This study examines articles published between 1998 and 2008 that report on the usability of online finding aids. In an attempt to better understand the body of literature that exists on the usability of online finding aids, information about the publication, contributors, and study methods were coded and analyzed. Results showed that professors, practitioners, and students are publishing these studies about equally in the following sources: *American Archivist, Archivaria, Journal of Archival Organization,* and as Master’s Papers at the School of Information and Library Science at the University of Chapel Hill. All but two studies were published in 2004 or later; one third of the total studies were published in 2008 alone. Onsite usability testing is the most frequently employed data collection technique. Studies overwhelmingly engaged subjects in retrieval tasks during the study. Display issues were most troublesome for subjects. Additionally, a variety of reporting practices were observed which made conducting the analysis that much more difficult because it was often difficult to determine what was actually done in the studies. Therefore, recommendations have been made for reporting on empirical studies that employ human subjects.

Headings:

Archival description

Finding aids

Usability studies
USABILITY STUDIES OF ONLINE FINDING AIDS:
A CONTENT ANALYSIS OF THE LITERATURE, 1998-2008

by

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Approved by

Diane Kelly
Introduction

Finding aids are descriptive objects created to facilitate people’s use of archival collections (Nimer, 2008, p. 217). These descriptive objects, usually written by archivists for researchers, act as guides to archival collections and are intended to make navigation of collections more efficient (Zhou, 2007, p. 100). In the past, it was necessary for users to physically visit an archive to view finding aids and locate materials. As such, users were required to interact with archivists, who served as interpreters of finding aids because, “Archivists have tended to prepare their finding aids in a language and manner they are more comfortable with than are the researchers seeking to use archives” (Cox, 2008, p. 8).

The advent of the Internet changed traditional service models in archives, “erod[ing] the close relationship between researcher and archivist” (Duff and Cherry, 2008, p. 499). Because the Internet made information immediately accessible, user expectations of archives changed (Altman and Nemmers, 2001, p. 121). Archives responded, and in the past fifteen years, archives have been mounting finding aids online, changing forever the model of service for archives. In 2004 Christina Hostetter predicted that 60 to 100 percent of all processed collections will have online finding aids in the next decade (Hostetter, 2004, p. 125).

Online finding aids are far more accessible than their paper counterparts. Users are no longer limited to one access point (the reading room or reference desk) and instead
can access finding aids through a variety of access points (Google, library web pages, OPACs). This multiplicity of access points has changed the way in which archival research is conducted; more users expect to be able to conduct research without ever visiting an archive (Prom, 2002, p. 258). Whittaker notes, “we can no longer control all the haystacks in which to go searching for needles. People do not have to come to the reading room to see our idiosyncratic descriptions and finding aids” (Whittaker, 2006, p. 126). Users are no longer encountering the archivist-as-interpreter model of service. It is therefore imperative that finding aids are as usable as possible, because these descriptions now serve as the sole guide to collections. Archives cannot simply make this content accessible; it must be easy to use and must meet the needs of users (Chen, et al., 2009; Lack, 2007; Genuis, 2004).

Because online finding aids are structurally and informationally complex, it is challenging to provide content to users, especially those unfamiliar with archival terminology, clearly and efficiently (Lack, 2007, p. 70). Online finding aids represent the complexity and chaotic nature of archival materials in the Internet age (Prom, 2004, p. 234). Despite challenges, it is imperative that libraries and archives design services with usability in mind and create interfaces that display information in usable ways. Van Schaik and Ling state, “Design for usability is of principal importance in order to attract and retain visitors to both commercial and non-commercial Web sites” (Van Schaik and Ling, 2001, p. 513).

To create usable archival services, web usability practices must be incorporated into the design of online finding aids. Usability, for the purposes of this paper, can be defined “the effectiveness, efficiency, and satisfaction with which specified users can
achieve goals in particular environments” (ISO, 1998, p. 2). In a virtual environment it is challenging to know who the users are and what their tasks will be, therefore making usability tests a challenge to design and create. Because websites serve different audiences and purposes, usability is different for every site (Guenther, 2003, p. 65; Genuis, 2004, p. 161; Chowdhury, et al., 2006, p. 658). Conducting a usability study is one way to determine a website’s audiences and purposes.

Usability studies seek to determine “users’ thoughts, opinions, and needs and to determine whether users can navigate the site easily and retrieve the information they are seeking” (Letnikova, 2008, p. 382). Usability studies involve target audiences into the design process (Thomsett-Scott, 2006, p. 474). A typical usability study life cycle consists of first identifying target audiences, conducting formalized tests, and analyzing the results (Comeaux, 2008, p. 459). Iterative testing is ideal, but very often time and budget constraints prevent repeated testing (p. 459).

The term “usability testing” is often applied to various methodologies, but proper usability testing requires careful observation of users interacting with systems in real world situations (Comeaux, 2008, p. 459). Typically, during formalized testing, test administrators observe users as they complete a series of tasks designed to test specific parts of a system (p. 459). Guenther states, “The key to good testing is to identify and test the critical tasks of the site and to make sure test participants are given the appropriate task assignment or scenario to engage these particular tasks” (Guenther, 2003, p. 68).
An understanding of users' needs is the first step in developing usable web services. Archivists have called for a more complete understanding of how users use archival resources (Prom, 2002; Altman and Nemmers, 2001), and that call has been answered with online finding aid usability studies (Sheir, 2006; Prom, 2004; Yakel, 2004; Altman and Nemmers, 2001; Duff and Stoyanova, 1998). Because there has not yet been a review of this research, not much is known about the body of literature as a whole. There is much speculation about the findings of these studies, but as of yet no one has attempted to look at what the body of literature, as a whole, says about the nature of online finding aids. The literature suggests that online finding aid studies are important and necessary tools for understanding users’ needs, but there has not been a content analysis of online finding aid usability studies. A greater understanding of this body of literature is needed and will aid in the further development of usable archival systems. A content analysis of these studies will help answer the following questions:

RQ1: How much literature exists on the usability of online finding aids? Who is writing these articles? In what sources are these articles published?

RQ2: What methods are employed in these studies? Specifically: How many subjects are employed? What types of subjects are employed? How are these subjects recruited? What is the most common data collection technique for conducting usability testing for online finding aid studies? What sorts of tasks are subjects asked to complete?

