

# USABILITY AND THE EVOLVING LIBRARY WEBSITE

by

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A THESIS

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## An Abstract of the Thesis of

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The academic library website presents many complex usability issues, and most are affected by the ever-changing nature of digital information. This thesis explores these issues with the aid of usability testing on the University of Oregon Libraries website. Undergraduates performed tasks that reflect real library usage; the problems they encountered are summarized based on the usability measures of effectiveness, efficiency, and satisfaction. The study found that although students were able to effectively use the UO Libraries website to complete tasks, they did so inefficiently, with many missteps before reaching completion. Similarly, although students were able to find the information they needed on the website, they indicated that they preferred search engines over libraries for research purposes. These results serve as a starting point for discussion of the relationship between the library website and the search engine, the necessity of background knowledge in information gathering for competent website use, and a strategy for making the Libraries website into a tool students prefer.

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## 1. INTRODUCTION

The World Wide Web presence of the modern higher-level academic institution has evolved considerably over the last decade, from relative non-existence to a vital part of the “college experience” for current students. In my five-year career at the University of Oregon, my day-to-day interactions with the institution have become increasingly web-based. Registration, for instance, is only possible through the University’s web-based Duckweb<sup>1</sup> system, which is also the portal for transcript requests, end-of-quarter grade reporting, and participation in Associated Students of the University of Oregon (ASUO) elections. Over the last two years, the University has introduced the online QuikPay®<sup>2</sup> system for paying student bills, with the intention of phasing out paper billing. Similarly, students have come to expect frequently-updated class websites from their courses, and sophisticated instructors have used the University’s Blackboard™<sup>3</sup> system to facilitate out-of-classroom instruction and interaction. Students returning to the University’s Residence Halls next year will submit their “Room Race” requests online, instead of submitting paperwork in person.<sup>4</sup>

The benefits from the shift of these services to online formats are obvious: tasks like registering for classes and finding a place to live on campus no longer require long lines and extensive paperwork. Everything can be done at the student’s convenience, from the comforts of his or her own

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<sup>1</sup> <http://duckweb.uoregon.edu>. This and all other listed links are current as of May 2006.

<sup>2</sup> For the University of Oregon’s “Introduction to E-Billing and E-Payment”, see <http://baowww.uoregon.edu/Student/EbillIntro.htm>

<sup>3</sup> <http://blackboard.uoregon.edu>

<sup>4</sup> <https://housing.uoregon.edu/roomrace/main.php>

home. However, the success of these interfaces relies on the students' ability to use them. If, for instance, a student cannot figure out how to correctly register for classes, pay a bill, or sign up for a place to live in the "Room Race", the consequences for that student can be extremely severe. As an undergraduate and regular user of these interfaces, I have been especially compelled by the high stakes involved. If the day-to-day affairs of students continue to be ported to the web, usability issues must be a priority.

For this thesis, I wanted to learn about usability studies in the context of one of these academic web interfaces. Given the limitations of time and scope, I needed an interface that was easily accessible and relatively static. I chose the University of Oregon Libraries website<sup>5</sup> as this domain.

My intention with this thesis is to study usability in the context of the University of Oregon Libraries website, and then apply the lessons learned to the domain of academic library websites. I am also interested in exploring the challenges presented by information searching in general. I will do this through the development and administration of a usability test on the web interface. After analyzing the test results, I will discuss the usability problems that were revealed by the testing. This will be followed up by a discussion on ways to improve the usability of the library's web interface.

In this process, I will address the following research questions:

- Given the usability measures of effectiveness, efficiency, and satisfaction, is the University of Oregon library website usable for the largely inexperienced members of its undergraduate user group?

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<sup>5</sup> <http://libweb.uoregon.edu>

- What do the usability issues of the University of Oregon Libraries website reflect about the usability issues of academic library websites in general?
- Are students fully aware of the functionality provided by the academic library website? If students had this awareness, would their overall usage of and preference for the library website versus other online resources be influenced?
- How important is training in information research to successful use of the UO Libraries website? How important should it be?
- What are the similarities and distinctions between academic library websites and other online resources: specifically, search engines? How has students' familiarity with these online tools influenced the usability of the academic library website?

