and communication, and content. One respondent said that a benefit of the CMS was its ability to make things “quicker.” Another respondent said that, besides being easy to do, it is also quicker to perform an update in the CMS. Another survey participant named as a benefit the “speed with which I can populate and post a webpage in response to student and faculty needs.” Among other comments, one librarian expressed his/her opinion about the content of the guides’ web pages: “Sometimes I wish I could make them [web
pages] more attractive and implement more Web 2.0 items.” However, this librarian did not provide more details that could lead to further implications.

Information Services: Lessons Learned

*Categories:* Information services, system, consistency and standardization, qualifications and responsibilities, speed

The category qualifications and responsibilities was significant in 41% of the responses in discussion of lessons learned. Furthermore, the category cooperation and communication was newly introduced in this question. It is important to note that, initially, the research did not plan to develop the theme of cooperation. This category emerged from the data obtained during the data collection. The analysis of the data that fits into this category demonstrated the importance of cooperation of librarians with other library staff, university departments (including the academic departments), end-users, and the community. See discussion about cooperation and communication in use of the CMS farther in the chapter.

Survey respondents stated that with the CMS, information services are “patron-centered” because the CMS “allows the services to be much more responsive to patron needs on the library website.” The CMS allows visitors to “find information in indexed reference chunks—if indexed and tagged as such by the librarian.” One participant stated, “It [the CMS] had made my instruction more organized and easier,” and another noted, “Creating subject guides prompts me to identify current reference sources for my academic areas.” Another respondent’s lesson learned was “the need to prepare short pages with short entries” when providing information services using the CMS.
Describing lessons learned, survey participants characterized the System as an “essential tool for information services.” However, the CMS is “still a very hands-on process; you have to make most changes by hand rather than being able to make global changes.” In answer to all the three sections of Question 29, one respondent stated, “Get a better CMS.” Perhaps the feelings expressed in that answer can be explained by the fact that, as indicated by another survey participant, the system “didn't deliver as promised.” The experts clarified the former statement. One of them said, “We were promised a LibGuides 'like' interface, look and feel. While it has some LibGuides characteristics, it’s not close enough.” Another expert added, “Plone did not make possible all of the features/functionalities that the Users Interface Unit told us it would have.”

Additionally, among the lessons learned, one librarian named the “importance of standardization” that was confirmed by another participant who observed that the guides’ web pages “consistent look and feel” made it “easy to go to one guide and then another and know what to expect.” Both answers referred to consistency and standardization.

Some respondents mentioned qualifications and responsibilities: one suggested that the template allowed librarians to distribute the responsibilities in creating the web pages, so “students can assist in producing pages by simply entering the content created by librarians into the templates;” another added that with the CM platform, “less web design ability is needed by info services staff.” Distribution of responsibilities and delegation of work was seen as a benefit by one librarian, which “means we can create new web pages speedily.”
Technology/Web Design: Lessons Learned

Categories: Web design, qualifications and responsibilities, cooperation and communication, consistency and standardization, learning

Logically, the category web design was significant in 41% of the responses about the lessons learned in web design. As stated by a participant, the “web design looks more attractive with a CMS, which provides templates and limited design choices for librarians who are not knowledgeable in web design.” Among the lessons learned in web design, a participant perceived the “importance of authoring tools.” It has to be noted that the survey participants’ answers about the web design tools available within the CMS expressed a certain degree disagreement with each other. For instance, one stated, “Many tools [are] available.” On the other hand, another participant characterized web design as “very restrictive unless you are knowledgeable in HTML.” Additionally, one participant’s statement, “Quick and easy to add content and update” using the CMS web design tools, somehow disagreed with another participant who learned the lessons of the “limitations imposed by the CMS/Plone.” Another comment concerning lessons learned in technology and web design under the CMS stated, “Uniform but ugly.” The feeling of not getting what was expected from the CMS in the area of technology and web design was in another participant’s comment: “Busy work. We were promised that the information would only have to be updated one place and that was not true.” This comment was interpreted by one expert as, “We were told that global changes would be possible, but Plone hasn’t had that functionality as implemented” under the current CMS.

Furthermore, among the lessons learned in technology/web design from the point of view of qualifications and responsibilities was that under the CMS, “Subject librarians
can spend more time identifying and annotating subject-specific resources, which is their expertise,” and that “it was helpful to have GLAs assist in migrating content from old to new subject guides.” A conclusion was made about the qualifications acquired in web design: “I have learned more about web design with this than in library school.” Another respondent stressed the “need to know HTML” to carry on web design under the CMS. One of the lessons learned was that “standardization of design is desired.”

Finally, in answer to the question about lessons learned in the area of web design using the CMS, a librarian wrote, “It is very important for the CMS administrators to meet with librarians to understand what they need on their web pages before templates are created.” This answer was coded under the category collaboration and communication. As indicated above, this category received more in-depth attention in the next sections of this chapter. A librarian emphasized the importance of training in web design and noticed that time spent for training library staff should result in “less ‘help calls’ later.”

Organization of Content/Information: Lessons Learned

**Categories:** Content, consistency and standardization, cooperation and communication

Describing the lessons learned from creating the content/information using the CMS, the librarians recognized that applying the CMS influenced the content. They noted that there is “not much flexibility” in the content, but the system helped to obtain a “consistent look and feel for users.” One participant stated that the use of CMS “has made my content more organized as well as my ability to teach classes” perhaps because well-organized information on guides’ web pages can be easily integrated into
class presentations. Librarians also commented that in authoring content, one “must think before you write” and keep the content “simple.” It is important how content is organized and tagged. One librarian’s lesson was in recognizing the “importance of use of Web 2.0 tools for feedback related to improvements.” Two experts commented on this statement, saying that the answer is “discussing the lack of Web 2.0 tools” and that “Web 2.0 tools are important for getting responses from patrons on whether improvements are helpful or not.” Another participant’s lesson learned was the “need to know how to work with folders.” The CMS organizes information using a system of folders. The choice of the folder depends on the stage of the process, the type of the content, etc.

Four from the total 14 answers to this section of Question 29 referred to consistency and standardization of subject guides: “Having templates for specific types of pages, like subject guides, helps users find information easier.” The CMS provides for “uniform presentation” of information and “standardizes the library's web pages so the website is easier to navigate for patrons.” Black (2011) stressed that a CMS offers the model of websites with a consistent system-user experience that is facilitated by centrally managed presentation (p. 189). One participant’s positive attitude toward the consistency and standardization of information provided by the system is revealed in the comment, “I do like that CMS has a format that all creators must use in order for the information to be standardized for end users.” Thus, the librarians value that CM technology assists in the organization of information for purposeful presentation, providing “topical information and significant clues as to linguistic, conceptual, and critical suitability” and allowing end-users to “reduce the search time and to make
informed selections” (O’Connor & O’Connor, 1998).

The importance of ongoing cooperation and communication with a dialog about what information has to be presented in subject guides and about how to present this information was stressed by a participant who said that it is “vital for the CMS administrators and librarians to have an ongoing dialogue about what the patrons need to be able to find easily on the website.”

Future Improvements in Maintenance under the CMS

**Categories:** System, flexibility, content, web design, consistency and standardization, learning, cooperation and communication

The analysis of the answers to this question demonstrated the librarians’ constructive approach to issues of maintaining the guides’ web pages. Of the 17 librarians who answered this question, three did not give any suggestions. The other 14 librarians gave at least one suggestion. Many librarians gave two or even three suggestions. Some suggestions related to existing conditions, and others proposed to add new attributes to the system or processes. The specified improvements were about the CMS, CM technology, web design features, information organization and content, improvements in information services, getting users’ feedback, and answering users’ information needs.

Some respondent gave only a brief comment characterizing the “current system as text-heavy.” Other respondents gave a closer look at the specific system attributes. For instance, “the assets folder organization system within Plone is not creator-friendly. As an example, you must load a PDF into a Plone asset folder, then add it to the subject guide.” The majority of respondents not only named the issues in maintaining the web
pages within the new system but also provided practical suggestions for resolving of those issues. Several participants stressed the need to facilitate updating the web pages, for example, providing a “link check via a link resolver” that has “automatic link checking and repair—at least for internal links.” A librarian suggested “more complete templates” to improve maintenance and web design. One participant said, “Maintenance is OK. A nice feature would be an automatic reminder, perhaps December, May, and August, to ‘prompt’ me to review the guides.” Another librarian stressed the necessity to simplify the process of adding images to the guides’ web pages: “I have tried to add images, and it is not easy to complete . . . . It seems that Plone does not work well in that environment.” One participant pointed out that the CMS should be compatible with a wider variety of web tools and gave an example of such tools. Another respondent stressed the need for “more flexibility” to improve the maintenance of the web pages.

As indicated above, survey participants said that the CMS created more structured content by organizing into tabs the lengthy pages of the previous system. Furthermore, as indicated earlier, one librarian stressed “the need to prepare short pages with short entries” when providing information services using the CMS. Another survey participant thought that the CMS created “unwieldy amounts of . . . sections and pages.” He or she said, “Once the patron gets their [subject guides’ web pages], they don’t know what they are seeing. It is so confusing to my patrons.” That librarian found a way to solve this problem by creating one-page PDF brochures with a condensed content of the guides and said that the patrons “prefer this.” Survey participants made suggestions directly related to the content of the guides. They expressed concern that
the content of the guides is too text-heavy. One librarian noted, “Patrons like images and graphics to explain info.” One participant said that “dynamic scrolling content to be added.” Another suggested that “a good idea would be to be able to mouse over a title and have a popup balloon give the description. That way, the pages could be kept short and the entries could be kept short.” One participant suggested a radical measure—to switch to LibGuides (the Springshare, LLC, product mentioned in the previous chapters) because, in this respondent’s opinion, “there isn't a Learning curve every time you try to use it.”

The librarians expressed their appreciation of the consistency and standardization brought in with the CMS. They are devoted to following the required standards and regulations.

Talking about improvements in maintenance, the librarians recognized the necessity of cooperation and communication with the end-users. Librarians suggested introducing new tools for getting feedback from end-users. One librarian suggested “allowing a comments form directly related to subject guide and on the page with the subject guide” as a way of getting feedback from users about a particular subject guide. The librarian anticipated that the patrons’ comments could contribute to better maintenance of the guides and could provide for their improvement.

CMSs at Academic Libraries: Areas to Explore

**Categories:** System, content, flexibility, consistency and standardization, qualifications and responsibilities, cooperation and communication, learning

It is important to mention that the content analysis’ categories content
management and CMSs that were created in the initial stages of the research appeared afterward to be inapplicable to the data analysis and were excluded from the coding scheme. The survey participants and experts barely used the term ‘content management’ and very seldom referred to the CM concept. Although some survey and interview questions asked about the CM in general, the answers of the participants mostly concentrated on the issues related to the current or the future use of their particular CMS or the CMSs in general. Often, in the text of the answers, the statements about the CMSs in general were supported by examples about the currently used CMS. Furthermore, some descriptions started with particular attributes of the applied CMS and ended with inferences and generalizations about the CMSs and CM technologies. Therefore, it was impractical to separate the discussions about UNT libraries’ particular CMS and CMSs or CM in general without interfering with the coding reliability. This issue was resolved with the help of the category system that included all of the aspects above (see the definition of this category in Appendix L).

Four of the total number of answers to this question \( n = 17 \) were neutral because they did not provide any information. Furthermore, one librarian stated that all areas of CMS utilization at academic libraries need further exploration. The rest of the respondents commented on CMS utilization in general or indicated some specific features of CMSs that need further study and development.

The procedures for applying CMSs should be as simple as possible. The librarians expressed the necessity to explore a “variety of web tools to use with CMS.” One librarian suggested that the CMS has to provide “more point-of-use data or information for patrons” and stated that the “entire website should be tied together.” An
expert commented that this librarian’s answer “appears to be a request for integration of the entire libraries’ website (i.e., easy access to information from any point on the site)” and that this is achieved by linking web pages to related information so that the web pages that have been linked together make the website a “coherent whole.” Thinking about the possible ways of utilizing CMSs, one participant said, “I like how the CMS has provided a more ‘technologically literate’ look to the subject guides, and I feel we need to do this for our class pages also.” One expert said that in this answer, the librarian suggested creating a better template for class pages. Another expert confirmed that the current CMS could be applied to develop class pages.

One survey participant indicated the need to explore opportunities to increase the “provision of visual media as instruction tools on the website,” thus requesting an exploration of the ways to deliver content in a variety of formats. One librarian suggested continuing to explore the ways to make it easier for patrons to find “information that is available.” Another librarian indicated that the indexing aspect under the CMSs needs a closer attention. One participant looked into the opportunities of personalization and customization of the guides’ web pages and the libraries’ website with the use of CMS (see the discussion about personalization and customization of content farther in this chapter):

Set up a template where someone can type in a title, a brief location, a brief description, and keywords. All this goes into a pool of data. Later, when a student types [his/her] keyword (or class) into the search engine, a list of all resources tagged with those keywords pops up. Thus, the student does his/her own help guide. At present, we can do this for pages, not for individual resources. Also, enable “mouse over” descriptions.

The librarians saw a need to achieve “more flexibility in design” with the use of CMS, which means “more flexibility in font, color, and other formatting for text.” One
librarian said that better templates can help the “overall consistency factor” of the web pages. One librarian saw the template as a tool to facilitate work over the web pages and noticed, “If someone could create a template then subject librarians could add the needed info. for their academic areas.”

The librarians were preoccupied with finding ways to improve cooperation and communication for end-users could communicate with subject liaisons on a regular basis, getting just-in-time assistance and guidance from subject liaisons. One librarian suggested, “The CMS could be used to create ‘office’ web pages where subject librarians could communicate with faculty and students during ‘office’ hours using an instant messaging widget.”