RQ3: What are the major findings of online finding aid usability testing?

This research will review usability studies published from 1998 to 2008 in an attempt to better understand who is conducting these studies, how online finding aid
usability tests are being conducted, and the outcomes of these studies. The findings of this study will establish a more complete understanding of online finding aid usability studies that will be potentially beneficial for the archival community.

**Importance of Study**

This information will be beneficial to the archival community as well as the library community at large. Due to a diverse group of users and increasingly complicated web resources, the need for usability testing will only grow; therefore this type of research is useful to those conducting usability studies (Craven and Booth, 2006, p. 180; Chen et al., 2009, p. 953).

As usability testing becomes increasingly common, this catalog of study methods will be beneficial to those conducting future studies. A synthesis of the results and assessment of usability studies will provide future online finding aid developers and usability testers with a better understanding of the current nature of online finding aids and a set of best practices by which to design additional studies. Finally, the collection of online usability studies will create a useful data set that can be referenced by the archival community.

The collection and synthesis of such information could potentially encourage and shape future usability studies. Conducting well informed studies could result in more useful data by which to design systems that better meet users' needs, thereby increasing user satisfaction.
**Literature Review**

This review will examine literature about the nature of usability testing in libraries and archives and highlight several online finding aid usability case studies. There will be an examination of the importance of usability testing, a look at content analysis of usability testing, and an overall explanation of how to conduct usability testing. The following points from the case studies will be emphasized: study purpose, subject type, tasks assigned, data collection technique, results, and assessment.

*Usability Testing In Library and Information Science*

*A Case for Usability Testing*

Usability studies are a vital part of designing efficient and usable systems. Craven and Booth note that, “usability studies and user testing are emerging as an important feature of service design and development” (Craven and Booth, 2006, p. 180). Libraries promote much of their content on library web pages; therefore it is critical that users can efficiently use the information displayed on library websites. Usability testing is necessary to ensure that users’ needs are being met (Chen et al., 2009, p. 953; Genuis, 2004, p. 164). Chen notes that, “focusing on usability will help to limit user frustration and enhance a site’s functionality” (Chen et al., 2009, p. 953). Traditionally, libraries most frequently employ usability testing on the library’s main page and the OPAC, but there exists a need to test lower-level pages as well as web services that extend beyond the OPAC (p. 954).

*Reviews of Usability Testing and Measures*

The following studies systematically reviewed usability guidelines and tests. In 2009, Chen et al. surveyed 113 ARL libraries to determine whether web usability
Policies/Standards/ Guidelines (PSGs) existed. Additionally, Chen, Germain, and Yang identified “the levels of difficulty surrounding implementation, the impact of PSGs on actual usability practice … and the relationship between ARL ranking and usability practice or PSGs” (Chen, Germain, and Yang, 2009, p. 953). Chen et al. found that 85% of libraries surveyed had conducted usability testing, but only 30% had PSGs (p. 964). This study reports that the most common usability testing methods employed by ARL libraries were in-person observations and think-aloud protocols and that students, faculty, and staff were most commonly tested (p. 959).

Kasper Hornbaek reviewed 180 studies from human-computer interactions literature in an effort to understand current usability measures (Hornbaek, 2006, p. 80). To be considered for study, the following criteria were required: the results or method of a study must report quantified data on usability measures, studies that focused on human users and interfaces (as opposed to cognitive models), and studies must use measures of usability to describe differences in interactions between human users and interfaces (p. 81). Effectiveness, efficiency, and satisfaction were the three categories used to classify the measure of usability (p. 82).

When reporting measures of usability, Hornbaek found that 22% of studies reported no measures of effectiveness (Hornbaek, 2006, p. 84). Hornbaek found “that a number of studies combine usability measures into a single measure, report the combined values, [and] make statistical tests on the combinations” (p. 84). Though these combinations simplify data analysis, Hornbaek concludes that “combined measures do not lead to clarity in analysing and reporting the results” (p. 84). This research reported that 57% of studies measured “time” as the amount of time taken to complete a task,
though even this measurement varied (p. 84). While satisfaction is commonly measured, the details on how that data is gathered are not readily reported in most studies (p. 87). Hornbaek found that “approximately one quarter of the studies do not assess the outcome of the users’ interaction, leaving unsupported any broad claims about usability” (p. 97).

**Usability Testing Guidelines**

Several articles provide how-to methods for conducting usability studies in libraries. Craven and Booth’s 2006 study, “Putting Awareness into Practice: Practical Steps for Conducting Usability Tests,” outlines a checklist for usability testing based on their examination of usability case studies. Craven and Booth describe and provide information on each of the following items for usability testing: choosing objectives for the usability test; deciding on the type and number of participants; recruitment of participants; pilot testing; ethics; conducting the test; transcribing the data; data analysis; and reporting the findings (Craven and Booth, 2006, pp. 190-192). Genuis offers descriptions of common usability testing types including card sorting, focus groups, questionnaires, and formal usability testing (Genuis, 2004, p. 162). Guenther lists usability testing methods and provides instructions for in-house usability testing (as opposed to outsourced testing) (Guenther, 2003, p. 67). Guenther’s guidelines include identifying and recruiting users; designing the test, determining test criteria, measurement, and data collection instrument; developing materials; conducting the usability test and documenting the results; and finally, analyzing the data (p. 67).

Usability testing is important for the success of library’s web services, though analysis of usability testing in the library and information science field shows that the way in which usability tests are conducted varies. This variation illustrates the need for
an understanding of common data collection techniques employed in the testing of online finding aids.

*Online Finding Aid Usability Case Studies*

In 1998 Wendy Duff and Penka Stoyanova published the seminal work “Transforming the Crazy Quilt: Archival Displays from a Users’ Point of View,” in which they analyzed the results of focus group discussions about online finding aid usability, determining that subjects preferred archival displays incorporating web design guidelines over then-current systems (Duff and Stoyanova, 1998, p. 48). In the study, subjects discussed online finding aid displays with a moderator, ranked elements by importance, and described the ideal online finding aid display.