### 1.1 Purpose of Study – Applications within the Domain

The academic library website is an index into the library's physical collections and electronic holdings (an electronic "card catalog"), and a valuable tool for research. Despite the availability of this valuable resource, the library website is underutilized by students. Not only are many students unaware of the full capabilities of the library web site, but they are also satisfied with the relevance and adequacy of web-based results from easy-to-use search tools such as Google<sup>6</sup>, MSN Search<sup>7</sup> or Yahoo!<sup>8</sup>, despite the credibility issues raised by internet resources. Vassiliadis and Stimatz explain, "For today's students, information is a commodity and, like many

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<sup>6</sup> <http://www.google.com>

<sup>7</sup> <http://search.msn.com>

<sup>8</sup> <http://www.yahoo.com>

consumers, they are willing to sacrifice quality for convenience. If students cannot locate information they need on the library's Web site, they will go elsewhere" (2002). Students that opt out of using the library web site are often opting out of better information as well. The information on academic library web sites does not come cheap, either: the library's physical collection reflects a continued investment, and library subscriptions to electronic journals and databases are expensive and recurring, stretching already sparse library budgets thin (Breakstone, 2005). It is in the best interest of the librarian, then, that the resources for which they are using their budgets are adequately utilized by the student population.

Librarians are well aware of the necessity of usable web sites. Publications of past usability studies on library web sites are plentiful, and they reveal a myriad of issues that are both unique to this type of interface and common across all interfaces dealing with processing and presenting large amounts of information. Most of the library usability studies that I read were dated by several years. Meanwhile, the library web interface has continued to evolve, accommodating new features and an ever-increasing number of sources and categories of information. Each user interface presents its own unique set of usability problems, and the problems that are revealed by a usability test rely largely on the care that has gone into the test's design. It is with this in mind that I hope the issues addressed in this thesis will uniquely add to the discussion that is already taking place in the communities of both academic librarians and usability engineers. In turn, the University of Oregon Libraries staff has been simultaneously conducting its own usability research in the development of a website redesign. It is my hope that the findings of this thesis, which has been developed independently

of the library, will provide the potentially valuable perspective of a University student in the discussion of the website redesign.

### 1.2 Purpose of Study – Personal Applications

During my career as a student in Computer & Information Science at the University of Oregon, I have developed a strong interest in the study of Human-Computer Interaction (HCI), which encompasses a myriad of subtopics, including the concept of usability and usability testing. The Clark Honors College thesis requirement presents the opportunity for me to develop and refine my knowledge of usability studies beyond what I normally would acquire in the classroom. With the coursework of Computer & Information Science 443: User Interfaces as my foundation, I have the opportunity to put some of the concepts acquired in class to practice. I will be entering industry in the summer of 2006 as a software engineer, and although user interface design will only be a small aspect of my work, a well-developed background in human-centered development will be a boon to any software I produce. In turn, the experience of planning and conducting a usability test will aid me considerably if I do decide to move my career emphasis to user interface testing and design in the future.

### 1.3 Outline of the Thesis

The central theme of this thesis is the administration of a self-designed usability test and the discussion of its results. In order to design a high-quality usability test, extensive research into the domain is required, which is why the test methodology is preceded by a literature review (Chapter Two) and a breakdown of additional work done in the process of designing the test

(Chapter Three). Chapter Two, the literature review, will go into greater detail about the concepts of usability and usability testing; it will also give a conceptual overview of library science. The literature review concludes with a discussion of usability studies that librarians have already performed, and summarizes some of the usability issues that are typically found in these studies.

Chapter Three, “Developing a Usability Study”, will include the research that was done as part of the human-centered development process to familiarize myself with the domain of academic library websites. This chapter includes an overview of the user group that will be tested, a description of the functional requirements for a library website, and a description of additional explorative exercises that were done in preparation for the development of the usability test. The actual test description and its methodology are outlined in Chapter Four. Chapter Five summarizes the results of the study. Chapter Six is a discussion of these results and other issues that were raised in the development of the study. In particular, this discussion examines possible solutions to the usability problems encountered in testing.

## 2. LITERATURE REVIEW

The first half of this literature review provides an overview of the concept of usability and its importance not only to software but to any device or object that is used by people. The discussion of usability leads into an overview of human-centered development and usability testing, with emphasis on the methodology that will be used in the test developed in this thesis. The second half of this literature review focuses on the library science domain. The “information literacy” of users of library web sites is an important aspect of the discussion surrounding the web interface. In order for this discussion to succeed, a base level of “information literacy” will be established in this chapter with the description of key concepts and terminology in library science. Finally, the fields of library science and usability testing will be combined in an overview of usability studies that have already been administered on library websites.