There was also mentioned a need to make CMSs “easier to learn.”

Roles of Librarians in Development of Web Content

Categories: Qualifications and responsibilities, information services, content, cooperation and communication

In general, the majority of answers to this question stressed the librarians’ leading role in developing the content of web pages and defined this role as “active,” “real important,” “major,” and “primary.” One survey participant said that librarians have to play “all” roles in developing web content. Discussing the librarians’ activities, the participants used the terms “guide,” “identify,” “highlight,” “suggest,” “communicate,” “provide,” “support,” and other terms that recognize librarians active involvement in the development process. Reasonably, the text of the majority of answers to this question was coded under the category qualifications and responsibilities. Survey participants made comments about the librarians’ activities in providing information services,
including reference, instructional, and liaison work. They spoke about the role of librarians in developing, delivering, and updating the content of web pages. Discussing the role of librarians in developing web content, one participant said, “They should be completely involved.” One librarian’s statement that she/he hopes that librarians will play a “very active role” is supported by another’s saying, “I think it’s real [the role of the librarians] important. If it’s delegated, the end result won’t be exactly what the librarian wants.” Survey participants spoke about librarians’ activities in providing information services: “Subject librarians should know the subject as well as the resources,” and “they should identify the most useful and/or popular resources and highlight them in the libraries' online spaces.” Participants stressed that information services are based on users’ needs. The librarians know the “needs of the students and faculty, and provide assistance on the web page for them.” To carry out information services, librarians “guide based on what they learn from helping users.” As stated by a participant, “I am a subject librarian that knows the needs of my academic area, the UNT curriculum related to my subject.” Another participant stressed that librarians and web designers “both need to listen to the users.”

This survey’s open-ended question asked about librarians’ role in developing web content. Naturally, many of the answers to this question touched upon content issues. One survey participant characterized librarians as “major developers of content.” Another said that they perform “development of content where appropriate” and “should provide all instructional and reference content.” According to one participant, web content consists of “instructional and reference content to include
subject guides, class pages, tutorials, handouts, videos, anything that communicates with users about the library and teaches them how to use it.”

Survey participants looked into qualifications applied by librarians to develop web content: “Librarians know the content, so they should always create the content and index the material in such a way to use the words that the users use to find the information.” Another participant said that using the CMS librarians “can have some HTML training.” The following quote of one survey participant provides an overview about the roles of librarians in the development of web content, the responsibilities in the creation of content under the CMS, and the qualifications that allow librarians to carry on their roles:

The librarians should be identifying the best content and doing the actual writing of the content. From there, trained students and paraprofessionals can actually populate the templates. Librarians should be primary in developing content because they are the experts in subject-specific information and resources, and information literacy.

Furthermore, survey participants discussed the distribution of responsibilities between librarians and IT staff to use the CMS to create web content. One respondent indicated, “Librarians are the experts for their academic programs; technology should support the curriculum needs.” Another participant expressed his/her opinion on the sharing of tasks to create web content: “I want to provide content and let a techie create the Subject Guide in CMS,” meaning, perhaps, that IT specialists create templates within the CMS. One librarian went further and stated, “Librarians should get to do what they want, not be ruled by strictures from the tech folks and their current favorite fad technology.” Another participant concluded that librarians “should own the content. However, web developers should own the design.”
In line with discussions of responsibilities, survey participants talked about cooperation and communication in creating web content. One participant said that librarians know the “best way to communicate what patrons need.” Another participant said, “They [librarians] should also communicate to those who make and manage the CMS system. Hopefully they will listen because we work with the patrons everyday, we DO know what kind of problems they have.” A participant stated, “Librarians should be shown a prototype of the proposed system and be allowed to suggest revisions before a final product is set in place.” This statement was supported by another participant who noted, “Instruction librarians should be consulted in developmental stages.” Additionally, one participant referred to cooperation among library departments to create website content: “Since reference librarians deal with the patrons, we should be invited to provide comments for all public pages.” One participant indicated that to create web content, librarians must “share ideas from other universities’ implementations.”

Comments about CM and CMSs

**Category:** System

All valid answers to this question were coded under the category system because, as indicated earlier, survey participants commented either on the CMS currently used by the library or on CMSs in general. About the CMS currently used, one respondent said, “It seems as though the great promise of using a content management system, to simplify updating by the ability to update globally, has not been realized.” Another respondent noticed, “Plone seems very inflexible and not user friendly.” Survey participants also compared their libraries’ CMS to other web design applications,
including CM applications: “Even Dream Weaver seemed better.” Another respondent provided a comment and a question: “I am aware of Drupal being used around UNT as a way to present web information. Is the UNT Libraries looking into this as a CMS?” One respondent stated, “Plone was the CMS selected for the UNT Libraries to use; it may be time to re-visit this CMS.”

Among the comments about CMSs in general, one survey participant commented positively and enthusiastically: “They are a great invention! Now I can create web pages without worrying whether the design is good or not because of the web design experts.” A comment of another participant was not positive and expressed dissatisfaction: “They have been a slight disappointment to me. There has to be something better.” One librarian provided a general comment that can be applied to CMS technology and its applications and innovations: “They are the current techie fad that is in force; as soon as the next fad comes along, the techies will all summarily discard this current fad and force the next one on us; this is one thing I thoroughly dislike about the tech-heavy environment in which we function.”

Interview Analysis

The content analysis of data from the two rounds of interviews, which are presented in this section was performed within the research themes and categories of content analysis (see Appendix L for the definitions of categories) that were presented in the previous section. The data from the interviews allowed the researcher to perform a qualitative analysis with a high level of precision, exploring deeper into the
phenomenon under study following the evolution of concepts from the data.

Discussion of the Project and the Use of CMS

System

The migration to the new system was characterized by the experts as, in general, a straightforward process:

I mean, it was really straight forward for me because I had a set of guides; I was taking guides from point A to point B. It was a really good opportunity to revise them [the subject guides] while I was working . . . and then putting them in the CMS, and then publishing it.

Compared with the old system, the new system introduced in many new useful features and attributes:

The previous system we used, we could not insert widgets, and it was not easy to update, it was not easy to link things. We didn’t have a directory, where you can just go in and click, and pull, and insert the link on a page.

Another helpful feature brought in by the CMS is eliminating the problem of old unused web pages that existed in the previously used system:

One of the nice things about it is that it pulls up pages that we’re not working… People were just leaving them out of date, they were irrelevant or they were not important, just didn’t get done for various reasons, forgotten about.

It has to be specified that when talking about the migration process and the new system, the experts looked at the system and its attributes from different angles, sometimes expressing contradicting opinions about this or that issue in different contexts. For instance, “If you are only changing information in one place, it’s changing through entire website, but it could be more flexibility in reordering things.” Another example stated that “it’s still not [as] flexible as your own page [a page created in applied previously HTML or other software], but the template is nice because . . . .”
Moreover, as discussed earlier, different survey respondents disagreed with each other about the same topics. A similar pattern was observed in the interviews when one expert’s opinion about a particular issue disagreed or did not correspond with the opinion about that same issue of another expert. The diversity of views on a particular topic was reported in these results of the data analysis.

The experts discussed the problems they observed in the process of migration to the new platform and how the problems were resolved. One problem was in “setting up the structure of a subject guide” and was answered by training librarians and other participating staff:

Some people got confused about how to set up the structure so that the introduction page will be followed by the content page, and how to add tabs after that . . . . We saw that it would be a problem, so we had training provided for all of levels of staff.

Another problem was related to the process of transporting the old content to the new template and required an additional intermediate step:

You could not bring content directly from our previous web pages into the template; you had to strip formatting so the way we have resolved that is by pasting the content into Notepad before transferring it to the CMS template.

Discussing the difficulties in the migration, the experts spoke about the attitudes of librarians and other library staff toward the new system and its attributes as well as about the character of work under the new system:

Some people, in terms of all-library-wise, not everybody bought into the CMS, so it took some extra work to make sure that the subject guides were moved over, some people needed extra training, some people did not like the pages, they were trying to have something, you know, liked adding their own images and stuff. They were resolved mandating and saying here it is, use it, and things must be moved over by XYZ date.

An expert provided more insight into librarians’ opinions and concerns about the new
design of the web pages:

There were especially librarians who had been at this library for a long time [who] resisted having a standardized page because they had liked the ability to be creative and make their pages look unique, and now they were being asked to make them look more alike.

Often, when discussing difficulties, the experts opened up about the attitudes toward the project, the new system, and the process of migration and work with the new system. There were overall positive comments: “I am really happy we moved to content management system. It makes sense for an organization to be able to centralize control of a website.” On the other hand, at the beginning of the first interview, an expert made a cautious introductory comment: “You are going to get a large amount of frustration because we specifically wanted to go with Libguide, which is a subject guide, that, basically, templates and everything. They are very easy to work with.” Some librarians expressed a sense of frustration about not being able to perform the operations they wanted to perform using the system: “Sometimes, it was frustrating, I could not make the CMS do what I would like to do in straight HTML, but I found work around for all of that.” They expressed concerns about not being able to use some attributes that were available in the previously used software and that, in their opinion, improved the content of the web pages. One of these attributes was the option to put images on the web pages.

Similar to survey participants, the experts expressed disappointment concerning the limited features of the system saying that the new CMS will “strike out all Java and Java script, it will not let it go, and that has created a level of frustration. It’s an important tool that is not in my toolbox.” It was indicated that those restrictions must have been targeted at system users who did not have advanced qualification and
experience in web design. There is a need to adjust the system to users’ diverse levels of knowledge and experience in web design. The librarians named features that have to be added to the system because “they would make our job and presenting information much easier, much more straightforward what would make more sense to the students, to the users of these subject guides.”

The experts said that some issues and difficulties observed in the process of migration were caused not by the Plone software but by the version of the CMS that was developed in-house. This version was not compatible with some standard web design applications that limited the functionality of the system: “We can’t use some of the very powerful and very useful tools that are available in Web development and instruction work because, and our huge part of the frustration is the [version of] Plone, we are using.”

It has to be noted that survey respondents and experts often referred to the system as an active participant, expressing their attitudes toward how it ‘acts.’ Frequently, the system’s actions were described as mandatory and uncontrollable. Furthermore, the experts also provided examples of how system users deal with the system’s actions. For instance, “it does not matter what work I do, the CMS puts them [the databases in the list] in alphabetic order . . ., and I cannot redo that list.” One commented on “the way the CMS forces everything.”

As indicated by Kling, Rosenbaum, and Sawyer (2005), normally, after being implemented once, all computerized systems are refined throughout years with changes to the systems’ functionality that, subsequently, require corresponding adjustments from the technology and the system users. During the interview, the experts indicated that
the system itself, its attributes, and its functionality went through continuous advancements with multiple changes and adjustments. The system’s evolution started at the first stage of the project: “[W]e did an original migration to the CMS, and then the librarians were not happy somehow with the results, and then the Multimedia Design Lab made a second template for us, and then we migrated again into that.” The system changed during later stages of the project upon the librarians’ request:

Initially, when they started, they said “no images, no files, just text,” and a lot of people argued against that, and now we can use your occasional image and your occasional file, and that’s made it a whole better. So it has gone through a little bit of growth.

Consistency and Standardization

Similar to many survey respondents, the experts said that the new system brought more consistency into the guides’ web pages. As indicated earlier, the better consistency and organization of content was achieved with the help of predetermined tabs: “It’s broken down in such a way that it’s consistent across.” The study by Slater (2008) about Oakland University’s Kresge Library indicated that when every page in a website has “standard header, footer, style, and appearance, regardless of who made or edited it,” the site has “consistent look and feel and standard navigation across pages” (Slater, 2008, p. 575). Thus, using the template allows librarians “add simple text content to a Web page and still have a final product that appeared professional and branded” (p. 575).

All the experts and many survey participants appreciated restrictions enforced by the new system that helped to achieve consistency and standardization in the guides’ web pages. The experts’ comments illustrate this positive attitude: “The subject guides
now look professional because we standardized,” and “I really like it because it standardizes all these things.” A comment of another expert speculates about the system users’ attitudes toward standardization: “I think it provides some people with some comfort because they felt like they are filling in almost a form as opposed to, again, sort of a blank page [in the previous system].”

Qualifications and Responsibilities

As it indicated earlier, the group under study had different levels of knowledge of and different types of experience with web development (see Table 11 and Figure 3). The experts expressed their attitudes about these differences and informed the researcher how they reflected in the work on the project, in training, and in cooperation. Some group members had advanced knowledge of web design: “I am very familiar with Web development . . . I still these days primarily code in HTML, I do my own coding. I don’t think about it, I just do it.” Another expert said about his/her knowledge of HTML, “I don’t know that much HTML, but I can get in there and correct problems because I can see on the other lines what the code should look like.” These differences affected librarians’ experience with the CMS: “People with more web knowledge can make use of the more advanced features.”

When asked about the need for HTML knowledge and knowledge of other web design applications, the experts’ opinions varied. One expert said, “The migration was fairly easy because we were going into templates that had wysiwyg or, in other words, you don’t have to know HTML.” It has to be noted that in the reviewed literature, findings of many authors demonstrated that CMSs functionality that allowed content
providers at academic libraries to easily add, update, and publish content to the website as in a simple wysiwig editor was among the pros of CM solutions (Donovan & Nomura, 2005; Slater, 2008 and other).

One expert stated that for those librarians who did not know HTML, the process of migration was problematic: “Those that don’t know HTML would find editing in the CMS problematic.” Furthermore, an expert clarified the need for knowledge of web design, precisely HTML, when using the CMS: “Some things it’s not able to correct for you, you do need to go to the HTML.” However, in general, at the basic template level, “you do not have to worry about HTML, you know, it’s just easier . . . once you got used to the system itself, it’s not as high technology curve, as it would be with blank HTML pages.”