Duff and Stoyanova found that subjects wanted increased browsing usability. Displays with right-justified labels made browsing more efficient and clear (Duff and Stoyanova, 1998, p. 51). Duff and Stoyanova asked subjects to describe their ideal display and found that many requested lists of information because they felt it made the location of useful information easier to find (p. 61). Additionally, Duff and Stoyanova found that subjects struggled to understand terminology, and yet subjects felt that the labeling of elements was essential to understanding (p. 52).

Duff and Stoyanova were among the first to discuss the importance of web design guidelines when designing archival finding aids. They state, “The results from this study indicate that users preferred an archival display created according to design guidelines over archival displays produced from existing systems” (Duff and Stoyanova, 1998, p. 61).
In another study Burt Altman and John Nemmers’s (2001) employed usability testing to inform the first phase of the Pepper OnLine Archival Retrieval and Information System (POLARIS) project at Florida State University Libraries. The findings from their study were reported in an article titled “The Usability of On-line Archival Resources: The POLARIS Project Finding Aid.”

In the first stages of the POLARIS project, the team collected data about online finding aids from a variety of sources in an iterative fashion. First the project team solicited information from those within the archival community with online finding aids. The team then corresponded with web designers and usability experts in order to design tools that would best serve user needs. Finally, the team issued a questionnaire to a focus group “represent[ing] typical Pepper Library researchers and professionals experienced in assisting users with their information needs, and included historians, archivists, library science faculty, professional researchers, and librarians” (Altman and Nemmers, 2001, p. 126).

The questionnaire evaluated the following: the ease of use of POLARIS, how comfortable subjects would feel conducting research using POLARIS, the ease of navigability of the finding aid, and the usefulness of help pages. Subjects reported that the search and navigation of the online finding aid was useful and found that the online finding aid was more efficient than traditional paper finding aids (Altman and Nemmers, 2001, p. 126). However, participants expressed concern about the hierarchical arrangement of the finding aid, stating that users “could become lost or simply confused as they browsed” (p. 126). The project team responded to the concern and redesigned the display to better illustrate the hierarchical arrangement of collections (p. 127).
Additionally, subjects expressed concerns about searching, calling for a basic and advanced search as well as a cross- or multi-media search. These features were subsequently incorporated into future phases of the project (p. 127).

In the 2004 article “User Interactions with Electronic Finding Aids in a Controlled Setting,” Christopher Prom hypothesized “that experts and novices employ different search strategies and reach different search results” (Prom, 2004, p. 238). The purpose of Prom’s study was to discover how subjects, expert and novice, navigated online finding aids and the efficiency with which they searched (p. 237). Subjects were classified as archival experts, computer search experts, novices, or both archival and computer search experts (p. 238).

Eighty-nine subjects participated; thirty-five participants were on-site and the remaining fifty-four were off-site, performing tasks remotely (Prom, 2004, p. 245). Subjects were given eight retrieval tasks to complete.

Prom found that simple lists were searched most easily because they allowed “users to jump quickly to the content of most interest” (Prom, 2004, p. 249). Conversely, he found that an increase in search options or paths increased the amount of time it took for subjects to locate relevant information (p. 250). Subjects expressed a desire for browsing options within finding aids (p. 252).

Subjects reporting computer expertise performed nearly as well as those subjects reporting archival expertise, leading Prom to conclude that “archival and computer expertise are both important predictors of efficient finding aid usage” (Prom, 2004, p. 248). By limiting options for potential searching methods, Prom discovered that subjects, both novice and experts, were able to complete tasks more efficiently. Simple interfaces
were found to be the best for novice subjects because novice subjects tend to “get lost in 
options not relevant to the task at hand” (p. 252). Furthermore, collection lists keep 
novice subjects from getting lost (p. 254). Prom found that all subjects struggled with 
terminology and suggested that archives "avoid archival terminology" (Prom, 2004, p. 
262). Prom concluded, “it is unlikely that on-line finding aids will ever make the chaotic 
nature of archival systems wholly understandable to archives users” (p. 265).

The purpose of Elizabeth Yakel’s 2004 study, entitled “Encoded Archival 
Description: Are Finding Aids Boundary Spanners or Barriers for Use?”, was to identify 
and examine “design and content elements that inhibited the convergence of EAD 
interfaces and the users’ worlds and acted as barriers rather than boundary objects 
between users and archival collections” (Yakel, 2004, p. 64). Study subjects, all graduate 
students at the University of Pittsburgh, were asked to complete four retrieval tasks using 
the online finding aid.

Yakel found the results to be “disappointing” in terms of user understanding 
(Yakel, 2004, p. 67). She found that subjects had difficulty with “terminology, search 
functions, and contents display issues” (p. 74). In addition to general unfamiliarity with 
archival terms, Yakel found that subjects did not understand the abbreviations (p. 74). 
With regard to display, she notes that the “lack of any navigation on the left side was 
definitely a problem for users in the study” (p. 75). Additionally, subjects struggled to 
understand the hierarchical organization of archival collections (p. 68). The study 
assessed that finding aids acted as “both barriers and boundary spanners” (p. 75).

The purpose of Wendy Scheir's 2006 study, detailed in her article titled “First 
Entry: Report on a Qualitative Exploratory Study of Novice User Experience with Online
Finding Aids,” was to test the routes novice users take to locate archival materials within an online finding aid, in order to determine which of those features are useful and those that are not. To do so, Scheir conducted an online finding aid usability test with nine novice subjects and one expert subject (an archivist tested for comparison) (Scheir, 2006, p. 53). Each subject was emailed a list of six retrieval tasks and asked to complete the task or move on after five minutes (the time limit recommended) had past (p. 54). Subjects answered the questions, when possible; recorded their routes of discovery; listed unfamiliar terminology; and supplied observations to the tester via email.

Scheir reports the following findings: clarification regarding the standard display of dates is needed; subjects wanted immediate answers and did not want to wade through blocks of contextual information or layers of hierarchical context; archival structure and hierarchy are not “self-evident” to novice subjects; standard archival terminology is confusing to subjects; many subjects were confused about the host site of the finding aid (Scheir, 2006, p. 63). Despite this, Scheir found that though participants were confused by archival terminology, their use of the finding aid was not hindered (p. 73). Additionally, it was found that participants could not make sense of container lists (a navigability issue), wanted less text and more lists of information (a display issue), and finally, did not grasp multilevel context of an online finding aid (a structure issue). Regardless, Scheir found that novice users were generally able to adapt, self-educating during the study.