### 2.1 The Concept of Usability

What makes usability such an interesting problem for computer scientists (as well as other designers of essentially any product used by humans)? I’ve been drawn to usability because it seems to be the aspect of technological development that computer scientists, among others, struggle with – and fail at – the most. Computer scientists and engineers have had astounding success with developing data structures, algorithms, and core concepts which have utilized the potential of technology to a breathtaking degree. The cleverness and brilliance of the problem-solving behind these concepts has been one of the most compelling aspects of an education in computer science. Unfortunately, the interfacing between humans and technology has been a

more difficult problem to attack – in particular, because the challenge of creating software that is usable is imprecise, widely varying on a myriad of conditions, and continually evolving – a distinct departure from the consistency and timelessness of a developed science.

Donald A. Norman's *The Design of Everyday Things* (1988) is a classic introduction to critically thinking about usability as an all-pervasive concept. Norman examines glaring design failures in the simplest of objects: door knobs, light switches, and stovetops are three recurring examples. The frustrations that Norman highlights, from doors which look like they should push but pull, to electronic devices with an overwhelming number of buttons and knobs, are experiences most people can relate to. They also serve as foundational evidence of the carelessness of the designer at even the most basic level. Norman's book also gives face time to design successes, which are breathtaking in their simplicity and elegance. Unfortunately, designing for usability is no simple problem – in particular, because humans, human thought and human behavior are not easily broken down into reliable rules and postulates. Norman explains:

Even though principles of rationality seem as often violated as followed, we still cling to the notion that human thought should be rational, logical, and orderly... Mental life is not neat and orderly. It does not proceed smoothly and gracefully in neat, logical form. Instead, it hops, skips, and jumps its way from idea to idea, tying together things that have no business being put together, forming new creative leaps, new insights and concepts. Human thought is not like logic; it is fundamentally different in kind and spirit (p. 114-115).

Despite these ample challenges, computer scientists and specialists from interdisciplinary fields have tackled the usability problem. They have created a set of concepts and tools that the well-versed designer can use in

the process of creating new products. Adopting these principles will curb the current overflow of unusable objects and applications. The center of this approach is a focus on the user, and a belief in the idea that Norman pushes amply in *The Design of Everyday Things*: usability problems and failures are the fault of the design and not the user. This philosophy is supported strongly by the rest of the usability-centered literature.

### 2.11 Defining Usability

Norman's work shows that usability is a concept which applies to anything that can be designed for a person to use. However, this thesis will focus more explicitly on usability concepts as they apply to computer software, and in particular, web applications. Earlier discussion reveals an informal definition of usability as "user-friendliness" and ease of use – how in touch with a well-defined user group is the design of the product? However, a more explicit, less subjective definition is needed if we want to effectively evaluate this concept. According to Patrick W. Jordan in the book *An Introduction to Usability*, the formal definition of usability, as given by the International Standards Organization (ISO), is "the effectiveness, efficiency, and satisfaction with which specified users can achieve specified goals in particular environments" (1998). Effectiveness, efficiency, and satisfaction are known as usability measures, and are explored in greater detail in section 2.12.

Usability is entirely determined by the specific traits and behaviors of the intended user group for a particular product. For instance, a product that is considered "usable" for a person heavily experienced with the interface, but intended for the casual user to walk up and use without prior experience, may not be "usable" at all. It is for this reason that designers are typically

poor judges of the aspects of their products which will create usability problems – because they are not only specialized in the content of the software, but intimately familiar with its functionality as well. This is similar to the gap in understanding that occurs when a specialist in any field is talking to the “layman audience” without taking the time to make the appropriate clarifications. In order to truly conquer usability, the designer must be deeply in touch with a product’s user group, and bridge this gap of understanding in every way possible. Human-centered development, which focuses on the needs of the target user group from the onset of a project, is becoming an increasingly utilized approach to the software development process. This user interface design strategy is further explored in section 2.2.

One core aspect of usability that will not be explored to its fullest extent in this thesis is the concept of “universal usability”. Shneiderman and Plaisant describe universal usability as “the ultimate goal – addressing the needs of all users” (2005, p. 25). Diversity is wide-ranging, with the traits that influence user behavior and needs varying wildly. These variations include physical characteristics, cognitive and perceptual abilities, personality differences, cultural differences, and age. Users with disabilities have additional needs that deserve recognition. Although universal usability is an incredibly ambitious goal for designers, it is the ethical and responsible ultimate endeavor.

### 2.12 Usability Requirements & Usability Measures

Another way to think of usability is as a combination of “usability requirements and usability measures.”