Another expert had a broader approach to the differences in web design skills and indicated that an issue of “technological comfort” was involved in this:

There are people who are happy to go and play, and if it does not work, they are just get it reset and start it again; there are people who get really unhappy if they either don’t know how to do something or if it does not look quite the same, and they are not willing to play, you know. There is always a technological difference in both the ability or the current skills, their desire to learn new technology, and the desire to play with the technology.

The use of the CMS simplified the division of responsibilities among team members, allowing librarians to concentrate on creating the content of the web pages: “It makes the work a lot easier with the CMS because we can use the work of other staff members, which switched librarians to the things that, you know, require more of our expertise.” As mentioned earlier, one of the sources of help in migration was GLAs. The ease of use of the system required only a minor training before they started
migrating and updating the content of the old guides into the new system. The experts appreciated their help: “I was grateful for the help of the graduate library assistants.” The GLAs’ technical work was valuable because “that was really helpful to those people [librarians] who did not want [to] do the technological work.”

The differences in knowledge and experience of web design were accommodated with the help of various forms of training and with cooperation among the team members:

I often get that calls or emails from people saying how do I do this. One of my colleagues was the same way. This coworker was one of the people that was helping to train people who use the CMS.

Web Design

The design of web pages under the old system was either too text-heavy and difficult for end-users to navigate or too overloaded with graphics and other elements, preventing the web page from presenting information in an approachable way for end-users. Design of the new template went through multiple revisions and involved librarians and IT professionals. The template was “fairly well done” and made many processes faster and easier: “We all already have headings kept out for us, and I really like that because it just makes the creation a lot faster.” The experts viewed the use of the template as an advantage that brought consistency and facilitated navigation:

We can’t just create a generic page; we are put within a specific template, and we have very little flexibility on that template. That’s a big advantage because if a student or a faculty member, whoever is using the subject guides, looks at one, finds all the information they need, and then looks at another one, the information they need on another one is going to be in approximately the same place, so they all look very similar.
On the other hand, although consistency was considered a good thing, the accompanying “complete lack of individuality” in the design was a concern:

If my page looks exactly the same, if they look exactly the same, except at the very top, where one says name of the subject guide . . ., they [end users] may be on the wrong subject guide without thinking about it.

Furthermore, intention to put more personality into the web pages was expressed in variety of ways. These issues were resolved by introducing design elements, allowing for added individuality in the web pages.

Ease of Use

The experts’ comments on the ease of use of the system in general and its flexibility, the speed of performing operations, and the training and learning correlated with the comments of survey participants (see Appendix L for definitions of these categories). The experts furnished more details about each of the categories.

Ease of use helped in learning the system: “I had one training session on this [the CMS]. Overall it was really easy.” Simplicity was also observed in the use of the system: “It is really is you type in a bunch of stuff in an appropriate spot, and check, make sure it shows up, and it's done,” and in editing and updating the content, “you go in, you update, again, it's slightly less thought on your part because it is just typing in, as opposed to the HTML pages.” Ease of use was also connected to speed in performing operations: “This is very easy because all I have to do is go to that page and click the time from a dropdown menu . . ., and it means instead of taking may be half hour for updating page, it's taking five minutes; and the fact it takes less time, means it is more likely to get done.”
Cooperation and Communication

Because the topics of cooperation and communication were brought up by the experts in the first round of interviews and were also noticed by many survey respondents, the themes of cooperation and communication were discussed in more detail in the second round of interviews.

The experts discussed topics related to cooperation with the IT department, with other university departments and with community in the CMS. The template as an inherent part of the CMS helped participants follow the requirements of the university’s website design; each page of the libraries’ website links to important pages and policies in the university website. This opinion is consistent with the findings of the earlier mentioned study by Kim (2010). In that study, when discussing factors that affect web design of academic libraries, 75% of surveyed web designers said that they comply with the guidelines given by universities and university policy (Kim, 2010, p. 101).

Participants of the research of Partridge et al. (2010) stressed that working “intimately with IT and other disciplines” in the current technology environment, information specialists must cooperate “successfully as part of a team,” be “willing to build new relationships outside the library context,” and know “how to be an advocate and lobbyist for the resources and programs he or she wants to introduce, especially when faced with IT departments or senior management who have competing agendas or policies” (p. 327). The participants in this study expressed similar to discovered by Partridge et al. (2010) opinions. The interviewed experts said that:

- The CMS helped participants follow ADA regulations because the template automatically follows these regulations. The CMS added features to improve accessibility for people with disabilities.
• One participant commented on need for cooperation in testing the CMS and the template:

The IT people often present a look [under the system], but what the librarians need to be thinking about is the feel, how it’s actually going to operate because . . . until you get in and start using it you don’t realize the flaws. So encourage IT people to let you do beta testing before they unravel, unveil it, and then they get annoyed when you go, “Oh no, that’s not what it is, it does not do that, it’s supposed to do . . .” because looking at it and then using it are two very-very-very different things.

• Cooperation at all levels must continue through all the processes. Librarians need to “provide suggestions, make sure that we do provide comments, and compliments [to the IT people].”

• The need for guidelines about how to use the system. The guidelines must be developed through the collaborative work of all the involved departments. Vidgen et al. (2001) emphasized that procedures and controls need to be defined to manage the web publishing process. The experts suggested that the guidelines have to go through regular reassessments and updates following changes to the system. This should include a timeline for assessment and reassessment of the guidelines.

• The essential characteristics of a CMS are content audit and control and ability to track and reconstruct changes that have occurred to content (Vidgen et al., 2001). The experts made positive comments, saying that under the new CMS, they observed more control.

Discussions about communication with IT professionals focused on the following issues:

• Cooperation must look at the process from end-users’ perspectives. Librarians have experience and knowledge of end users’ needs and have to bring this information into their cooperation with IT people to “show them how people [end-users] use the information, the content, why they are going for the content.” Because end-users are not going to “see, for example, what the software is, they don’t care what it is, they just care if we really give them the information they need in a timely manner.”

• IT people must communicate to librarians existing technological opportunities and ways to adjust technology to the needs of system users and end-users. The information about the changes in functionality of the current system has to be delivered to the librarians in a timely manner.

• There is a need of communicating information in a way that both sides can understand and using for this terminology with familiar concepts.
Librarians must use a variety of communication channels (conferences, publications, presentations, etc.) to communicate with IT people and vice versa.

From 23 survey participants who answered the question about how the use of CMS facilitates communication with the guides’ end-users, 56% characterized this impact as average, 26% said that it is not significant, and 17% said that it significantly influences communication with end-users. The interviews’ discussions about communication with end-users in the CMS focused on the following:

- Communication using the web pages of subject guides is “starting to work.”
- “The CMS influences the process because I can get reference information to the end-users in a variety ways, so I can reach the communication channel they prefer.”
- “The CMS allows us to have direct communication with the end-users at the point of use.”
- Standardizing the web pages improved navigation for end-users and facilitated their access to the librarians’ contact information.
- With the CMS, the “users can navigate through a subject guide more quickly, and we can communicate to them more quickly. Also, we communicate more quickly because it’s easy to update the subject guides.”
- The channels of communication and the CMS itself adjust to end-users’ needs based on accumulated experiences. An expert gave the example of an instant messaging tool that was available on the guides’ web pages to communicate with liaisons but was relocated to the libraries’ information services page because of low usage.
- There is an unexploited potential in utilizing available communication tools.

Level of communication with the guides’ end-users within the CMS received special attention. Some librarians said that end-users seem to resist using the offered tools. On the contrary, another expert informed the researcher about very active communication with end-users through the channels available at his/her guides’ web pages:
In the static guides that we created, generally, the only contact information in these is email at the bottom and a telephone number, and I very seldom had contact either via email or telephone with users of the subject guides. In the current CMS and in the subject guides, ... as soon as I turn my computer on and open a web browser, I am logged into my Meebo account, and I have had multiple queries via Meebo.

Degree of activity depend on the subject of the guide, the character of information, the nature and department of subject major, the characteristics of the group that uses the guide, and other issues. An expert shared an assumption about why end-users do not ask questions or contact librarians through subject guides’ pages:

I think the information-seeking behavior of people in my subjects, it’s a little different. I am not sure if there are going to be students or the faculty looking for a subject guide and then looking for a librarian. They may go directly to a librarian, they may go to somebody else, and they’ll say, “Contact [librarian’s name], this librarian handles the [subject] stuff,” so, you know, we are always dealing with different people, with different groups of people.

The experts unanimously agreed that the resistance to communicate can be resolved with better promotion of subject guides: “I don’t think people are still finding those [subject guides],” and “I am hoping that if we’ll do start to advertise the subject guides enough that we’ll start seeing a better pick up from those [more communication].”

Discussion about Information Services and Content/Information

Information Services

Interview participants discussed the differences in providing information services at the libraries’ website in the new CM compared with doing so in the previously used system and the new ways of organizing information and content. In answer to whether the CMS helps in reference and instructional work, an expert said,
With reference, [it] sort of helps because, again, there is a consistent look and feel, so you have the Ask us, you have the Meebo widget for personal reference. Instruction—it’s a little easier. I think that the tabs make it a little nicer for the instruction; you might be giving an intro page or may be having instruction page.

This expert also added that, for the liaison function, “just having information more broadly, more noticeable” is helpful:

The intro page [subject guide introduction] makes it clearer for users and makes them see little bit easier. I’ve put in a little more instructions, a little more about me, [those] kind of things. Now that we are able to use files, I’ve gotten some nice help files there as well.

A librarian clarified that there is a way to use files under the previous system, but it was not as easy as in the CMS.

The CMS template makes it easier to link web pages to other sections of the libraries’ website. This was mentioned as a positive change because it allows librarians to “add value to the content you have in a page linking out to various information services we have.” The librarians discussed the tool to add the links to interlibrary loan, to other subject guides, to library instructional workshops, etc.

The experts also noted that using CMS allows librarians to meet the needs of people with different learning styles by presenting content in different formats:

For example, on a page about how to use a particular database, besides describing in text what steps to take to do a search, I can include screenshots because we can insert images in the CMS, and I could even, not in our CMS but [in] other CMSs that are a little more sophisticated than what we have, you can also put in audio and video items, so you could hit people who learn in all those different ways: visually, reading, auditory.

The librarians also appreciated that with the CMS, there are more ways to personalize references:

I can put widgets on that page, and I can offer reference service directly from that page . . . . I can answer questions through IM, but [it] would be possible to put other widgets like text reference. I have my picture there; if I wanted to, I can put
an audio clip introducing myself, so it gives them more personalized reference service in the subject area.

The direct communication tools allow librarians to provide information services when users use the information, adjusting that information to the users’ inquiries:

I had someone in one of my subject guides make that suggestion on the Meebo, and we had a probably 15-minute, two-page discussion on Meebo. The student was asking what appropriate resources were out there, and I was trying to help them through that.

It has to be noted that real-time communication is especially helpful for distance education students. Morris and Bosque (2010) said that librarians have to use subject guides to connect with patrons and employ for this open access technologies and free Web 2.0 tools. In their opinion, “Adding a photo along with contact information is a valuable way to market services to patrons and to let them know that individualized assistance is available” (p. 190).

As described earlier in this chapter, survey and interview participants discussed and made multiple suggestions about the functionality of the system. The majority of those suggestions were targeted at the improvement of information services.

Survey and interview participants were asked to look at the three components of information services: reference, instructional work, and liaison function. It has to be noted that even though the librarians made efforts to discuss these components separately, they preferred to talk about information services as a whole. Perhaps it was hard for them to frame the observed effects because all the components are interconnected and because the CMS has multi-sided impacts on all of them.

The librarians use the new subject guides in all the areas of information services on a “regular basis.” An expert informed the researcher how the guides are used to
help patrons at the reference desk. Furthermore, librarians update faculty about changes in the guides: “I will send an email to the faculty as a whole and always I include links to subject guides to that particular faculty group. I ask them to share this with their students.” The experts said that it is easier for them to instruct on the guides’ pages because of the way the content is organized within the CMS:

Because of the different tab structure, wherever they land they always have a bit of instruction for the beginning as opposite to the way it was before; when they open the page, they look at table of contents, and skip right down to one page. They’ll miss all that good stuff. So on one page, it would be terribly repetitive to have that instruction, but because it’s a tab form, each on [a] different page, so it’s repetitive in a way, but you don’t really notice that, so it made that better.

Besides, the experts link the content of the guides to other instructional materials on the libraries’ website, making a variety of related instructional information available for end-users. The librarians use the information presented on the subject guides’ web pages to teach library instruction classes. The guides’ pages are easily accessible from the libraries’ homepage and are freely available (not protected with a password).

In general, the use of CMS supplies more opportunities to add value to the content of web pages and to facilitate navigation for end users. Consistency and standardization with the CMS make the subject guides “look more professional, and in turn, . . . that lends more credibility and authority to the content within the subject guides.” The librarians expressed positive feelings about the web pages maintained in the CMS: “I think it’s a product we can be proud of.” They also expressed contentment about receiving users’ positive feedback: “I would have people communicating to me that they really appreciate having all the resources at their fingertips through the subject guide.” The librarians feel more confident in providing information services with the help of the guides’ web pages and in sharing the information about the guides with end-
users: “Now, that we have the CMS and our subject guides are easier to navigate, they are more current, more professional, I feel more confident about sharing with faculty that they [subject guides] are available.” The librarians also spoke favorably about the selected features of the guides that were invented with the CMS. In general, the experts expressed positive attitudes toward the fact that the web pages have increased value of information services and that, with the CMS, information is presented in a professional way that speeds communication with end-users:

The CMS allows us to communicate to the end users the wealth of the information that we have at the libraries, and that’s possible through linking from the subject guides to related information within the website in a professional representative way and speeds this communication.