In 2008 Erika Dowell studied the usability of the Lilly Library (the special collections library of Indiana University) website against a redesigned site to “reveal
some of the usability issues particularly related to the Web sites of rare book and manuscript libraries” (p. 168).

The first stage of the study used paper layouts to test the different displays. Field tests on the current live site were conducted during the second stage of the study. The study subjects consisted of “five graduate students, five undergraduate students, and one faculty member” (Dowell, 2008, p. 173). Of the eleven subjects, four tested the paper version of the current site, four tested the redesigned site, and three subjects were observed in field testing. Dowell used questionnaires and observations in her study.

All subjects were asked to complete a questionnaire designed to gather information about subject’s computer experience, special collections library experience, and experience with the Lilly Library website (Dowell, 2008, p. 173). Subjects were asked to complete the following five retrieval tasks (p. 174). Facilitators used scripts to conduct the studies while a note-taker recorded observations on a prototype page (p. 173).

Dowell found that participants struggled with terminology: “The results of almost every task raised questions about the vocabulary selected for headings and menus” (Dowell, 2008, p. 178). Additionally, Dowell found that participants encountered issues with context. Dowell discovered that the site had both too much context (a note stating that 45% of Lilly Library’s holdings were in the catalog deterred users) and too little context (sidebars listed too little information to be useful) (pp. 179, 180). Dowell emphasized the need for effective searching tools as “another strategy for mitigating problems with terminology and menu choices, as well as avoiding text-heavy context for links” (p. 180).
Cory Nimer and J. Gordon Daines III examined the L. Tom Perry Special Collections at Brigham Young University and published their results in the 2008 paper “What Do You Mean It Doesn’t Make Sense? Redesigning Finding Aids from the User’s Perspective.” In the fall of 2002, Perry Special Collections began the process to implement EAD for online delivery of finding aids. The purpose of their usability testing work was to inform the redesign process. Before redesigning the finding aid template, the group “examined finding aids from numerous institutions including the Minnesota Historical Society, the Oregon Historical Society, Yale University, and the Utah State Archives and Record service” (Nimer and Daines, 2008, p. 220). Next, the group reviewed archival literature and their own patron statistics to come up with categories of users or an “archetype” for groups of subjects (p. 223). Additionally, the group conducted a content analysis of other institutions’ use of EAD. In so doing the group found “some consistency in basic site features” but found “a great divergence in the repositories’ methods of displaying finding aid content” (p. 225). Finally, the group conducted usability testing of other sites “to better understand how subjects interacted with the finding aids” (p. 223).

During usability testing, five subjects were asked to complete “common research tasks, such as locating relevant research materials and citing their sources” (Nimer and Daines, 2008, p. 225). Additionally, facilitators had subjects rank various page elements and describe their reasons for ranking (p. 225).

Through a variety of study methods, Nimer and Daines found that subjects generally dislike the entire EAD structure (Nimer and Daines, 2008, p. 226). They found that while subjects wanted simple paths to information, too much simplification
prevented subjects from understanding the context of the collection’s content. In answer to this problem, an “expandable tree menu” was implemented in the redesigned finding aid (p. 227). After reconfiguring the finding aid, the team conducted another round of usability testing. The testing had the following purposes: to test “the overall design and sitewide navigation elements and determining which of the collection navigation schemes provided the best context and navigation” (p. 227). The results of this test indicated that novice subjects appreciated limited context while experienced subjects wanted to be able to browse the entire finding aid.

As Wendy Scheir found (2006), Nimer and Daines found that neither novice or experienced subjects’ struggle with terminology hindered their use of the finding aid. In follow-up interviews, “it became clear in many cases that they could not define the words when they were presented on their own, but when used in context as a label they were understandable” (Nimer and Daines, 2008, p. 229).

The diversified results point to the need for some coalescence of online finding aid usability study findings. Without some sort of qualitative assessment of these studies, the archival field will continue to duplicate efforts and will not have the opportunity to learn from the findings of their peers. This sort of content analysis is particularly timely because usability tests will be used increasingly in an attempt to design web services that are understood by most subjects.

**Method**

This research uses content analysis to analyze usability studies of online finding aids. Content analysis examines attributes of content in order to infer suppositions about a set of materials. Klaus Krippendorff (1980) defines content analysis as “a research technique for making replicable and valid inferences from data to their context” (p. 21).
Bernard Berelson (1952) defines it in this way: “Content analysis is a research technique for the objective, systematic, and quantitative description of the manifest content of communication” (p. 18).

The systematic examination of content can be either quantitative or qualitative. Quantitative content analysis is deductive and the results are usually more generalizable than the results from qualitative content analysis (Spurgin and Wildemuth, 2009, p. 298). Quantitative content analysis usually has large samples (p. 298), focuses on “numerically measurable objectives” (Beck and Manuel, 2008, p. 35), and draws on deductive reasoning to examine content.

As opposed to quantitative content analysis, qualitative content analysis research is able to observe meaning beyond that of simply what is present within the text. Zhang and Wildemuth define it in this way: “Qualitative content analysis goes beyond merely counting words or extracting objective content from texts to examine meanings, themes, and patterns that may be manifest or latent in a particular text” (Zhang and Wildemuth, 2009, p. 308). Qualitative content analysis is a “process designed to condense raw data into categories or themes based on valid inference and interpretation” (p. 309). Due the variance in the ways that usability tests are conducted, data is collected, and findings are reported, it will be necessary to make inferences and to interpret the data. Therefore this study will systematically review documents as a form of content analysis.

Sample

As this study seeks to draw conclusions about online finding aid usability studies from across the field, an attempt was made to establish a census sample of all articles
reporting on such studies, though the resulting data set most likely only approximates a
census sample because of accessibility issues and exclusion decisions made during the
course of the study. Nevertheless, every effort was made to identify all articles that were
appropriate for the scope of this study.