Early on in the development of software and other systems, designers perform a requirements analysis of their system. As a result of this

requirements analysis, designers typically produce a set of functional requirements, which lay out the specific tasks and features that are supported by the system. Usability requirements are produced in tandem with functional requirements and capture the ways that users should be able to interact with the system. Some examples of usability requirements include the amount of background knowledge a user is expected to have to effectively use a feature, or the amount of time needed for a user of different skill levels to complete a task. In a human-centered development process, these requirements are typically developed after the extensive research into the needs, behaviors, and characteristics of the user group. Therefore, the requirements typically fit the needs of the users: for instance, the functional specification should differentiate the most important “core” features from the “nice-to-have” features, and the usability requirements should accurately reflect the characteristics of the user group. This thesis includes a functional requirements specification in section 3.2. Although there are no usability requirements, the functional requirements are strongly oriented towards the chosen user group for this project.

Usability measures are applied to the evaluation of an interface to determine how well the interface is meeting usability requirements. These measures are in place to give an objective measurement of usability. Jordan defines these measures off of the ISO definition of usability: effectiveness, efficiency, and satisfaction.

Effectiveness is “the extent to which a goal, or task, is achieved” (p. 18). One way to measure effectiveness is task completion: can a user complete a given task with this interface? The quality of output is another measurement tool: although users may have completed a task, they may have done so at varying levels of quality. In this thesis, users were given tasks to

complete in the form of questions. If the participant could answer the question, they had completed the task, but sometimes the answers were incorrect, or indicated that the user hadn't taken the optimal approach.

Efficiency is "the amount of effort required to accomplish a goal" (p. 19). Efficiency can be measured by number of derivations from the critical path: in the tasks for this project, there was usually an optimal way of solving a problem, but users may have gone in the wrong direction first, or accessed the resource in a roundabout way, resulting in inefficient completion of the task. Error rate is another way of measuring efficiency, and can be further broken down into classifications of errors and error severity. Does an error slow the user down, take them completely off course, or crash the system? Additional measurements of efficiency include the time to complete a task and mental workload.

Satisfaction is "the level of comfort that the user feels when using a product and how acceptable the product is to users as a vehicle for achieving user goals" (p. 23). Both qualitative and quantitative attitude analyses are used to measure user satisfaction with an interface. A qualitative analysis allows an open-ended response from users about their feelings for the product; a quantitative analysis fits these feelings to discrete measurements.

Two additional measurements fitting these usability measures are given by Shneiderman and Plaisant (p. 16). The time to learn how to competently perform tasks on an interface, and the retention of this knowledge over time, also impact the usability of an interface.

## 2.2 Human-centered Software Development

This review of usability concepts has already touched lightly on the concept of human-centered software development. This design strategy will now be

examined in more detail as the context for usability testing and the driving force for many of the strategies utilized in the development of this thesis.

Dr. Sarah Douglas' User Interfaces course (Computer & Information Science 443 at the University of Oregon) provides the backbone for this discussion of human-centered development (2006). Human-centered development places the developmental direction of the user interface on a connection with the users. This is contrasted with a technology-centered design, which is guided by technological advances (functional "bells and whistles"), or designer-centered design, which is guided by the intuition of the designer. Both of these strategies fail when the resulting interface is out of touch with the user's needs. Even so, these are the strategies that are typically implemented in software design, inspired by carelessness and an interest in saving time, effort, and money.

User-centered software development is based on four principles:

- *Early and Continual Focus on Users.* This means that developers should be in touch with the users through as many means possible, from interviews to observation to participative experiences.
- *Integrated Design.* All aspects of usability should be considered in parallel with the rest of the development process.
- *Early and Continual User Testing.* Real users of the product should be tested on the product from the earliest prototypes to the final product. This will help developers diagnose problems early in the process.
- *Iterative Design.* User testing is a continual process. When a test is completed, improvements should be made on the design, and then this design should be tested again. This process of continual refinement and improvement, followed up by testing, occurs throughout the entire development.

This last component of user-centered development, iterative design, is the guiding aspect of the steps in the development process. These steps are meant to be repeated again and again as development of a product proceeds.

1. *Planning*. Establish the purpose of the project, gain a full understanding of its scope, and learn about the user group in depth.
2. *Requirements Analysis*. Develop a functional and usability requirements specification.
3. *Design*. This is done with the previously-mapped specifications used as a guide.
4. *Implementation, or Prototyping*. A mock-up of the system should be developed; in later stages this would be an implementation of the actual software.
5. *Usability Evaluation*. Evaluation methods without users, such as walkthroughs and the application of standardized guidelines can be used, but the best results will be acquired by actually bringing the user in to test out the design.