Furthermore, in answer to the survey question whether better marketing/promotion of subject guides would result in higher usage, 83% of the 23 respondents to this question gave a positive answer. Moreover, there were no negative answers, but 17.4% of the respondents said “no opinion.” In many places during the study, librarians discussed issues of marketing and promoting the subject guides’ and information services available on these pages: “We’ve done those wonderful things to improve them. My theory is that we failed in marketing them, and there is not enough promotion.” The theme of marketing and promoting the libraries’ websites, their sections, and their information services is outside of the frame of this research.

End-Users

Discussing the CMS and its influence on a variety of their activities, the librarians constantly returned to the importance of the web pages’ usability. They stressed the necessity to follow end-users’ interests and to make the web pages convenient and
helpful. They were always concerned about the effectiveness of information services and the questions that were specified by Cooper (1982): “Does the user get what he or she is seeking or not?” and “How completely or accurately does he or she get it?” The focus group participants in the study of Partridge et al. (2010) indicated that using Web 2.0 settings, “LIS professionals are driven by a focus on people, not resources” and “evolve into a more synergistic and equal partnership that involved both the 2.0 librarian and the [end-]user working together more as equals” (p. 328). A 2.0 librarian has to look at “things from the user's perspective and seeks to actively use the emerging technologies to provide their users a voice” (Partridge et al., 2010, p. 328). These authors’ findings showed a distinct relationship with the findings of the current study.

Multiple experts’ comments provide evidence that in creating web pages, librarians try to “make more sense not only to the librarians, but to the students, to the faculty members, to the people that are using the subject guides and the information.” The interview participants expressed an overall positive opinion about how using the CMS affects the information services provided to end-users and assists in meeting end-users’ needs:

The CMS has a template look, so it becomes very familiar to users; it also, again, provides the Meebo widget and provides contact information a little more clearly. Instead of having fairly long bookmarks on the top of the page, it made the little tabs, which a lot of people are familiar with; so, overall, I think it made it more standardized and a little bit more usable.

As indicated above, the experts appreciated the “similar look and feel” of the web pages that came with the template standardization and thought that this made things easier for end-users.
The experts also mentioned that they carry out different forms of usability testing on the subject guides' web pages with faculty members and students. It was stated that the process of getting users' feedback and making changes did not change much under the CMS: “The only change is the structure that impacts work in the CMS.” Kim (2011) stressed the importance of integrating instruments for getting end-users’ feedback into web design systems because direct end-user feedback can help librarians evaluate the actual users’ knowledge and skills and effectively adjust the information and services to the needs of those users. In this study, the experts agreed that a reliable and easy way to receive feedback directly from users of the guides’ web pages could improve the information services:

If there would be ways to monitor use of the web pages, that would be wonderful. Because you could make changes and know before you made a change to your subject guide what the rate of use was, make some changes, look at it monthly after and see . . . . Usually, you can also get the reports on how many downloads or prints, so you would know whether people print out the instructions you have created. You could also find out which resources are most popular.

In answer to the survey question how using the CMS facilitates the presentation of purposeful materials to end users, 60% of all respondents to the question said “average,” and 35% said “significantly.” When asked how using the CMS facilitates serving the variety of end-users’ needs, 55% of respondents to this question said “average,” and 35% said that it significantly facilitates serving a variety of end-users’ needs. These data correlate with disappointment expressed by survey participants and experts when the system’s functionality prevents them from performing operations to present information in the best way for end-users.
Web 2.0 Tools

The discussion about how Web 2.0 tools are utilized with the CMS did not result in plenty of comments to make a strong inference and conclusion. In answer to the question about the opportunities that exist to use Web 2.0 tools with the new CMS, 70% of the total number of respondents ($n = 20$) said that these opportunities have not changed, 15% said that they decreased, and 15% said that they increased. In general, when talking about the system’s functionality, this study’s participants referred to various Web 2.0 tools. However, they barely linked the use of Web 2.0 tools with the current CMS. There were more comments about future plans and opportunities for use of the tools. One expert’s comment speculates about the librarians’ attitudes toward the CMS and Web 2.0 tools:

It’s a little difficult to say whether it’s the content management system that’s letting us use some Web 2.0 tools or simply that we moved to the CMS as these tools were becoming available. I am not sure if the CMS helps me to use any of these tools, except maybe for instant messaging because that’s something that they’d [the CMS administrators] put into the content management system very easily. Otherwise, if we’d still have those static pages, I’d have to download that myself.

The interview participants said that there is a need to simplify technical procedures to Web 2.0 tools with the CMS and to give system users more flexibility to apply those tools. It was indicated that, because of the settings arranged by the CMS, using Web 2.0 tools on the guides’ web pages is problematic for end-users: “They have to do so much work in order to make an RSS for my subject guide work that they are not going to use it.” The experts discussed the limitations they face to develop dynamic content and to use advanced Web 2.0 tools. The librarians think that the actual version of CMS has enough capabilities to implement advanced Web 2.0 tools and expressed a degree of disappointment that this had not been accomplished. The experts discussed
their plans to improve the of Web 2.0 tools on the subject guides' web pages. As with many other issues related to end-users, the experts stressed the necessity of advertising the available Web 2.0 tools.

Content

In general, when talking about the maintenance of content/information that they put on web pages, the librarians think that “maintenance with the template is much easier to update the content or add new content.” The fact that the guides’ information is organized into the tabs was appreciated because the “tabs do make it easier for the librarians to think about what they are putting on each page, and that may be more helpful in terms of thinking about what users need.” The structure of the guides’ pages helped librarians to structure information and to see gaps: “I think, it’s not that we could not afford it with the HTML pages, but it just helped to organize the information when we realized that, maybe, that was what was missing.” Another expert added that the template was “labeled,” and “you knew exactly where to put what content. Here is where you put the information about articles, here is where you put the information about books.” The following comment of an expert unveils his/her view regarding the relationship between authors and information and regarding the librarians’ input into the web content:

Identifying content, I think that has to do with resources. We understand what’s important about a resource, which also goes into creating descriptions or annotations of the content. We understand how to use the resources, so we can make the instructional content. I think that’s our expertise, and then you can even have expertise within your subject area. I know the particular problems my subject area students have with using databases, with searching for different subjects, and so I can bring all that expertise into my content.
An inherent feature of CM is close control of the structure and content of websites, which improves navigation and search capabilities and makes it easier for content users to find information (Vidgen et al., 2001). An expert described the changes to content/information presented at the web pages and the benefits these changes had for end-users:

It makes the process of bringing current information to end-users much faster because it’s easy to update, it’s easy to add new content, so the CMS allows us to bring the most current information we can to our patrons. The CMS makes it easier for patrons to navigate the subject guides, so they can find things themselves, surf themselves through the information, and the CMS enables that with the standardized template that makes it easier for them to find the information they want.

To increase the effectiveness of information services with the help of automatic systems, librarians follow quality considerations that include coverage of the database, completeness (recall), relevance (precision), novelty of output, and completeness and accuracy of data (Cooper, 1982). Their target is to present end-users with a sufficient amount of information tailored to their needs. Furthermore, the organization of information within the tabs in the body of the guides motivates the librarians to put a larger amount of useful content on the pages:

One thing about CMS, though, is that because there are so many tabs, we’ve been able to broaden our content. The need for changes [to the content/information] is more obvious so that helps . . . . Sometimes with the static web pages, you just would be scrolling to a particular part and not really realizing that you’d need to change something about that part.

An expert said that one of the reasons the CMS was put in place was that under the previous system, content was not reused. One of the advantages of CM is that data are not stored redundantly, and the copying, storing, and replicating processes are organized automatically and controlled in one source (Vidgen et al., 2001). The
librarians discussed how this advantage is reflected in their work on the content of the web pages, “The CMS is designed to allow us to reuse content. If we want to make to or embed a specific table, for example, …, so if I want to put that on any of my web pages of subject guides, I know where to find it.”

The interview participants had affirmative thoughts about shared resources organized in the CMS repository: When “everything fits, . . . that is huge, the way we developed the information that we have” and the way the content has become reusable. In the librarians’ opinion, the reusable content function of the CMS

- Saves time because they do not have to recreate the content that was already created. The librarians do not have duplication of efforts: “If other librarians have already created a web page on how to find journal article, I don’t have to recreate that information in my subject guide, I can link to it.”

- Allows librarians to spend more time on creating other useful content.

- Keeps content “structured and organized,” “all in one place,” so “we know where to find it.”

- Allows librarians to present more resources on web pages: “Before . . . I made limits in the number of resources I was demonstrating or discussing because there was so much work to create those individual pages, but now . . . I reuse the content in a variety of pages.”

- Ensures more consistency in content. Under the old system, content was stored in different places, and information on the same topic was different from place to place.

- Improves the overall quality of the information presented on the libraries’ website for the interests of end-users with the better organization of the content and its higher consistency.

- Saves space because it allows librarians to store large amounts of information in a shared repository without using much space on the individual web pages.

- Allows librarians to preview the files in the repository to select the file they need.
- Provides access to a variety of information that is helpful to create content and information services.

Another useful feature introduced by the CMS was the opportunity to make global changes to the website. The experts made positive remarks, saying that it is an “incredible benefit because it makes everything that matches the content, that all information about our service, is as current as possible.” Another expert stated, “That’s really a big advantage from the viewpoint of technology issue.” The experts noticed that with a large website like the one the libraries have, global changes in URLs are a very helpful feature. The librarians appreciated that a global change can be applied to a portion of the website’s content: “I change it on the electronic resources database, and then it will automatically update absolutely everywhere that it is displayed. That’s nice.”

The comments of the librarians about influence of CM on content/information presented on the websites are consistent with findings presented in many publications (see chapter 2). For example, the study of Slater (2008) demonstrated that the new CM model applied by this author’s academic library resulted in a “marked increase in both the amount and freshness of information on the library site, as well as the complexity and interactivity of the data being presented” (p. 577).

As indicated above, the librarians were disappointed that in the new system, they could not perform the operations they used to perform before. They need to have certain attributes to organize, enrich, and integrate the information into other resources and to guide users through this information. For instance, all the experts discussed inserting hyperlinks into the body of the subject guides: “Embedding an internal link or an external link onto a particular word is something that is not that easy.”

In general, the librarians appreciated the functionality of the CMS in organizing
and creating content, but they indicated that the CMS could provide more flexibility in performing some content authoring operations. As discussed above, the librarians are satisfied with the available communication tools (IM and other widgets), the opportunity to make their contact information and pictures available, and other features. On the other hand, the experts and survey participants stressed that the system does not have enough flexibility to customize web pages. Further clarifications revealed that in this context, interview participants were referring to web design and other technical tools that could help them to give more individuality to the guides’ web pages. “Individuality” is defined as “qualities and character which distinguish one person or thing from others, or a separate and distinct existence or identity” that is opposite to a stereotype, which is defined as “one that does not allow for any individuality or variation” (“individuality,” 2001; “stereotype,” 2001).

The librarians said applying the CMS was beneficial for customizing and personalizing content. Hackos (2002) described personalizing content as the “practice of allowing individual users to develop their own view of the information so that they access only what they need, not everything available on the site” (p. 262). At academic libraries, customizing and personalizing website content is achieved with cross-page search options, cross-links to library catalogs and to other university web pages, tools to submit feedback, and RSS and other Web 2.0 tools.

The experts wanted the CMS to have more tools to implement dynamic features into the content of the web pages. They emphasized that dynamic content (see the definition of dynamic content in Appendix A) is one of the major benefits of a CMS and that the current version of the CMS needs to change before it can deliver the content in
One of my problems with the core implementation of the CMS is the use of some of the dynamic content tools, you know, the video podcasts, audio, RSS, the methodology of doing the certain things is not implemented in our current incarnation of the CMS.

Table 13

*Experts’ Ratings for Features of Dynamic Content*

<table>
<thead>
<tr>
<th>Feature</th>
<th>Current CMS</th>
<th></th>
<th></th>
<th></th>
<th>CM Potential</th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Expert 1</td>
<td>Expert 2</td>
<td>Expert 3</td>
<td>Mean</td>
<td>Expert 1</td>
<td>Expert 2</td>
<td>Expert 3</td>
<td>Mean</td>
<td></td>
</tr>
<tr>
<td>Customized</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2.7</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>4.7</td>
<td></td>
</tr>
<tr>
<td>Personalized</td>
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<td>1</td>
<td>1</td>
<td>1.3</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4.3</td>
<td></td>
</tr>
<tr>
<td>Updated constantly</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3.3</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>Enriched content</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2.0</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>Interrelated with other content</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4.0</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>Variety of formats</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2.3</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4.7</td>
<td></td>
</tr>
<tr>
<td>Incorporation of Web 2.0 tools</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1.7</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>Interactive</td>
<td>3</td>
<td>2</td>
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<td>2.0</td>
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<td>5</td>
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<td>4.7</td>
<td></td>
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<tr>
<td>Collaborative use</td>
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<td>1</td>
<td>1.7</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>4.7</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
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<td>2.1</td>
<td>2.3</td>
<td>2.3</td>
<td>5</td>
<td>4.7</td>
<td>4.7</td>
<td>4.8</td>
<td></td>
</tr>
</tbody>
</table>
At the end of the second round of interviews, the experts discussed the features of dynamic web content. They used for this Table 6 (see chapter 2), which provides definitions of the features of dynamic content. They were asked to evaluate (on a scale from 1 to 5) the potential of each of the features under the CM and the level of each feature observed under the applied CMS. Table 13 presents the results of the assigned ratings. According to experts, the ‘interrelated with other content’ feature received the highest rating among the features under the current CMS (4 out of 5). It was followed by the ‘updated constantly’ feature (3.3 out of 5). Furthermore, Figure 5 illustrates the experts’ rating of dynamic content in the current CMS compared to the estimated potential of the CM.