Only peer-reviewed journal articles were considered. The inclusion of which
journals to include was based on the archival journal rankings proposed by an
international group of archives and records academics for the 2009 Archival Education
Research Institute (AERI) Conference (please see Appendix A for the complete list of
journal rankings). Journals receiving a score of “A+” or “A” were selected for inclusion
in the sample. The following journals were included: Archival Science, Archivaria,
American Archivist, Journal of the Society of Archivists, Archives and Manuscripts, and
The Records Management Journal. Additionally, because of known usability studies, The
Journal of Archival Organization. An attempt was made to access all journals through the
library system of the University of North Carolina at Chapel Hill. The Records
Management Journal was not accessible and therefore was not included in the sample.

Master's Papers from the University of North Carolina at Chapel Hill's School of
Information and Library Science were also included in the sample. In addition to known
usability studies, Master’s Papers were included in an effort to better understand the type
of researchers (academic, practitioner, graduate student) conducting this type of research.
The following fields of the Master’s Paper Index were searched using the term “finding
aid”: “Title Keyword of Phrase,” “Abstract Keyword of Phrase,” and “Subject Keyword
or Phrase.” Master’s Papers were accessed online through the School of Information and
Library Science at the University of North Carolina at Chapel Hill.
Each journal and master’s paper was examined manually for articles reporting on results of an empirical evaluation of the usability of online finding aids. Article titles and abstracts (when available) were read in an attempt to ascertain the subject of the article. When it was not possible to determine whether an article was about an online finding aid usability study from the title and abstract, the article was read for understanding.

To be included, articles needed to report a specific usability study and report what subjects were tested, what online finding aids were tested, and the results of the test. Articles that reported users' perceptions of finding aids or the information seeking behaviors of archival researchers were excluded from this study.

Finally, to be included studies must be peer-reviewed\(^1\), written in English and have been published between 1998 and 2008. This time frame was chosen because it is believed that the first online finding aid usability study was published in 1998 by Duff and Stoyanova. Due to the scope of this paper, a ten year time period was believed to be manageable.

*Data Collection*

Due to the lack of consistency in reporting practices in the literature, an open approach to coding was necessary. The lack of systematic reporting is problematic as it complicates this sort of review. Therefore the code sheet used to collect data consisted of six broad categories of variables (as opposed to specific variables): “Publication Information,” “Subjects,” “Study Method,” and “Type of Tasks,” and “Findings.”

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\(^1\) Master’s Papers published by students of the School of Information and Library Science at UNC-CH are not peer-reviewed, but are reviewed by faculty members prior to publication.
In the “Publication Information” category, information about the author, title of the journal, and the year of publication was captured. This data was analyzed to show which authors are most prolific in this field, which journals most frequently publish online finding aid usability studies, and when these articles were published. In addition to the author’s name, information about the type of researcher (practitioner, professor, or student) and their affiliation was recorded. This information helps to determine who is publishing these studies: practitioners or academics.

The “Subject type” category documents the type of subjects, the number of subjects, and the recruitment of subjects. Analyzing this data illustrates the average number of subjects, the type of subjects most frequently tested, and the way these subjects are recruited all of which will aid the creation of future usability tests.

The “Study Method” section will capture the specific study methods employed in each study. “Types of Tasks” will record information about tasks used in testing. In addition to illustrating the most frequently employed task type, this data helps to illustrate the reporting practices of study authors.

The findings of a study were recorded in the “Findings” section. This data helps to build a better understanding of how subjects interact with online finding aids. Gathering assessment information is a vital component when analyzing the current state of online finding aid usability studies.

After all articles were identified, the articles were read once for general understanding. Articles were read a second time and coded according to the code book in
Results and Discussion

This section reports on the findings of this study and offers observations on the reporting practices of the articles examined.

Publication Information

How much literature exists on usability of online finding aids? Nine articles were identified for this study. The articles and their associated codes appear in the table below.

<table>
<thead>
<tr>
<th>Article Title</th>
<th>Author</th>
<th>Source</th>
<th>Year</th>
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<td>User Interactions with Electronic Finding Aids in a Controlled Setting</td>
<td>Prom, Christopher J.</td>
<td><em>American Archivist</em></td>
<td>2004</td>
<td>University of Illinois at Urbana-Champaign</td>
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<td>Transforming the Crazy Quilt: Archival Displays from a Users' Point of View</td>
<td>Duff, Wendy &amp; Stoyanova, Penka</td>
<td><em>Archivaria</em></td>
<td>1998</td>
<td>University of Toronto</td>
<td>Article3</td>
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<td>Encoded Archival Description: Are Finding Aids Boundary Spanners or Barriers for Users?</td>
<td>Yakel, Elizabeth</td>
<td><em>Journal of Archival Organization</em></td>
<td>2004</td>
<td>University of Michigan</td>
<td>Article4</td>
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<tr>
<td>What Do You Mean It Doesn't Make Sense? Redesigning Finding Aids from the User's Perspective</td>
<td>Nimer, Cory &amp; Daines, J. Gordon III</td>
<td><em>Journal of Archival Organization</em></td>
<td>2008</td>
<td>Brigham Young University</td>
<td>Article6</td>
</tr>
<tr>
<td>A Qualitative Study of the Experiences of Novice Undergraduate Students with Online Finding Aids</td>
<td>Johnston, Rita D.</td>
<td><em>SILS Master’s Paper</em></td>
<td>2008</td>
<td>University of North Carolina at Chapel Hill</td>
<td>Article9</td>
</tr>
</tbody>
</table>

**Table 1. Article Codes**

All but two of the articles were published in 2004 or later; one third of the total articles were published in 2008. Articles appeared in one of three journals (*American Archivist, Archivaria, or Journal of Archival Organization*) or were published as Master’s Papers at the School of Information and Library Science at the University of North Carolina at Chapel Hill.
Author Information

What authors are writing these articles? The nine articles identified for this study represent the work of 12 authors. The table below illustrates the author’s represented in this study.