A single iteration of this development process has been implemented in this thesis with the third and fourth steps removed, as the interface has already been designed and implemented. However, by engaging in the planning and requirements analysis step of this process as if I were ultimately designing the interface, I was able to familiarize myself with the user group in a way that directly aided usability evaluation techniques.

The usability evaluation method of user testing is the central focus of this thesis and can now be described within the correct context.

## 2.21 Usability Testing

There are many ways to evaluate the usability of an interface, but the best results are attained when actual users interact with the product. Usability testing gives participants taken from the user population a set of tasks or scenarios to complete on the interface. By observing users interacting with the actual system, test administrators can diagnose usability problems and can determine whether the usability requirements have been met by the interface.

Placing the actual user in front of a computer to evaluate the interface seems obvious, but it is a step that is often skipped by software developers, for the reasons mentioned earlier: perceived loss of time and money. By administering usability testing to determine problems early and often, developers will cumulatively be save themselves considerably more time and money than may be needed to fix these problems if they emerge after a release.

Jeffrey Rubin's *Handbook of Usability Testing* (1994) takes the basic concept of usability testing and presents the many variations of test administration. This handbook is especially useful because it provides all of the necessary tools for people who do not have the training and expertise in usability evaluation to successfully administer a test. The librarians who have evaluated the interfaces presented in section 2.31 consistently use this book as a guide and reference. Rubin also presents different methods of test administration to accommodate varying budget and scheduling limitations. The guide comprehensively walks developers through the entire process of developing and administering a usability test, similar to what has been done in this thesis.

Sarah Douglas' "How to do Usability Testing" (1998) guided the methodology of the usability testing in this thesis. The paper outlines steps to follow in the development and administration of a usability test, as well as guidance for analysis of the results. In particular, the paper emphasizes two important strategies for successful usability testing: first, test monitors should not be in the room with participants while a test is being conducted, in case they influence the actions of testers in any way. Second, there are many disadvantages to testing a single person, including the inherent difficulty people have with vocalizing their decision-making process or "thinking out loud". Collaborative testing of pairs of users allows for "thinking out loud" to be done in the context of naturally-occurring conversation between partners working together to complete a task. The methodology outlined by Douglas' paper is further detailed in Chapter Four.

To begin my own user-centered development process, and initiate the construction of an effective usability test, it was also necessary to familiarize myself with the domain of library science and the academic library website. This required a literature review of its own; first to review basic library concepts and terminology, and then to draw the fields of usability and library science together.

### 2.3 Academic Libraries & Information Science

Long before computer scientists first tackled the problem of "information overload", librarians had dealt with the issue themselves. The field of library (or information) science has developed the long-standing infrastructure which manages the incredible quantities of information found in modern libraries. Library science, like any academic field, also suffers from the gap of

understanding which exists between the specialists (often academic librarians) and the average person (in regards to this thesis, typically a student, and specifically an undergraduate). To aid in closing the gap that may emerge in this thesis, a glossary of academic library terms which will have importance in this thesis is included in Appendix A. This glossary also expands on some terminology which is unique to the University of Oregon Libraries.

Technology has changed the role of the academic library, and these changes are presenting challenges to the very infrastructure of the library itself. Librarians are quite aware of both the advantages and drawbacks of computers and online resources, and are heavily involved in discussion about the implications of technological change. Opinions vary considerably about how librarians as a community should react to this change.

In regards to technological adoption, libraries have utilized the power of computing since the late 1960's. I've used computerized library systems for most of my life, starting with on-line catalogs incorporating Telnet<sup>9</sup> terminals. The usability studies presented in section 2.31 reflect library interfaces ranging over the last decade in the development of internet technologies and their adoption into society. Some of the studies are based on library web sites which were almost entirely textually based; others are from times when graphical elements and greater complexity were incorporated into these interfaces. None of the studies I read dated later than 2003, which means that they do not reflect the complexities of the "modern" academic

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<sup>9</sup> In this context, Telnet represents the client-side or user interface of a network protocol (connection enabler) that allows users to interact with network data through a command-line interface. [see Wikipedia: <http://en.wikipedia.org/wiki/Telnet>]

library website in the way that this thesis will<sup>10</sup>. In particular, the library website now accommodates more features than ever before, and with complexity comes additional usability hurdles. Web design is no longer limited to simple text, images, and links. Built-in applications (developed with languages such as JavaScript<sup>11</sup>, JSP<sup>12</sup> and PHP<sup>13</sup>) and dynamically updating website components (implemented with technologies like Flash<sup>14</sup> and AJAX<sup>15</sup>) allow for more sophisticated websites than ever before. These new possibilities have mixed implications: although libraries may be able to use these tools to find new solutions to old interface problems, they may also find themselves burdened with even more functionality and complexity to accommodate. If these developments are not carefully implemented, website designers may cripple a formerly usable website.