![Figure 4. Comparative rating of dynamic content features by the experts.](image)

**Discussion about Role of Librarians in Content Management**

Many of the survey participants and all of the experts stressed that with the CMS, they can focus more on authoring the content of the web pages. The experts
appreciated that they do not have to worry about format and design of the web pages and can concentrate on creating content that all of them consider their expertise:

I can spend more time in thinking which resources are best for the community and also what actual text will be the best. I can concentrate on making clear concise steps for processes that students and faculty have to go through, so I have more time to spend on what’s my expertise, which is instructing and evaluating resources in my subject area.

Furthermore, the study's participants discussed the distribution of responsibilities and the roles involved with CM, saying that librarians have to be major creators of web content:

We [librarians] have to have an active role, an advising role. I don’t know exactly the right term, but it’s the whole active and advising, but we have to have the IT people. We have to have the web content people [to] actually acknowledge that while they might be able to do the coding they do, we can provide the information that they can code something that can be found quickly easily.

In the librarians’ opinion, authoring web content in CM must be their responsibility. One interview participant explained the reasons for this necessity:

We, public services librarians, knowing the users are not going to look at something that a page full of text, or full of ‘librarianisms’ [library jargon], or there are long-long tedious paragraphs of stuff, and nobody would read that, so we need to be in there with the content, and, again, it’s sort of look, but we need to make sure that the content meets the needs of users and is organized in an effective manner, and that all useful content is there.

Knowing the end-users’ and the environment in which the information will be used, librarians “estimate the potential value” of the content/information presented at the subject guides’ web pages and design web pages accordingly performing value-added activities that “produce, enhance, or otherwise strengthen the potential utility of message” presented with the help of the CMS on the web pages (R. Taylor, 1986, p. 203).
Authoring web content is performed in close collaboration with other librarians, other library departments, IT specialists, and other members of the university community, including end-users. Issues of cooperation in various CM areas were discussed earlier in this chapter. Next section summarizes findings on collaboration in authoring of content of the web pages within the CMS. The librarians emphasized the significance of collaborating to author the content of the web pages: “The level of collaboration and coordination has really been good with the CMS.” Collaboration in authoring brings new ideas and enriches content:

I’d actually had people say, “Hey, I am using your subject guide, and I have a question about this,” and I can answer the question immediately, or they’ll make a suggestion saying, “Why have not you included this resource?” or “I had a question about this particular database, and I am not finding it in your subject guide,” so I can go out and either create or add that content to my subject guide.

The main stream of collaboration in authoring of content is with other librarians within the same department. The experts said that librarians appreciate the benefits brought with collaboration and expressed satisfaction with the level of collaboration:

I think that cooperation within departments is very good. Obviously, we are cooperating when we are generating similar content. We are proofreading each other’s pages, we are doing things that will help. Somebody may have great ideas that are not presenting it in a way that really is deserving of the content that they have, so if I write something and it’s just (pause), it’s not thrill[ing] or exciting enough to get people’s attention, I’ll make colleagues read it, and they’ll all make suggestions, and, you know, as far as the collaboration is going, we’ve got really good content.

The librarians value sharing content and exchanging ideas in collaboration:

I can look at what my colleagues have created, if they had created something in their content area that’s appropriate for inclusion in mine. There are just times when I have not thought to add a particular set of content, but somebody going through one of my subject guides who is interested in something that may not be traditionally or not strictly [the participant’s liaison subject area].
The opportunity to collaborate with librarians who have different areas of expertise and subject specializations provides more choices in selecting resources, helping to diversify information presented on the web pages:

We all have our areas of expertise, and I may be the best at these four databases, but my colleagues are the best at these four, so if there are five of us, and we created four databases that are appropriate for our subject areas, so suddenly we’ve got a pool of twenty resources that we can use that I can pick and choose the most appropriate for my particular subject guide or class page.

The librarians discussed various forms of collaboration that were performed one-to-one or as a team:

We have group meetings, we have the liaison meeting, where all the liaisons that are primarily responsible for creating of the subject guides that are on CMS, we have discussions in those meetings. We collaborate there about how to improve content, how to make it more usable, more accessible to students, faculty, staff, community.

Collaboration with colleagues became part of the authoring routine with familiar procedures. The librarians see the sharing of content and exchanging of information as a straightforward process. One expert discussed the simplicity of the process in sharing content, making adjustments, and borrowing the content that he or she authored:

They cannot change it, it’s locked under my login, so if it does not fit exactly in their parameters, they may contact me and ask me to make adjustments to benefit the use of the content in their area, and we do that often. There are times when I will get a request from one of my colleagues saying, “You created this, and if you could add this to that content, it would not affect the content you created as far as your own subject guides, but it will really benefit the work I am doing in my subject guide,” and so we exchange information that way on a regular basis, and that’s collaboration.

The second stream of collaboration in authoring is with other library and university departments. Web content authors collaborate with the other public services of libraries. Cooperation with IT specialists and university web development, marketing, and other departments was discussed earlier in this chapter.
The third stream of collaboration in creating web content develops with the LIS community. Librarians use social networking, conferences, professional publications, and other channels of communication:

I’ll go to other universities’ websites, I’ll go to places that have known, well-recognized programs. I’ll look at their LibGuides, I’ll see what content they include, how they present it, how they use it. If they do something that just, you know, knocks me down and jumps off the page, I will send them a note saying, “By the way, I would borrow your content,” and I’ll usually get an email back saying, “Hey, thanks for the compliment.” It’s not plagiarism, it’s copy of, it’s content memory because they did something so well, you know, I’ll say, “Can I use your content?” and they’ll say, “Yes, great! Thanks!”

The final stream of collaboration in authoring content is with end-users. Cooperation and communication with end-users was discussed formerly in this chapter. To create the content of websites, librarians follow end-users’ demands and appreciate end-users’ direct requests and suggestions: “They [end-users] would email to me that they knew another great resource that they would like added to the subject guide.” In authoring the web pages, the librarians considered a broad spectrum of the issues involved in usability of the web pages. For example, one expert stressed the need for consistency in terminology used in the content of the libraries’ website.

The web CM authoring process has an evolving character. Librarians constantly monitor changes in available resources, end-users’ requests, changes in curricula, requests of subject major departments, other libraries’ experiences, etc. Content of guides goes through adjustments according to end-users’ feedback: “For example, if they aren’t using some of the professional associations that I put up, then I’ll just take them out and try a different content to see if it’s more valuable to them.”

Issues of training and learning were discussed in previous sections. In relation to authoring responsibilities, the librarians stressed the need of continuous learning and
ongoing training. When talking about their qualifications applied in web authoring under CM, the experts said that the skills in authoring, editing, updating, and presenting of content they obtained using a CMS have to be practiced on a regular basis to retain them:

Those people who learned the CMS and entered their information, when they migrated the subject headings, and did not look at it again for a year, this is one of those use-it-or-lose-it type of things. By the time they go to revise a page, they don’t remember how to get into the CMS, they don’t remember how to get to their particular page, and they certainly don’t remember how to edit or save! Basically, it turned into process of re-training.

To employ the entire potential of a CMS, authors have to master both its existing and its new attributes. A lack of sufficient knowledge about the system’s attributes can result in certain limitations to efficient utilization. An expert discussed a situation, when a peer librarian would tell him/her, “I wish I could do this,” and the expert would say, “Well, we can. We have this resource available, we have this technology available, we have this.” This expert concluded his/her thought,”They know what they want to accomplish, they just don’t know the tools to accomplish what they need.” This example demonstrates the need of continues learning.

As discussed earlier, in creating web content, librarians value end-users' feedback. They shared optimistic feelings they have about receiving positive feedback:

I set a link to the newly published subject guide [published a new subject guide], and I’ve got five comments in the next two days from faculty who use this consistently saying, “This is great! I love the new look, I love the new layout, I love the new format! This makes it so much easier to do my job and to refer my students to your content this way”; so it’s one of those proofs of concept for me that . . . I got very positive feedback, very positive comments.

Reusable content/information, global change to content, and other CM features were ‘very useful’ and changed the nature of librarians' work with content:
It had really changed the nature of the content that I create. Instead of creating a very specific set of content for a particular subject guide, I can create [something] a little more generic. It still has the specificity that I need to work with that particular group [the end-users], but if I make it a little more generic . . . I can reuse the content, versus creating something so specific for everything that creates a lot more work than it does with the CMS.

Many of the CMS features “allowed me to be a lot more flexible and a lot more in-depth in what I do.”

Discussing their areas of responsibilities in web content management, librarians connected these responsibilities to their educations, professional qualifications and experiences, and knowledge of environments and end-users:

I think librarians should stick to doing environmental scanning to find new resources and evaluate them; select the best ones for their subject guide based on the abilities of the end-users (pause) and learning goals of the end-users. Librarians should also stick to doing instruction via subject guides whether it’s with text or interactive element because we do have training. We should be the ones deciding how to add value to a subject guide by linking them to other information within the website. Also, we are the ones who have training in learning styles and different styles of pedagogy, so we should be addressing that in developing the subject guides. I don’t think the IT people know much about pedagogy or learning styles, so they need to stay off that part; that’s what we are usually concentrating on.

The above librarians’ arguments about their roles in providing information services using CM correlate with the findings encountered in the literature. For example, Partridge et al. (2010) wrote that participants in their study said that Web 2.0 “requires librarians to take on the role of educator, trainer, or guide” and that the “librarian 2.0 must know how to be an advocate and lobbyist for the resources and programs he or she wants to introduce, especially when faced with IT departments or senior management who have competing agendas or policies” (p. 327).
Chapter Conclusion

This chapter reported results from the analysis of the data collected in the survey and two rounds of interviews with subject librarians. Chapter 5 will provide the conclusions of this study that include the overview of findings, the discussion of implications for LIS, the limitations of the study, and the considerations for future research.
CHAPTER 5
CONCLUSION

Introduction

This study focused on information management behavior of the academic librarians and its impact on information services with CM technology as an instrument to facilitate the process of bringing information to the point of use and to answer the end-users’ information needs in the most efficient way. The research explored the librarian’s attitudes about authorship of web content and the lessons learned while applying the CMS.

At the beginning of this study, the theoretical foundations and literature findings helped to formulate the research problem and the research questions and to construct broad organizational categories on the topic of the study. The data analysis performed in the study had an evolving character. It started in the initial stages of the study and continued to organize, compare, interpret, and present the data received at each stage of the data collection. The analysis of data from the first round of interviews with experts clarified the tentative substantive categories of the study that were used to shape the survey questions. Furthermore, the statistical data received from the answers to the survey’s open-ended and (first round) interview questions were analyzed in conjunction with the substantive categories. Subsequently, themes (sub-categories) were developed among the categories. Finally, data of the second round of interviews provided clarification of the themes and deeper examination of the categories to obtain conclusions about the prospective of substantive and theoretical categories developed and employed in the study.
Overview of Findings

First, the researcher set out to explore the perceptions and attitudes regarding the use of a CMS by web content authors, specifically by subject librarians. The analysis of data results demonstrated that compared to the system used before, the new CMS introduced many useful features that support librarians' web authoring tasks of providing information services by using subject guide web pages and by answering end-users' information needs. Migration to the new system involved issues of learning, organizing content, finalizing of page structures, revising content, and various other procedures and regulations of administration and technology. Many indicated by Goans et al. (2006), Seadle (2006), Benzing (2006), McAfee (2006) and outlined in chapter two attributes and features of CM were discussed by participants in this study. They expressed positive opinions about the CMS attributes that help them to organize information and to achieve consistency and standardization with the help of the template with predetermined tabs, the ease of use of the system, the flexibility of some of its attributes, the speed in performing certain operations, and other CM features. Compared to the previous mode, applying the CMS allowed librarians to more easily divide the work responsibilities among the participants of the website development process. Librarians can delegate technical work to other staff members and concentrate on their authoring responsibilities. The CMS centralized website control to benefit system users and end-users of the website. Training provided at the libraries and cooperation with other library employees were the most important factors to efficiently use the CMS.
Difficulties observed in migration to the new CMS were related to transferring the old content into the new template. Goans et al. (2006) also observed this difficulty and named it as one of the findings in their study. Organizing and formatting old content to fit into a new template can cause problems in migration. Additional difficulties were caused by the differences in levels of experience with web development, knowledge of web design tools, and general “technology comfort” among the librarians users of the system. These differences reflected in the librarians’ approaches in learning and using the system and in their attitudes toward the system’s features and processes. Learning the new system required time and effort, which sometimes seemed problematic. These problems were resolved by training, cooperating with team members, IT specialists, and other library departments, reorganizing the template, administrative measures, and others. Kling, et al. (2005) emphasized the importance of the user-oriented prospective in development of technologies to avoid “unintended problems/losses” after the users start to apply the technologies (p. 47). Green (2008) stressed the need to get feedback from system users at every stage of migration to the CMS. Vidgen et al. (2001) indicated that the initial period of the practical application of a newly-introduced system should provide for understanding of specific-use situations and conditions in which people use the system. The study’s participants discussed the need for further improvements in the system itself and adjustments to the system (see chapter 4) that included using currently available features and adding new features to improve the design, the content presentation, and the work process in general.