<table>
<thead>
<tr>
<th>Article</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Article1</td>
<td>Altman, Burt &amp; Nemmers, John R.</td>
</tr>
<tr>
<td>Article2</td>
<td>Prom, Christopher J.</td>
</tr>
<tr>
<td>Article3</td>
<td>Duff, Wendy &amp; Stoyanova, Penka</td>
</tr>
<tr>
<td>Article4</td>
<td>Yakel, Elizabeth</td>
</tr>
<tr>
<td>Article5</td>
<td>Scheir, Wendy</td>
</tr>
<tr>
<td>Article6</td>
<td>Nimer, Cory &amp; Daines, J. Gordon III</td>
</tr>
<tr>
<td>Article7</td>
<td>Howard, Dawn E.</td>
</tr>
<tr>
<td>Article8</td>
<td>Chapman, Joyce C.</td>
</tr>
<tr>
<td>Article9</td>
<td>Johnston, Rita D.</td>
</tr>
</tbody>
</table>

Table 2. Article Authors

Though there has been a concentrated research effort to examine the information seeking behaviors of archival users (Krause and Yakel, 2007; Coats, 2004; Duff, Craig, and Cherry 2004; Anderson, 2004), no author has exhibited a concentrated research effort
in the area of online finding aid usability. Each of the 12 authors represented in this study published only a single piece on online finding aid usability during the chosen ten year time frame. As usability testing is an iterative process, further testing and reporting is necessary and beneficial for both the tested system and the archival community at large. Further research in this area would both inform and promote an environment of recurrent usability testing in a way that one-off studies cannot.

This study examined the type of authors conducting online finding aid usability studies. The figure below illustrates the type of authors represented in this study.

![Figure 1. Type of Researcher](image-url)
This study found that practitioner-authors and professor-authors each accounted 33% of the examined studies. This finding is in contrast to Watson-Boone’s 2000 study that found that practitioner-authors accounted for 43% of articles published in the *Journal of Academic Librarianship* between 1985 and 1995 (p. 85). However, Watson-Boone considered a larger sample that contained a more diverse representation of topical areas. Though practitioner-authors published fewer articles than previously found, it is encouraging to see practitioners publishing this type of work despite the fact that practitioners very often do not have the resources (time, financial, staff, excreta) to conduct this type of study or support a sustained research program (Powell, et al., 2002, p.50-51).

Despite the split between practitioner-authors and professor-authors, it is important to note that all the authors in this study were, at the time of publication, affiliated with a university as opposed to a public or private archives or library setting. The following table illustrates the affiliation of each author.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Number of Authors Affiliated</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of North Carolina at Chapel Hill</td>
<td>3</td>
<td>25%</td>
</tr>
<tr>
<td>Florida State University</td>
<td>2</td>
<td>17%</td>
</tr>
<tr>
<td>Brigham Young University</td>
<td>2</td>
<td>17%</td>
</tr>
<tr>
<td>Rutgers University</td>
<td>1</td>
<td>9%</td>
</tr>
<tr>
<td>University of Illinois at Urbana-Champaign</td>
<td>1</td>
<td>8%</td>
</tr>
</tbody>
</table>
Table 3. Author Affiliation

Student-authors (all Master’s of Library or Information Science students at UNC-CH’s School of Information and Library Science) accounted for 20% of examined articles. This high percentage of student-authors is encouraging as this sort of research is needed for problem solving and better decision making in the archival field.

Source Information

The *Journal of Archival Organization* and University of North Carolina at Chapel Hill’s School of Information and Library Science (SILS) Master’s Papers were the two most common sources of publication of articles discussing online finding aid usability testing. *American Archivist* was the second most common, followed by *Archivaria*. The following figure represents the publication source of the nine articles.
Figure 2. Articles by Source

Year of Publication

Results found that a third (33%) of the articles were published in 2008. The graph below shows the increase of articles during this study’s time frame.
It is not surprising that the number of online finding aid usability tests increased during the ten year time period examined as computer use in all parts of life has increased. Online finding aids have become increasingly common and therefore the need for testing has increased. However, the increase in studies does not seem sufficient given the number of archives and libraries that now mount finding aids online.

**Subjects**

The number of subjects is an important feature of usability testing. This study examined the number of subjects employed in online finding aid usability testing. The following figure displays the numbers of subjects.
The following table shows the mean, median, standard deviation, and range for the number of subjects in the study.

<table>
<thead>
<tr>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>22.44 subjects</td>
<td>12 subjects</td>
<td>26.56</td>
<td>83</td>
</tr>
</tbody>
</table>

*Table 4. Number of Subjects*

It is important to observe that Article 2 (Christopher J. Prom’s “User Interactions with Electronic Finding Aids in a Controlled Setting”) employed 89 subjects, creating a wide range in the number of subjects and thus slightly skewing the data. Prom conducted both an onsite usability test and offsite test which may account for the large number of subjects employed in his study. Additionally, it is important to note that three of the nine
studies examined were those written by students pursuing a Master’s in Library or Information Science. Typically, students have less time in which to conduct a study and fewer financial resources to offer subjects as incentives. Despite this consideration, the Master’s students in this study managed to recruit and test subjects on par with other examined studies.

What types of subjects are employed in online finding aid usability testing? The following table displays the number of subjects, type of subjects, and specific data about subjects employed in the studies examined.

<table>
<thead>
<tr>
<th>Article</th>
<th>Article2</th>
<th>Article3</th>
<th>Article4</th>
<th>Article5</th>
<th>Article6</th>
<th>Article7</th>
<th>Article8</th>
<th>Article9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Subjects</td>
<td>11</td>
<td>89</td>
<td>27</td>
<td>6</td>
<td>9</td>
<td>5</td>
<td>22</td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge of Archives</th>
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<th>Both</th>
<th>Expert</th>
<th>Novice</th>
<th>Novice</th>
<th>Both</th>
<th>Expert</th>
<th>Both</th>
<th>Novice</th>
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</thead>
<tbody>
<tr>
<td>General Public</td>
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<td>X</td>
<td></td>
<td>X</td>
<td></td>
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<td></td>
<td>X</td>
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<td>X</td>
<td>X</td>
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<tr>
<td>Master’s Degree</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Doctorate Degree</td>
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<td>X</td>
<td>X</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5. Subject Type

Of the studies that examined only novice users, two of the three tested only subjects with Master’s degrees or higher (the third study reported on undergraduate novice archival
subjects). The studies that examined expert users and novice users, all of the examined studies recruited subjects with various educational backgrounds. Testing of novices and expert users is even.