### 2.31 Usability Studies on Academic Library Websites

Librarians are aware of the usability problems presented by academic library websites, and they want their patrons to use the library website with greater frequency than other online resources. As a result, usability studies of

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<sup>10</sup> A fully comprehensive review of all library usability studies would have included more recent studies.

<sup>11</sup> Javascript is a scripting programming language that is best known for its use in the creation of websites. [see Wikipedia: <http://en.wikipedia.org/wiki/Javascript>]

<sup>12</sup> JSP, or JavaServer Pages, is a Java (programming language) technology that allows Java code and pre-defined actions to be embedded into static web content. [see Wikipedia: [http://en.wikipedia.org/wiki/JavaServer\\_Pages](http://en.wikipedia.org/wiki/JavaServer_Pages)]

<sup>13</sup> PHP is a programming language that helps create dynamic web content and server-side web applications (where a script is run directly on the server to create dynamic content). [see Wikipedia: <http://en.wikipedia.org/wiki/Php>]

<sup>14</sup> Flash is a name used for the Macromedia Flash player, which can be installed into most web browsers, and the technology used to implement this player. Flash technology allows for animated and interactive web content. [see Wikipedia: [http://en.wikipedia.org/wiki/Macromedia\\_Flash](http://en.wikipedia.org/wiki/Macromedia_Flash)]

<sup>15</sup> AJAX is short for Asynchronous Javascript and XML. It is a web development technique for creating interactive Web applications, and has recently become very popular with website developers. [see Wikipedia: <http://en.wikipedia.org/wiki/AJAX>]

academic library websites are plentiful. My exploration of these studies included reading six papers detailing the methodology and results of usability testing (Battleson, Booth, & Weintrop, 2001; Benjes & Brown, 2001; Cockrell & Jayne, 2002; Hammill, 2003; McGillis & Toms, 2001; McMullen, 2001). Several additional papers summarized the usability testing concepts presented in section 2.21 for other librarians (King, 2003; Letnikova, 2003; Thomsett-Scott, 2003). These papers were less informative given my prior background, but were helpful in understanding the differences between the librarian's approach to usability testing and my own. In particular, this collection of papers showed the extensive variability that occurs between studies. Not only are the challenges presented by each library website unique to the particular design decisions made by its creators, but the results of each test are determined by the test methodology, choice of participants, and most importantly, the development of the tasks. At the same time, there is consistent common ground in all of the studies, which was ultimately reflected in aspects of the usability study done for this thesis.

Librarians testing usability websites were often motivated by website redesign projects, and the greatest limitations in their usability testing ambitions were time and funding. In particular, the librarians performing these studies did not have the facilities, or the funding to hire the expertise which would support the most highly-recommended usability testing methods. Instead of videotaping tests, for instance, librarians typically recorded notes while the tests were being performed. Some had audio recordings during testing as well. None of the tests were performed with test administrators out of the room. Unfortunately, without an accurate point of comparison, there is no way to fully determine how this influenced the results. The other distinct difference from my own testing was that all tests

were performed on single users. In several of the tests, administrators noted that “thinking out loud” was awkward for some participants. These tests were performed on a list of common library tasks, with 6-10 tasks per usability test.

In one usability study, Cockrell and Jayne (2002) had students perform tasks which revolved explicitly around the acquisition of articles from different sources – such as journals, magazines, and newspapers. Their testing also explored the differences in expertise between undergraduates, graduates, and faculty members. Graduates and faculty did have a higher rate of success than undergraduates, but these differences were ultimately negligible, as similar problems were experienced by all user groups.

Battleson, Booth, and Weinthrop’s study (2001) was notable for the particular care that the authors gave to task development. The conditions by which Battleson et al decided to construct their tasks were especially helpful for task development in this thesis. The most interesting component of the task development was the way that most of the tasks were presented as questions, for example: “Do the University Libraries own the book *Alias Grace*?” (p. 191) Questions of this nature were ultimately included in my own test development to give the participants a clear idea of when they had completed the task. However, I avoided the open-ended style of some of the questions incorporated in this test, such as “How would you find a journal article on soap operas?” (p.191) In particular, I worried that “How” questions would appear more as a “where are the help documents?” task than one which actually compelled the user to utilize the function proposed by the question.