Second, the researcher set out to explore how, in the opinion of the web authors, the use of a CMS affects the information services. The participants of the study
characterized their CMS as a technological support in adding value to information, creating user-oriented content and providing information services. A CMS supplies more opportunities to add value to the content of web pages and to facilitate navigation for end users. With the help of technologies, librarians transform information through “formal processes by which the potential usefulness of specific input messages being processed is enhanced” and increase the “probability that the content of formal messages, that is the information, will be useful to a client or group of clients in a particular environment with particular kinds of problems” (R. Taylor, 1986, pp. 6-8). In librarians’ opinion, the CMS’s consistency and standardization in design and content make web pages of the subject guides “look more professional, and in turn, . . . that lends more credibility and authority to the content within the subject guides.” Thus, the librarians are concerned about how the CMS helps them to fulfill their bibliographers’ duties in delivering to the end-users “what is known, what is the state of some question” and performing “quality control” for reliability and cognitive authority of information (P. Wilson, 1983, p. 171). The librarians expressed positive feelings about the web pages they maintained in the CMS (“I think it’s a product we can be proud of”) and articulated their contentment about receiving users’ positive feedback (“I would have people communicating to me that they really appreciate having all the resources at their fingertips through the subject guide”). The librarians feel more confident in providing information services with the help of the guides’ web pages and in sharing information about the guides with end users: “Now that we have the CMS and our subject guides are easier to navigate, they are more current, more professional, I feel more confident about sharing with faculty that they [subject guides] are available.” The librarians also
spoke favorably about the specific features of the guides that were invented with the CMS. In general, they expressed positive attitudes toward the fact that the web pages under CMS provide for an increased value of information services and that with the CMS, the information is delivered in a professional, representative way that speeds communication with end-users.

Discussing the CMS and its influence on the variety of their activities, the librarians repeatedly returned to the issues of the web pages’ usability. An ideal library’s information services have to organize universal access to information, making it available to all potential users (P. Wilson, 1977). The participants of this study indicated that applying CMS allows them to meet a variety of users’ needs and to accommodate different learning styles by presenting content in different formats. They informed the researcher that their information services are more personalized and that communication tools available within the CMS allow them to provide these services when the users need them and to adjust them to users’ inquiries, often in real time. Therefore, with the CM, librarians continue their role in “mediation of information” and providing a “human context for information” (O’Gorman & Trott, 2009, p. 327-330). They use subject guides’ web pages for purposeful presentation of information resources, and services that help users to “reduce the search time and to make informed selections, providing topical information and significant clues as to linguistic, conceptual, and critical suitability” (O’Connor & O’Connor, 1998). The survey and interview participants made suggestions related to information services (see the discussion in chapter four) and the functionality of the CMS.

Third, the researcher set out to explore from the perspective of authorship the
lessons learned in creating content with a CMS. The results of this study revealed librarians’ opinions about web content/information, their attitudes about their roles in CM, and their perceptions about the processes that go together with and have an effect on their authoring activities in the CMS. Librarians feel themselves responsible for the content and information presented on the website. The participants of the study appreciated the changes brought by the CMS into the nature of their work in authoring web content. Cooper (1982) noted the quality considerations about content/information organized within an automatic system: coverage of the data base, completeness (recall), relevance (precision), novelty of output, and completeness and accuracy of data. The participants of the study informed the researcher that they appreciated the innovative features of the CMS that provide for shared resources, reusable content, global changes within the website, single operation updates, content audit and control, centralized copying, storing, and replicating content, etc. (see chapter 4 for more detailed discussion).

The participants of this study emphasized the necessity of continuing advancements that discuss the issues of CM and CMS functionality in delivering dynamic content on their libraries’ website. They noticed the high potential of CM technology for dynamic content delivery and the necessity to use this potential in the interests of end-users.

In the librarians’ opinions, authoring web content in CM is the major responsibility of librarians/information professionals. Authoring web content in the CMS is performed in close cooperation with team members, other library departments, IT specialists, and other members of the university community, including end-users and other LIS field
professionals. The librarians emphasized the significance of collaboration and
coordination in authoring content because these processes bring new ideas, richer and
broader content, more choices in selecting resources, and a diversity of information.
The web CM authoring is an ongoing process. Academic librarians constantly monitor
changes in available resources, end-users’ requests, changes in curriculum, requests of
academic departments, other libraries’ experiences, etc. The content of the guides
goes through adjustments following end-users’ feedback.

The librarians stressed the need for continuous learning and ongoing training to
retain the acquired and to obtain new qualifications and skills required in authoring web
content with CM technologies. These results support previous publications emphasizing
that current ICT environment requires continual learning and acquiring new
qualifications (Evans, 1999; Commings, 1997; Connell, 2008; Gross and Leslie, 2008;
Iglesias, 2008; Milone & Hill, 2008; Rice-Livey & Racine, 1997; M. Taylor, 2000, and
other). The “need for librarian 2.0 to be interested in, and willing to engage in, lifelong
learning” was highlighted in the study of (Partridge, et al., 2010, p. 326).

The participants of this study stressed librarians’ leading role in developing web
page content and defined this role as “active,” “real important,” “major,” and “primary” to
web content management. They applied terms that acknowledged their active
involvement into the process: “guide,” “identify,” “highlight,” “suggest,” “communicate,”
“provide,” and “support.” To perform their authoring roles, academic librarians employ
CM technology to carry out activities summarized in the theoretical considerations
Taylor (1986), White (1992b), and P. Wilson (1977, 1992) regarding the framework of
The librarians saw CM technologies as a supporting instrument in their work activities. Revisiting and rephrasing Buckland (1999), the participants of this study saw CM technology not as a purpose of information services but as a means for providing information services using CM technology instruments. The participants of this study said that librarians "should be primary in developing content because they are the experts in subject-specific information and resources, and information literacy," and technology should “support” their work activities. As stated by Partridge et al. (2010), “successful librarians in the Web 2.0 world (and beyond) need to be aware of, and have some fundamental understanding of, the emerging technology—what is available and what it can do and how to make it do what is needed—but they do not need to be IT professionals per se” that agrees with the librarians’ opinions under the current study (p. 326). The participants of this study especially stressed the necessity of their involvement into all the stages of CM project, starting from selecting, constructing, and testing the CMS and template. As indicated by Black (2011), the “selection of a web CMS is not solely a technical decision; it is most effective when made in partnership with the web content providers” (p. 189).

During this study, some topics and concepts did not receive the anticipated attention from the study’s participants and did not yield sufficient results for a productive data analysis (see chapter 4). For example, the discussion about how Web 2.0 tools are utilized with the CMS did not result in an adequate number of comments to make a strong inference or conclusion. Furthermore, it is important to mention that the research category Content Management that was created in the initial stages of the research
appeared afterward to be getting insufficient attention and was eliminated from the coding scheme. The survey and interview participants barely used the term 'content management' and almost never referred to the CM concept. This can be explained first of all by a relative novelty of the concept and also by the existing literature and practice variations in terminology and definitions (see chapter 4).

Furthermore, some topics received much deeper attention than had initially been anticipated and developed into substantial categories (see chapter 4). The most obvious example of that is the topic of Cooperation and Communication. Because issues of cooperation and communication were brought in during the first round of interviews and were commented upon by many survey respondents, the cooperation and communication theme was discussed in more detail in the second round of interviews (see chapter 4). The study’s participants emphasized the importance of different forms of cooperation with the developers of the CMS, with other library and university departments, and with professional communities on a variety of issues related to the use of a CMS. These findings correlate with the research of Fulton (2010) that indicated that effective communication inside the institutions ensured a more effective management of CM projects. The participants in this study also stress the importance of improvement of communication and cooperation with the end-users with the help of emerging Web 2.0 applications.

LIS Field Implications

At present, essential parts of library information services are performed on libraries’ websites. A growing number of libraries are engaged in redesigning their web
presence. Because of the amount of information and the scope of work involved, “managing this multi-layered, sometimes slippery entity can be a great challenge” (Bundza et al., 2009, p. 240). A better understanding of the variety of factors involved in these processes can contribute to improving the effectiveness of the projects and systems used to redesign of the web presence of library information services.

As more academic library websites migrate to new CM platforms, there is a continuing tendency toward a higher involvement of librarians in creating, maintaining, and further improving library sites (Hendricks, 2007). Introducing CM into the design and development of web content fundamentally changed the very “nature of web authorship” (Yu, 2005, p. vii). Innovative CM technologies support the direct and active participation of librarians in management of information presented on their libraries’ websites. Sharing the experiences and the requirements to the CMS systems are valuable for other libraries using or planning to use CM models (Yu, 2005). The CMS selection and the CMS’s planning for a library’s website involve complicated solutions and must answer the needs of all the system users, including the content providers (Black, 2011).

As indicated by Dillon (2005), the current focus of information field studies is to study “human behavior in the context of data creation and use, where the data is abstracted into an examinable record” and that a “meaningful study of information” cannot be created without invoking “human aspect” (p. 312). With the growing involvement of librarians in the use of various applications of ICT, there is a distinct need for studies of their experiences and perceptions about the process of using new technologies (Rabina & Walezyk, 2007; Rice-Livey & Racine, 1997). The studies
related to various activities of library staff in “handling the new task of home page development in a time of restricted budgets” should become an important issue in library and information science research (Evans, 1999, p. 309). According to the State of America’s Libraries Report, 2011, currently, “many academic libraries are grappling with budget reductions and subsequent restructuring.” (“ALA Press Release,” 2012, para. 8). LIS field professionals need to “actively and assertively engage in research to determine the true effectiveness and efficiency of library tools and to create the designs that will return control of library tools” to LIS professionals (Wallace, 2007, p. 531).

There is a necessity to combine qualitative and quantitative research instruments and tools to achieve a deeper “exploration of social environments, of people’s assumptions, views, priorities, etc.” in academic librarianship (Warwick, 2009, p. 179).

Research about the information management behaviors of information professionals who use modern information technologies is complex and concentrates on both technologies and human aspects, attracting researchers from different disciplines (Erickson, Kellog, & Thomas, 2001; Hildreth & Kimble, 2002; Kuhlthau, 1999; Mora, Gelman, Forgionne, Petkov, & Cano, 2009; Mack, Ravin & Burd, 2001; Rice-Livey & Racine, 1997). Until recently, the mainstream of LIS field research about information-related human behavior concentrated on the various aspects of information seeking behavior. However, people who use ICT work in different information environments, carry on various information-related tasks, and, subsequently, demonstrate different behaviors toward information processing and ICT (Kling, et al., 2005). Together with the necessity to study aspects of information-seeking behavior, there is a significant need for research into other aspects of users’ behavior and their
demands towards ICT (Johnstone, Bonner, & Tate, 2004; Maceviciute & T. Wilson, 2005). Furthermore, the literature of the LIS field contains a significant amount of studies related to library administrators, various software programmers, and web development teams who use ICT to create and maintain web pages (Blummer, 2007). However, there is a need to address the existing insufficiency of research devoted to the roles of librarians in web CM.

Thus, in this study, the researcher explored the information management behaviors of subject librarians who apply CM technology to create and manage subject guide web pages presented on academic library website. Perhaps the most promising findings of this study are in discovering librarians’ opinions about how their utilization of CM influences the information services provided for end-users of their website; examining librarians’ perceptions about the effects of using CM to create the content/information of web pages; and investigating the lessons learned by subject librarians while using a CMS to author content.

Additionally, it is implied that the results of the study will help the members of the study’s population to self-assess the processes of migration and management of the web pages under CM and the lessons learned in this processes. The results of the research will have practical applications for higher effectiveness of information services.

Future Considerations

Limitations of the Study

To explore the information management behavior of librarians who use a CMS, this research followed the reflections of the existing theoretical concepts discussed in
chapter 1. It has to be noted that insufficiency of prior scholarly research into applying CM in the LIS field created certain constraints for this research. In addition, because the participants of the study provided the majority of the collected data, there was a possibility of self-reported data bias. Besides, the different experiences in using CM that existed among the study’s participants could be reflected in their responses to the survey and interview questions. The study was also limited in that it was conducted in a single academic library and that only subject librarians participated in the study. Some answers to the survey’s open-ended questions were not detailed enough to make any valid implications and further conclusions that brought certain issues into the coding process. To resolve these issues, the corresponding changes were made in the coding book and coding procedures. Beside, as it was discussed in chapter 3, certain survey responses were clarified with experts. These limitations also demonstrated a need of future modifications in data collection process that could involve clarifications of the survey questions, measures to encourage participants to provide more detailed answers, as well as recruiting more participants for interviews or organizing of focus groups.

The observed limitations of the study did not diminish the characteristics of research validity that were discussed in chapter 3. The above limitations must be taken into consideration while assessing the findings’ applicability and their transformability to other environments. The next section makes suggestions for further research that could take into consideration these limitations.
Future Research

Starting in the early stages of computerization, libraries and librarians have always looked for new technological opportunities to improve information processing and presenting to end-users. Modern technology infrastructures continually introduce new and more sophisticated platforms for collecting, analyzing, exchanging, communicating, and publishing information in diverse formats and environments. As discussed above, to determine potential ways to improve academic libraries’ virtual information services, there is a growing need for further research into using new technologies, including CM, by all the participants of these services (Anderson, 2007; Buckland, 2008; Croft, 2001; Maness, 2006; Rice-Livey & Racine, 1997).

Content management “cuts through many areas and assimilates concepts, including KM [knowledge management], document management, competitive intelligence, web development, library and information sciences, and e-commerce, among others” (Srikantaiah, 2004, pp. 149-150). Some of the issues related to using CM technologies have started to get more attention in the scholarly (LIS) field literature (see chapter 2).