How were these subjects recruited? Table 6 illustrates the methods used to recruit subjects. Emails were most commonly used to recruit subjects for testing.

<table>
<thead>
<tr>
<th></th>
<th>Article1</th>
<th>Article2</th>
<th>Article3</th>
<th>Article4</th>
<th>Article5</th>
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<th>Article7</th>
<th>Article8</th>
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<tr>
<td>Flyers</td>
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<td></td>
<td>X</td>
</tr>
<tr>
<td>Emails</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 6. Recruitment of Subjects*

In nearly half of the examined studies, the author did not fully report the recruitment procedures. No study reported on whether or not incentives were used.

*Study Method*

What is the most common data collection technique for conducting usability testing for online finding aids? The following table shows the primary study methods represented in this study.

<table>
<thead>
<tr>
<th>Study Method</th>
<th>Number of Articles that Employed Study Method</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onsite Usability Test</td>
<td>5</td>
<td>56%</td>
</tr>
<tr>
<td>Offsite Usability Testing</td>
<td>2</td>
<td>22%</td>
</tr>
</tbody>
</table>
Findings show that onsite usability testing was the most frequent study method employed. Focus groups and questionnaires were used least often as a primary method of data collection. Most onsite and offsite usability tests used additional data collection techniques such as questionnaires and interview. Often participants were surveyed in order to collect demographic information prior to usability testing and were interviewed as a follow-up to usability testing. The study method used to test the online finding aid or online finding aid system was coded as the primary study method.

**Tasks**

What sorts of tasks are subjects asked to complete? Overwhelmingly these studies engaged subjects in retrieval tasks. These tasks asked subjects to find items within a finding aid. Items could be intellectual concepts, such as series or subseries, or physical objects such as boxes or folders. One study asked subjects to compare different finding aid displays and discuss likes and dislikes. Another study had subjects rate the ease of use of a particular finding aid (though no official usability test was employed) using a multiple choice questionnaire.

**Findings**

What are the major findings of online finding aid usability testing? The following two tables illustrate the areas in which subjects struggled during testing.
### Table 8. Problem Areas I

Terminology 1 = was mentioned as a trouble area, but did not hinder success  
Terminology 2 = was mentioned and did hinder success

<table>
<thead>
<tr>
<th>Theme</th>
<th>Article1</th>
<th>Article2</th>
<th>Article3</th>
<th>Article4</th>
<th>Article5</th>
<th>Article6</th>
<th>Article7</th>
<th>Article8</th>
<th>Article9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Context</td>
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<td></td>
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<tr>
<td>Display</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Help</td>
<td>X</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Navigation</td>
<td>X</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
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<td>Search</td>
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<td>X</td>
<td></td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Terminology 1</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Terminology 2</td>
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<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

### Table 9. Problem Areas II

Subjects mentioned display issues most frequently as causes of confusion in finding aids.

Terminology was reported as the second most problematic aspect, though interestingly 19% of subjects said that it did not hinder their use of the finding aid (ten percent reported that terminology did hinder use). Searching, help functionality, navigation, and amount of context were also mentioned. The findings appear to be somewhat conflicting.
Some studies showed that searching can confuse subjects, while others showed that subjects want searching. The issue of terminology is an interesting one. Nearly a third of all subjects mentioned terminology as a problem with finding aids though only one third of these subjects reported it to be enough of a problem to hinder success. This raises questions of the truthfulness of subjects and whether or not they accurately report areas in which they struggle. Another possible explanation is that subjects are able to succeed despite poorly designed systems.

Most studies had few positive things to say about online finding aids. The two most common themes that surfaced was the subject’s use of ctrl+f and the subject’s ability to self-educate during the course of the usability testing. Examined studies showed that subjects were able to locate items by using the brower’s ctrl+f (the “Find in page” function) as opposed to finding items using an understanding of online finding aids. This sort of finding is inherently negative as it requires subjects to employ a work around to the created system in order to be successful. A second positive theme common throughout the studies was that subjects were able to self educate during the course of the study. This means that subjects learned enough throughout the course of the study to work more efficiently at the end of the study than at the beginning. This is a common to usability testing, but it is not necessarily positive. Again, it seems that these authors are relying on the ability of subjects to learn how to cope with a bad system rather than working to design a useful, intuitive system.

Over half of the studies reported that computer expertise played a role in a subject’s success with a finding aid. Closer examination of these results shows that
“computer expertise” was really a misnomer. Authors were really describing users’ search expertise. One study found that “both factors [computer expertise and archival expertise] play significant and roughly comparable roles in the efficient navigation through electronic finding aids” (Prom, 2004, p. 248). This type of claim relieves some of the onus on online finding aid creators and instead places that burden on users of the system.

Overall, due to the variations and inconsistencies that existed in the reporting of these studies, it was difficult to make generalizations and summaries of the data.

Observations about Reporting Practices

In conducting this study, a variety of reporting practices were observed. This made conducting the analysis that much more difficult because it was often difficult to determine what was actually done in the studies and in many cases, key pieces of information about the method were missing. While various standards and styles exist for more traditional types of archives scholarship, many of these do not provide guidelines about how to report results of empirical studies with human subjects. Of course, one of the most important reasons for providing a detailed description of method is to ensure replicability. It also provides reviewers with better information about which to determine the believability of the study results. Finally, it helps facilitate retrospective reviews of the literature (such as this one) which are likely to become increasingly important as more usability studies are conducted.
The publication manual of the American Psychological Association (APA) provides guidance about how to report empirical studies with human subjects. These recommendations require authors to fully report information on subjects, the recruitment of subjects, study methods, and results. This adherence to guidelines would help authors create more useful data. Based on the sample of articles examined, the archival community could benefit from employing the recommendations of the APA Publication Manual. For example, the APA Publication Manual recommends that when human subjects are employed in a study, the recruitment procedures and incentives should be reported (APA, 2001, p. 18). Additionally, the APA Publication Manual recommends that authors describe their study method in detail as it allows “the reader to evaluate the appropriateness of your methods and the reliability and the validity of your results” (APA, 2001, p. 17). The lack of full methodological reporting could be, in part, due to the length requirements for scholarly articles. The Master’s Papers included in this study reported more fully on study methods used, perhaps because a page limit did not exist for the publication and this was a required as part of the paper. Ultimately, some discussion needs to take place in the archival community to improve reporting practices of usability studies so that more can be learned from the research.