Benjes and Brown’s study (2001) served as an excellent example of the power of iterative user testing with regards to the University of Southern

California School of Medicine's library website. In this study, two tests were performed, with the second test requiring the users to perform similar tasks on an interface that had been improved using results from the first test. The results of the second test confirmed that just one test does not iron out all usability problems in an interface; nor do the "solutions" to these usability problems exist without presenting issues of their own.

A few patterns emerged in the usability problems discovered by these tests. They included:

1. *Students did not know what could be found in the library catalog, and what needed to be found elsewhere.*
2. *The naming of links was problematic.* Links using terminology specific to the library (for instance, an acronym for a library catalog) with no additional descriptions led users astray. Similarly, vague descriptions such as "Quick Links" and "Research Resources" were ignored by users.
3. *Students did not read pages on the site, but instead scanned for what they needed, typically in the form of a link.* This reiterates the importance of proper naming of links, but also implies that the highly descriptive text content of pages, help sections, and research guides was not a sufficient fix for aiding students through the difficult parts of website navigation.
4. *Students did not have a clear understanding of library vocabulary, and acted on a conceptual model of library terminology that varied considerably from that of the librarian.* This created the most trouble for tasks involving article research, as the terminology used – journal, magazine, serial, database, index – was often muddled and frequently interchanged by users. The main point of this discovery, however, was re-emphasis that librarians could not rely on users of their system to have the same basic knowledge of library terminology with which they were so familiar.

With this foundation of knowledge in place, I transitioned to the first step of the human-centered development process. The test development of Chapter Three explores academic library websites and their users.

### **3. DEVELOPING A USABILITY STUDY**

In order to develop a usability study that accurately revealed the problems encountered by actual users, it was important to start development by identifying both the user group and the functional requirements of the University of Oregon's academic library interface. To continue the human-centered development approach, these specifications are followed up by several exercises which explored the domain and usability testing in greater detail.

#### 3.1 Who are the Users?

A user-centered development approach begins with identification of the users. The library website has many different users, from University faculty, undergraduates, and graduates, to community members, visitors, and the academic librarians themselves. Within each group of users – in particular, the University community of students and faculty – there is an even greater breakdown of academic specialties which influence information needs and behaviors. Additional cognitive user characteristics influence user behavior: for instance, the University's large population of international students will have an entirely different set of usability problems to overcome before approaching the experience of a domestic user. Students with physical or cognitive disabilities will run into additional usability hurdles as well.

Although the library website should serve the entire University community, a usability test which attempts to address this wide variety of users is beyond the scope of this thesis. As a result, my focus will be on the University's largest group of users: undergraduates, who currently number at about 16,000. The needs of this large group of students vary considerably based on their individual choice of major and experience with research.

Despite these differences, the usability test was intended to address the common behaviors of undergraduates as a group. To get a better understanding into the population and its information seeking behaviors, I conducted my own research of the user group in the form of a survey (section 3.31), and gained additional insight from the research that has already been done by academic librarians.

Manuel's survey of undergraduate information literacy (2005) summarized much of the prior research into the information seeking behaviors of undergraduates. This study focused on first-year students, so it is not a completely accurate capture of the user group. Even so, the traits summarized by Manuel are necessary considerations for those undertaking the design of a user interface which accommodates this group of students:

- They rely heavily upon the internet for meeting their information needs, sometimes even changing their research topics to match the information available electronically.
- They ignore library information resources and services.
- They act on the 'principle of least effort' in researching. They often seek to get the highest grade with the least expenditure of time and effort and they sometimes unthinkingly use the first few information sources they find.
- They use unsophisticated searching techniques, which unbeknownst to them are inadequate for finding the needed information.
- They accept uncritically information sources from the Web, largely because they are unaware either of the existence of misinformation on the Web or of criteria for evaluating Web resources.
- They are disrespectful of others' intellectual property, routinely engaging in cut-and-paste plagiarism and in

downloading copyrighted files over the Internet (p. 401-402).