A new technology will effectively meet the needs of an organization if it is customized, flexible, and compatible with the organization’s entire infrastructure and external environment (Huang, Wang, & Wang, 1999). To achieve the expected benefits and to avoid unnecessary expenses, there is a need to research multiple aspects of ICT applications, so they will fit organization’s strategic goals and will ensure the adaptability of organization’s staff to changing environments (Fisher, 2004; Warwick, 2009). To keep up with the rapid pace of technological changes, academic libraries must “make
sense of these changes within their domain of expertise and engage with the issues, opportunities and challenges raised” (Anderson, 2007, p. 195). Accordingly, it can be implied that a significant demand will arise for research into issues in LIS that are related to CM.

The researcher believes that information management behaviors of information professionals who use CM tools to increase the effectiveness of information services provided on libraries’ websites deserve more attention. Future research with a more representative sample size that will expand with quantitative research methods could provide a higher degree of reliability and generalizability of results. The advancements in practical applications of CM should result in organizing of theoretical constructs for the future research could study the phenomenon related to web authorship in the LIS field attracting data of a broader scale and employing diverse research methodology in support of theoretical foundations. Cooperation between information specialists and IT professionals, core qualifications and training of LIS professionals, practical application of various technological platforms, issues related to development and delivery of dynamic web content, digital curation processes using CM, various usability studies, marketing and promotion of organized within CM online information services, and other areas in applying CM could be in focus of potential discovery. Forthcoming research could concentrate on obtaining data from a wider variety of organizations, which would allow researchers to expand the landscapes of study and to avoid the possible biases of a study with limited boundaries.

This research explored how CM technologies support subject librarians in providing information services to visitors of academic library websites. Using
instruments of qualitative research with elements of quantitative analysis, this study explored how applying CM technology helps librarians get closer to P. Wilson’s (1977) and Buckland’s (1992) “ideal library service” and future improvements to library services. The results obtained in this research coincide with the theoretical concepts and correlate with findings from other studies encountered in the LIS field literature. As discussed by Wilson (1977), information specialists apply knowledge and professional judgment to perform roles of pragmatic bibliographers who facilitate “bibliographical access to materials wherever located,” who provide “general instruction” and “highly specialized individual assistance” to ease the “burden of discovery and of physical access to documents” and to aid “reorganization and application of knowledge” (p. 104, pp. 119-120). Creating web content, academic librarians are concerned about “critical questions of reliability” of information and its “cognitive standing” (Wilson, 1979, p. 245). Carrying out activities of web content creators and using CM technologies, academic librarians are primarily interested in how these technologies assist them in applying their knowledge and professional expertise to deliver information to the point of use and to create information services that answer a variety of end-users’ information needs.
APPENDIX A

DEFINITIONS
• **Content Management**

  The “art of locating, selecting, acquiring, processing, managing, and disseminating content” (Srikantaiah, 2004, p. 23).

  *Web content management* is identified as the “discipline of collecting, organizing, categorizing, and structuring information that is to be delivered on a website” (Black, 2011, p. 185).

• **Data**

  “Input that has not yet been evaluated or given a context” (O'Connor et al., 2008, p.8).

• **Dynamic content**

  Content that is “easy to find, accurate, up-to-date, and continuously refreshed, complete enough for users’ needs, well organized for quick search and retrieval, readable in the right language, linked to other relevant content, targeted to each person’s needs and levels of experience and knowledge” (Hackos, 2002, p. 8).

• **End-users**

  In academic library settings, the end-users are library patrons including students, faculty, and members of the community.

• **Information**

  The “ore, the sum total of all the facts and ideas that are available to be known by somebody at a given moment of time” (Cleveland, 1982, p. 34).

  “Stuff” which is processed by information systems and comes in chunks ranging from a single datum to very large organized collections of data and/or knowledge,” where the chunk is “a generalized unit of information” (R. Taylor, 1986, p. 10; p. 202).

• **Information behavior**

  The “activities a person may engage in when identifying his or her own needs for information, searching for such information in any way, and using or transferring that information” (T. Wilson, 1999, p. 249).

• **Information management**

  “Six closely related activities: identification of information needs; information acquisition;
information organization and storage; development of information products and services; information distribution; and information use” (Choo, 1998, p. 24).

- **Information processing**
  
  “By information processing, we mean the deriving of new information-as-thing” (Buckland, 1991, p. 29).

- **Information services**
  
  “The information service is the mechanism of organization which provides the information (about the state of the world or public knowledge) to a user” (Saracevic and Kantor, 1997, p. 533).

- **Information systems**
  
  “The phrase “information systems” is used as a shorthand for activities with the following characteristics:
  
  - They are formally designed processes that select, acquire, organize, store, retrieve, display, analyze, and/or interpret messages;
  
  - These are processes where messages are enhanced in a variety of ways, either by signals or by fundamental alteration of the content;
  
  - Messages are formal communications that people consciously design, and issue in some form, for example, publish, record, present, or put in memo form;
  
  - Messages are also generated through various computing devices and processes, and may be massaged, formatted, or organized by programmed instructions;
  
  - These messages are sought by or automatically routed to other people who may or may not choose to make use of them” (R. Taylor, 1986, p. 30).

- **Information technology**
  
  “Information technology as any technology used in handling information” (Buckland, 1991, p. 70).

- **Semantic content**
  
  The “semantic content refers to the meaning of the information, its significance for authors and users” (Hackos, 2002, p. 69).

- **Subject Specialist**
“A librarian qualified by virtue of specialized knowledge and experience to select materials and
provide bibliographic instruction and reference services to users in a specific subject area or
academic discipline (or subdiscipline). In academic libraries, subject specialists often hold a
second master's degree in their field of specialization. Also refers to a librarian trained in subject
analysis” (Reitz, 2004).

• **Web 2.0**

“A popular buzzword among the technical and marketing communities, used to describe a
perceived ongoing trend in the use of world wide web technology and web design, which
emphasizes the importance of information-sharing, creativity, and collaboration among internet
users. It is regarded by some as the next phase in the internet's evolution, although the term,
which was coined in 2004 by O'Reilly Media, refers to changes in the ways existing internet
facilities are used, rather than to an actual ‘second generation’ of web technology. The increased
use of interactive internet-based services such as social networking sites, blogs, video-sharing
sites, wikis and forums has led to a movement away from static, read-only webpages towards
dynamic websites whose content is shaped partially or entirely by their users, and for this reason,
Web 2.0 is sometimes called ‘internet with a human face”’ (Web, 2009).
APPENDIX B

CHARACTERISTICS OF PLONE CMS
- easy to download, learn and use
- designed for non-technical people to enable creation and maintenance of public websites and Intranet sites using only Web browser
- offering solution to extend the system with multiple adds-on to meet various coming up needs
- security and reliability “without scarifying power of extensibility”
- broad community of users providing effective input into the system improvement
- employed by thousands of organizations from “large and small businesses, education, government, non-profits, sciences, media and publishing”
- offers global network of over 500 solution providers in 50 countries
- runs on Linux, Windows, Mac OS X, FreeBSD and Solaris
- integrates with Active Directory, Salesforce, LDAP, SQL, Web Services, and other
- meets US Government 508 and W3C’s WAI-AA standards
- based on Python (73%), XML (15%), JavaScript (6%), Perl, PHP, AWK and other programming languages (6%), and open-source Zope CM solution server
- expanded capability facilitating scaling and migration processes
- uses XHTML and CSS web standards (Limi, 2009; Plone, 2010).

For more detailed description of the features see Plone (2010).
The University of North Texas is a public university located in Denton, Texas. In the spring 2011 semester, it enrolled 34,085 students, including 26,428 undergraduate and 7,657 graduate students; in the spring 2009, the university had 988 full-time and 519 part-time faculty (UNT Fact Book, n.d.).

“The University Libraries house collections of over 6 million cataloged items, in a variety of formats, in five libraries located in five separate facilities, and provide electronic access through the University Libraries' website http://www.library.unt.edu. ... The University Libraries are administered by 51 librarians with the assistance of 83 full-time staff. The Libraries are under the general supervision of the Dean of Libraries” (UNT Fact Book).

In 2009, the Libraries’ collection had 1,825,148 books and bound journals that were accessible through the catalog, 36,104 electronic subscriptions, 437 electronic reference sources and aggregation services (UNT Fact Book, n.d.). In March of 2006, to improve the service offered by the Libraries and incorporate innovative technologies, an Emerging Technologies Group started to work to assist with “investigation and implementation of emerging technologies” (Annual Report, n.d., p. 34). Further, to improve customer service, the Libraries identified needs for training and planned to “provide training for staff on emerging technologies” to supply the employees with the “tools, training, and authority to correct problems” in use of the new technologies (Annual Report, n.d., p. 32).

UNT Libraries apply the LibQUAL+™ survey instrument developed by the Association of Research Libraries together with the Texas A&M University Libraries. The survey data are used to develop the libraries’ strategies and identify the areas for future improvement. The survey is a “web-based survey used by over 550 libraries in the United States, Canada, the United Kingdom, Europe, and Australia. The survey collects data on user perceptions of the quality of library collections, services, and both physical and virtual environments” (Annual Report, n.d., p. i)

The following leading themes from the users’ answers to the survey questions in 2005 were employed to identify the libraries’ goals and strategies for the next five years:

- “Enthusiasm about the availability of electronic resources.
- Desire for more online services.
- Desire for improved electronic interface to both resources and services.
- Importance of library instruction.
- Importance of library support for distributed learning.
- Need for a marketing strategy to ensure that the UNT community is aware of available resources and services.

- Dissatisfaction with unwelcoming, outdated physical facilities.

- Conflicting needs for space for group work and private study” (Annual Report, n.d., p. i, ii).
APPENDIX D

THE LIBRARIES’ WEBSITE REDESIGN PROJECT
• Management of the UNT Libraries website was centralized and assigned to the Manager of the Multi-Media Development Lab (MMDL) “with a structure put in place to ensure that all areas of the library have control of the content related to their areas of responsibility” (Annual Report, n.d., p. 1).

• The MMDL developed a charter for the Libraries’ website Re-architecture and Redesign Project. The Libraries’ Administrative Council approved the project proposal.

• “A Content Management System (CMS) Committee was convened in January 2006 to discuss requirements and make recommendations for a content management system for the Libraries’ website. The Committee included members from several departments in the Libraries. Selection of the CMS was approved May 2006.” The Committee had approved Plone CMS open source software as a default platform for migration of the website (Annual Report, n.d., p.3).

• “The Libraries’ website Re-architecture and Redesign Project team met with all stakeholders to identify, analyze, and understand their redesign needs. Preliminary usability research was conducted to assist the needs assessment planning for this project” (Annual Report, p. 4). The complete Current Site Report, which included “the stakeholder inventory, current site content structure outline, web publishing guidelines, technical specifications, usability study report, and recommendations for the re-architecture and redesign,” was made available at the Libraries’ website (Annual Report, n.d., p. 4).

• The Libraries’ website Re-architecture and Redesign Project Charter/Scope Statement and the Content Management System Committee defined departmental responsibilities for Web content ensuring that “individual departments retain authority over their web content” (Annual Report, n.d., p. 3).

• “Following stakeholders meetings with MMDL, departmental website Content Liaison assignments were made and agreements signed between the departments and MMDL” (Annual Report, n.d., p.3).
Departments began “systematic reviews of their web content in preparation for the website redesign and began to update and/or eliminate content no longer required to support the academic programs or the Libraries’ mission” (Annual Report, n.d., p. 3).
APPENDIX E

SUBJECT GUIDES REDESIGN PROJECT
1. The project included the following departments of the UNT Libraries: Government Documents, Discovery Park Library, Media Library, Multimedia Development Lab, Music Library, Research and Instructional Servicers.

2. The project polices, procedures, guidelines, timeline and other issues were specified. The Subject Guides Subcommittee was organized to coordinate the work over the project, develop a standard template for subject guides, and design standards and instructions for the authors of the guides’ content. The Subcommittee page was created on the Libraries’ wiki.

3. An ad-hoc workgroup was formed to study best practices and develop guidelines for the new subject guides. The group investigated opportunities to use various software platforms, including the LibGuides platform, to create and maintain the subject guides. Links to the examples of other libraries’ subject guides, screenshots, and descriptions were placed on the Libraries’ wiki site. MMDL started to develop a template similar to LibGuides using open source CMS platform Plone.

4. The new subject guides template was ready in the Spring of 2008.

5. Subject Guides Style Manual and Instructions were developed in August of 2008 and became available on the Libraries’ wiki.

6. In December of 2008, the system was tested and uploaded to the public website in order the authors (subject librarians) could start the migration process.


8. The Quality Control group was organized to monitor work-in-progress, provide suggestions, and assist with edits.

9. The librarians enlisted the help of the Graduate Library Assistants to complete the migration.

10. The project work process was organized in accordance with the UNT Web Publishing Policy and the Libraries Web Content Development Policies and Guidelines.
APPENDIX F

FORMS OF TRAINING IN THE SUBJECT GUIDES REDESIGN PROJECT
• Online tutorials in different format (Flash, PDF files, and other) available from the Libraries’ wiki.