**Conclusion**

Results showed that professors, practitioners, and students are publishing usability studies about equally in the following sources: *American Archivist, Archivaria, Journal of Archival Organization*, and as Master’s Papers at the School of Information and Library Science at the University of Chapel Hill. All but two studies were published in 2004 or later; one third of the total studies were published in 2008 alone. The results of
this study showed that usability testing accounted for more than 75% of the study methods used in online finding aid usability testing. Fifty-six percent of studies examined used onsite usability testing while an additional 22% used offsite usability testing.

Using content analysis, this study determined a significant number of studies reported users struggling with the following features of online finding aids: display, terminology, and searching. While more than half of those studies that reported users struggled with terminology note that this did not hinder their overall success, it continues to be an important theme. Overwhelmingly, the most important finding of note was the lack of consistent reporting in these articles. This lack of reporting made the answering of this study’s research questions difficult. Because such discrepancies exist in the reporting of findings of online finding aid usability studies, it is nearly impossible to draw conclusions about the work as a whole. Because such a summation is impossible to make, the record of research published on this subject is unable to inform future testing and creation of finding aids.
Bibliography


Thomsett-Scott, B. (2006). Yeah, I found it! Performing web site usability testing to ensure that off-campus students can find the information they need. *Journal of Library Administration 41*(3), 471-483. doi: 10.1300/J111v41n03_11


Appendix A

**Journal Rankings**

The entirety of the following journal ranking summary can be found at this web address:


**Proposed Journal Ranking List for Archives and Records Management**

<table>
<thead>
<tr>
<th>Title</th>
<th>Proposed Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archival science</td>
<td>A+</td>
</tr>
<tr>
<td>Archivaria</td>
<td>A+</td>
</tr>
<tr>
<td>American archivist</td>
<td>A+</td>
</tr>
<tr>
<td>Journal of the Society of Archivists (UK)</td>
<td>A+</td>
</tr>
<tr>
<td>Archives &amp; manuscripts: Journal of the Australian Society of Archivists</td>
<td>A</td>
</tr>
<tr>
<td>The records management journal</td>
<td>A</td>
</tr>
<tr>
<td>Archives: The journal of the British Records Association</td>
<td>B</td>
</tr>
<tr>
<td>Information management journal (ARMA)</td>
<td>B</td>
</tr>
<tr>
<td>Archival issues – Journal of the Midwest Archives Conference</td>
<td>B</td>
</tr>
<tr>
<td>Archives &amp; social studies: A journal of interdisciplinary studies</td>
<td>B</td>
</tr>
<tr>
<td>Libraries and the cultural record</td>
<td>B</td>
</tr>
<tr>
<td>Arkiv, samhälle och forskning (ASF)</td>
<td>C</td>
</tr>
<tr>
<td>IQ: InfoRMAA quarterly</td>
<td>C</td>
</tr>
<tr>
<td>Journal of archival organisation</td>
<td>C</td>
</tr>
<tr>
<td>Library and archival security</td>
<td>C</td>
</tr>
</tbody>
</table>
Appendix B

**Complete List of Studies**

<table>
<thead>
<tr>
<th>Article Title</th>
<th>Author</th>
<th>Source</th>
<th>Year</th>
<th>Author Affiliation</th>
<th>Article Code</th>
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<tbody>
<tr>
<td>User Interactions with Electronic Finding Aids in a Controlled Setting</td>
<td>Prom, Christopher J.</td>
<td><em>American Archivist</em></td>
<td>2004</td>
<td>University of Illinois at Urbana-Champaign</td>
<td>Article2</td>
</tr>
<tr>
<td>Transforming the Crazy Quilt: Archival Displays from a Users' Point of View</td>
<td>Duff, Wendy &amp; Stoyanova, Penka</td>
<td><em>Archivaria</em></td>
<td>1998</td>
<td>University of Toronto</td>
<td>Article3</td>
</tr>
<tr>
<td>Encoded Archival Description: Are Finding Aids Boundary Spanners or Barriers for Users?</td>
<td>Yakel, Elizabeth</td>
<td><em>Journal of Archival Organization</em></td>
<td>2004</td>
<td>University of Michigan</td>
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</tr>
<tr>
<td>What Do You Mean It Doesn't Make Sense? Redesigning Finding Aids from the User's Perspective</td>
<td>Nimer, Cory &amp; Daines, J. Gordon III</td>
<td><em>Journal of Archival Organization</em></td>
<td>2008</td>
<td>Brigham Young University</td>
<td>Article6</td>
</tr>
<tr>
<td>Title</td>
<td>Author</td>
<td>Institution</td>
<td>Year</td>
<td>Article</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>----------------------</td>
<td>----------------------------------</td>
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<td>---------</td>
<td></td>
</tr>
<tr>
<td>A Qualitative Study of the Experiences of Novice Undergraduate Students with Online Finding Aids</td>
<td>Johnston, Rita D.</td>
<td>SILS Master’s Paper</td>
<td>2008</td>
<td>Article9</td>
<td></td>
</tr>
</tbody>
</table>
Appendix C

**Codebook**

Unit of Data Collection: Individual articles reporting on the findings of online usability testing.

*Publication*

Article Title: Report the article’s title, including subtitle.

Article Publication: Report the journal title in which the article appears.

*Contributors*

Article Author(s): Report the article’s author(s) (please report only the first four names that appear).

Article Author’s Affiliation: Report the article’s author’s affiliation, if applicable.

Author’s Affiliation Type: Report the author’s affiliation type, if applicable.

*Study Method*

Subjects: Report in the number of subjects and type of subjects.

Data Collection Technique: Report the type of instrument used to gather this information.

Tasks: Report the nature of each task, purpose of task, time limitations given to complete each task, and number of tasks.

Findings: Report the findings.
Appendix D

Code Sheet

<table>
<thead>
<tr>
<th>Code</th>
<th>Data</th>
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</thead>
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<tr>
<td>Number</td>
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<td>Number of Subjects</td>
</tr>
<tr>
<td></td>
<td>Type of subjects</td>
</tr>
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