Some examples of the tutorials’ sections: Mandatory tabs, Suggested rules, Meebo widget, Proper organization and location of resources with tabs, Brief introduction (introduce yourself, the purpose of the subject guide and the tab definitions), and other;

• Face-to-face group and individual training sessions organized by MMDL staff and members of the Subject Guides Subcommittee;

• Handouts;

• Prior to migrating of the content to the public site, the librarians could use a site created for training and testing purposes for they could experiment in a real-view virtual environment;

• Tutorials available at the website of the CMS provider and other related to creation of subject guides resources;

• Information materials about procedures of use of the UNT brand identity and the UNT Libraries Logo for the UNT Libraries' public website.
APPENDIX G

THE UNT LIBRARIES WEB CONTENT DEVELOPMENT POLICIES AND GUIDELINES: RESPONSIBILITIES OF THE CONTENT CREATORS AND CONTRIBUTORS
• “Using Mozilla FireFox as the designated web browser for CMS content editing
• Understand and adhere to university web publishing policies and guidelines
• Maintain effective communication with MMDL team via unit content liaison
• Be familiar with the content management system for content creation
• Be familiar with basic html coding for better practice
• Be familiar with Adobe Acrobat
• Be familiar with image editors such as Adobe Photoshop or Firework
• Ensure all files uploaded to the CMS are free of viruses
• Respond to user inquiries
• Review and Spell-proof content before publishing
• Review unit level content routinely to ensure its timeliness and accuracy.
• Delete obsolete pages and files
• Fix Broken Links in timely manner
• Keep content updated, and modify content as needed” (UNT Libraries Web Content, 2009)
APPENDIX H

INSTITUTIONAL REVIEW BOARD PERMISSION LETTERS
Brian O’Connor  
Department of Library and Information Sciences  
University of North Texas

Re: Human Subjects Application No. 10405

Dear Dr. O’Connor:

As permitted by federal law and regulations governing the use of human subjects in research projects (45 CFR 46), the UNT Institutional Review Board has reviewed your proposed project titled “Web Content Authorship: role of Academic Librarians in Web Content Management.” The risks inherent in this research are minimal, and the potential benefits to the subject outweigh those risks. The submitted protocol is hereby approved for the use of human subjects in this study. Federal Policy 45 CFR 46.109(e) stipulates that IRB approval is for one year only, November 11, 2010 to November 10, 2011.

Enclosed is the consent document with stamped IRB approval. Please copy and use this form only for your study subjects.

It is your responsibility according to U.S. Department of Health and Human Services regulations to submit annual and terminal progress reports to the IRB for this project. The IRB must also review this project prior to any modifications.

Please contact Shelia Bours, Research Compliance Analyst, or Boyd Herndon, Director of Research Compliance, at extension 3940, if you wish to make changes or need additional information.

Sincerely,

Patricia L. Kaminski, Ph.D.  
Associate Professor  
Chair, Institutional Review Board

PK: sb
February 14, 2011

Brian O'Connor
Department of Library and Information Sciences
University of North Texas

Institutional Review Board for the Protection of Human Subjects in Research (IRB)
RE: Human Subject Application #10405

Dear Dr. O’Connor:

The UNT IRB has received your request to modify your study titled “Web Content Authorship: Role of Academic Librarians in Web Content Management.” As required by federal law and regulations governing the use of human subjects in research projects, the UNT IRB has examined the request to revise the survey to be used in this study. The modifications to this study are hereby approved for the use of human subjects. Federal Policy 45 CFR 46.109(e) stipulates that IRB approval is for one year only, November 11, 2010 to November 10, 2011.

Please contact Shelia Bourne, Research Compliance Analyst, at (940) 565-3940, or Boyd Herndon, Director of Research Compliance, at (940) 565-3941, if you wish to make changes or need additional information.

Sincerely,

Patricia L. Kaminski, Ph.D.
Associate Professor
Chair
Institutional Review Board

PK/sb
APPENDIX I

SURVEY OF SUBJECT LIBRARIANS
Part I. Demographic and Descriptive Data

1. What is your age?

   18-25
   26-34
   35-44
   45-54
   55-64
   65+

2. What degree in Library and Information Science (LIS) field do you have?

   Current library school student
   BA
   MLS
   PhD
   Certificate
   Other (please specify)

3. Years of work in LIS field:

   Less than 1 year
   1-2 years
   3-4 years
   5-9 years
   10-19 years
   20+ years

4. Do you have a degree in other subject area(s) (not the LIS area)?

   Yes
   No
5. If you answered “yes” to Question 4, please specify:

Currently student
Bachelor’s
Master’s
Doctoral
Certification

6. How many years have you worked as a subject librarian?

Less than 1 year
1-2 years
3-4 years
5-9 years
10-19 years
20+ years

Part 2. Application of CMS in Creation and Maintenance of Subject Guides

7. How many subject guides do you currently maintain?

One subject guide
Two subject guides
Three subject guides
Four or more subject guides

8. Did you have experience with the creation and maintenance of the subject guides before the migration to content management system (CMS)?

Yes
No

9. If you answered yes to Question 8, please specify the format of the guides:

Print
Online
10. How many years of Web development experience do you have?
   - 1 - 3
   - 4 – 6
   - 7 – 9
   - 10 or more

11. Please indicate your level of knowledge in Web design and development tools (programming languages and software):
   - Beginner
   - Intermediate
   - Advanced

12. Please indicate with which software and programming languages you have practical experience (Choose all that apply):
   - HTML
   - XML
   - FrontPage
   - Dreamweaver/CSS
   - Plone

13. Did you have experience using other content management applications prior to start of the migration to the Plone CMS platform?
   - Yes
   - No

14. How often do you currently use the Plone CMS?
   - Several times per day
   - Several times per week
   - Once in a couple of weeks
   - Once per month
   - One or twice per year
15. Which factors (choose all that apply) do you consider important for the efficient use of CMS? (For each factor use the scale above the table to match your opinion).

Knowledge of the CMS software
Knowledge of Web design
Training in the CMS provided at the library
Tutorials and help tools of the Plone software
Cooperation with other library employees
Experience with other CM applications
Other (please specify)

16. The use of CMS facilitates the presentation of purposeful materials to the end-users

Not significantly
Average
Significantly
Please provide any comments you may have:

17. The use of CMS facilitates serving a variety of the end-users' information needs

Not significantly
Average
Significantly
Please provide any comments you may have:

18. The application of CMS provides for accuracy of information in the online subject guides

Not significantly
Average
Significantly

19. The use of CMS facilitates continuous updating of the content of the subject guides

Not significantly
Average
Significantly
20. The use of CMS facilitates communication with the end-users of the guides

   Not significantly
   Average
   Significantly

21. How often are the subject guides currently maintained by you updated?

   Weekly
   Monthly
   Quarterly
   Annually

22. Under the new CMS, the opportunities for application of Web 2.0 tools

   Decrease
   Do not change
   Increase

23. Which factors do you consider in selecting the resources to be included in the content of the subject guides? (Choose all that apply)

   Reference questions received from the patrons
   Requirements of the academic departments
   Current courses curriculum
   Usefulness of the resources for the purposes of the guide
   Other (please specify)

24. In your opinion, would better marketing/promotion of subject guides result in higher usage?

   Yes
   No
   No opinion

25. Please rank the impact that the use of CMS has on:

   Information services
   Web content
   Web page design
   Authoring process (creating of web content)

26. How does CMS assisted maintenance of subject guides differ from the previously used process?
27. What aspects of migration to the new system were the most difficult?
28. What major benefits does the CMS bring to your work on the subject guides?
29. In your opinion, what are the lessons learned in the process of CMS application from the point of view
   - Information Services (reference, instruction, liaison duties)
   - Technology/Web design
   - Organization of Content/Information
30. What could be future improvements in the process of maintenance of subject guides with the help of CMS?
31. What areas of utilization of CMSs at academic libraries should be explored or continue to be explored in the future?
32. What roles should academic librarians play in development of Web content for the academic libraries websites?
33. Do you have any other comments on content management and content management systems?

Note: Partly based on Connell (2008); Goans, et al. (2006); Jackson and Pellack (2004); Morris and Grimes (1999); Rockley, Kostur and Manning (2003); Stephens (2007).
APPENDIX J

SEMI-STRUCTURED INTERVIEW QUESTIONS
(Round One)

1. Describe the process of migration of the subject guides to the CMS platform.

2. How does the current process of creation and maintenance of subject guides differ from the previously used system and process?

3. How does the use of CMS change the maintenance of the guides from the point of view of Web design and technology issues?

4. Does the library Web site follow the university’s Web design? How does the use of CMS influence this process?

5. What are the main advantages of application of CMS in the maintenance of subject guides:
   a. From the point of view of technology/Web design?
   b. From the point of view of provided information services?

6. What problems were encountered in the process of migration of subject guides to the new CMS platform? How were these issues resolved?

7. How does the use of CMS influence the process of bringing information to the point of use by the end-users at the library Web sites?

8. Discussion of the survey questions (a copy of the draft survey questions will be furnished to the interviewed experts in writing prior to the interviews).

Semi-structured Interview Questions (Round Two)

1. How does the use of CMS affect information/content presented at the subject guides Web pages?

2. What dynamic features do you observe in the content of subject guides? What is the role of CMS in the dynamic content?

3. How does the use of CMS affect communication with the end-users (faculty, students, community) of the guides?
4. How does the use of CMS affect the instructional function of the guides?

5. How does the use of CMS influence your interaction with faculty?

6. In your opinion, how does the CMS influence the way you use Web 2.0 tools in the subject guides?
   
   a. In creation of content and bringing information to the point of use (add new file formats: video, podcasts, audio files, RSS, other to deliver information)
   
   b. In instructional service (interactive tutorials, handouts, links to other pages of the library Web site, URLs to other websites)
   
   c. In communication with patrons (IM, email, blogs, Facebook, Twitter, other)
   
   d. In performing the liaison function (IM, email, blogs, Facebook, other social networking sites)

7. What could be future improvements in the process of maintenance of subject guides with the help of CMS?

8. What roles should academic librarians play in the development of Web content for academic libraries’ web sites?

*Note:* Partly based on: Connell (2008); Hendricks (2007); Goans et al. (2006); Jackson and Pellack (2004); Morris and Grimes (1999); Rockley, Kostur and Manning (2003); Stephens (2007).
APPENDIX K

MATRIX OF INTERCODER RELIABILITY DATA BY CATEGORY
<table>
<thead>
<tr>
<th>Categories</th>
<th>Intercoder Agreement by Survey Question (%%)</th>
<th>Intercoder Agreement by Category (%%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Q. 26</td>
<td>Q. 27</td>
</tr>
<tr>
<td>Cooperation and Communication</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Consistency and Standardization</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Content</td>
<td>94.72</td>
<td>100.00</td>
</tr>
<tr>
<td>Ease of Use</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Flexibility</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Information Services</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Qualifications and Responsibilities</td>
<td>94.72</td>
<td>94.12</td>
</tr>
<tr>
<td>Learning</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Speed</td>
<td>94.72</td>
<td>100.00</td>
</tr>
<tr>
<td>System</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Time</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Web design</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Average by survey question (%%)</strong></td>
<td><strong>98.68</strong></td>
<td><strong>99.51</strong></td>
</tr>
</tbody>
</table>
APPENDIX L

CONTENT ANALYSIS CATEGORIES/CODES
<table>
<thead>
<tr>
<th>#</th>
<th>Category/Code</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cooperation and Communication</td>
<td>All the forms of cooperation at all the levels in the use of CMS for variety of purposes. Communication with the end users (faculty, students, community), communication in carrying out the CMS project, cooperation with other library staff, the University departments, and the community.</td>
</tr>
<tr>
<td>2</td>
<td>Consistency and Standardization</td>
<td>Standards and uniformity in organization of the guides, development, and use of template. Application of the Libraries' standards and other standards and regulations. Consistency and structure in organization of the subject guides.</td>
</tr>
<tr>
<td>3</td>
<td>Content</td>
<td>Issues related to the migration of content, organization of content of the new guides, application of design and formatting, organization of information on the subject guides web pages.</td>
</tr>
<tr>
<td>4</td>
<td>Ease of Use</td>
<td>Easy to use the system in general, system features that make the functionality easy, operations that are easy to perform.</td>
</tr>
<tr>
<td>5</td>
<td>Flexibility</td>
<td>Ability of the system to adjust, adaptability of the system to changes, freedom in performing operations, availability/absence of availability of tools.</td>
</tr>
<tr>
<td>6</td>
<td>Information Services</td>
<td>Characteristics of information services (reference, instruction, liaison duties) with the use of CM, how the CMS influences information services.</td>
</tr>
<tr>
<td>7</td>
<td>Qualifications and Responsibilities</td>
<td>Changes in the librarians’ duties brought by the CMS. Distribution of responsibilities among the librarians and other employees using the CMS in work over subject guides. Qualification needed to work with the CMS. Role of librarians regarding content. Knowledge of web design. Other skills.</td>
</tr>
<tr>
<td>8</td>
<td>Learning</td>
<td>Learning the CMS tools, functionality. Learning how to use the system's features and perform the needed actions.</td>
</tr>
<tr>
<td>9</td>
<td>Speed</td>
<td>Making processes faster, characterizing of the CMS in general and its attributes and operations as quick, fast, speedy.</td>
</tr>
<tr>
<td>10</td>
<td>System</td>
<td>Functionality of the system. Characteristics/attributes of the CMS/Plone and/or of the current maintenance process. Comparing of the attributes of</td>
</tr>
</tbody>
</table>
CMS and the procedures with the previously used attributes/process. Suggestions to add/remove features to improve/change/cancel procedures and actions performed with the CMS. Content management systems in general.

<p>| | |</p>
<table>
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<td><strong>12</strong></td>
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Finding time for training, training others, work over the project. Differences in time spent.

Use of web design tools, as well as the procedures and processes associated with Web design under CM. Characteristics of web design when using CM instruments. Design of a template (procedures and characteristics of the design), but not the issues about the template related to standardization.
APPENDIX M

NUMBER AND PERCENTAGE OF CATEGORY FREQUENCIES

BY SURVEY QUESTION
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<th>Q. 28</th>
<th>Q. 29</th>
<th>Q. 30</th>
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Column total: 30, 25, 29, 45, 21, 17, 34, 8, 209
Column mean: 2.50, 2.08, 2.42, 3.75, 1.75, 1.42, 2.83, 0.67, 17.42
REFERENCES


Content and workflow management for library websites: Case studies (pp. 1-21).
Hershey, PA: Information Science Pub.