Manuel stresses that these characteristics appear to be the result of information illiteracy instead of laziness on part of the students. This is in line with the discoveries made by librarians in the usability tests summarized in section 2.31. However, it presents a unique challenge for the designers of library web sites. Information literacy is acquired knowledge just like any other academic subject, but students tend not to have the training in it to allow them to correctly utilize the resources provided by library interfaces. In turn, the pervasiveness of internet resources which provide quick results that are satisfactory, even if they are not the best, has influenced the information-seeking behaviors of undergraduates as well. Although the searching behaviors of students are not well-developed, they usually do not have to be for these users to make adequate use of popular search engines. Manuel states, "Unobtrusive studies of searchers' behaviors uniformly reveal that the vast majority of searchers use simple searches with one to two keywords" (p. 407). This means that these students may consider themselves to be better searchers than they actually are. With this limited skill set, students will not be able to properly utilize the sometimes complicated search technologies that are currently in place in library interfaces.

### 3.2 Functional Requirements

Developing functional requirements – a description of what software should be able to do – is the next step in the development process. In regards to developing a usability test, these functional requirements were important because they served as a guideline for the development of relevant tasks. The functional requirements that I developed are specific to the user group defined in section 3.1, and are not all-encompassing. Instead, I focused on functions of a library website that are important for the information needs of undergraduates. The functional specification is developed from my experience as an undergraduate user of the library website, and incorporates the results of the user survey in section 3.31. These features are all implemented, although with some constraints, in the current University of Oregon Libraries website.

**Table 3-1** Functional Requirements for an academic library website.

<b>Functional Requirements</b>
<p><b>Information-Gathering / Resource Acquisition:</b></p> <ol style="list-style-type: none"> <li>1. The high-level version of the basic core function is that users of the library website should be able to have access to <i>all</i> of the library's sources which are made public to library patrons. This access can either be direct: through the electronic availability of the source through the website; or it can be indirect: by listing information about where and how the item can be physically acquired. This is broken down into more explicit functionality below:</li> </ol> <p><b>Physical Collection (Sources formerly found in the physical card catalog.):</b></p> <ol style="list-style-type: none"> <li>2. Patrons with knowledge of the particular item they have in mind – i.e., title of the item, author, etc. – should be able to clearly determine if the item is or is not available in the library's collections.</li> <li>3. Important information about items that are available in the library's collection should be easy to access. This information should include: the type of the item (could be a book, video, magazine, etc.); whether the item is checked out or available; where to locate the item, either physically (library – if there are multiple campus libraries – and call number), or electronically (a link to the electronic resource); a short description of the item; and the standard information that would be used in a citation of this source.</li> <li>4. If access to other library collections is available through an interlibrary loan service, these same functions should be available for those collections. When browsing these collections, it should also be possible to place holds or request items through this interlibrary loan service.</li> </ol>

5. Patrons without a particular book in mind, but with a subject or keyword in mind, should be able to browse the library collections on this subject or keyword.

#### **Electronic Collection**

6. Electronic items in the library's collections should be clearly differentiable from items that are only available physically.
7. Patrons looking exclusively for electronic items should be able to narrow their search to include only these items; accessing these items directly from the website should be straightforward.
8. If users are trying to access electronic information off-campus, and electronic resources are only allowed for on-campus users, or for those who have "logged in" to the site, the website should provide clear feedback about why this information can't be acquired, and how to get appropriate access.

#### **Journal Indexes and Databases**

9. Patrons with prior knowledge of the specific journal article they want (i.e. article title, author, journal name, and journal volume/issue) should be able to determine how this article can be acquired (either physically – by finding the journal in the library – or electronically – by loading the journal through the website).
10. Patrons searching for particular articles in a particular subject should be able to perform a search on a subject or keyword which allows them to browse available articles meeting their search criteria. In turn, they should be able to determine how they can acquire the article directly from the website.
11. Patrons should be able to easily determine which of the three categories any journal fits into: journals the library has electronic (and perhaps physical) access to, journals the library has only physical access to, and journals which the library does not own or subscribe to.
12. If a library patron has a specific (library-subscribed) database in mind, they should be able to access that particular database directly from the library website.

#### **Additional Library Services**

13. Users of the library website should be able to open information about their library account and patron record, which should include information about the items they have checked out, due dates, and fines that have accumulated. This service should also allow users to renew their items directly from the website.
14. Any research guides or other publications made available by the library staff should be available online as well.
15. Users should be able to get in touch with library staff electronically – definitely through email, and possibly through other more advanced features as well.
16. Library patrons should be able to find out information about the physical libraries available on campus, in particular: the names and physical locations of campus libraries, and the hours each of these libraries are open. In addition, information about special hours (such as during dead/finals week) and special services offered in certain libraries should also be available online.
17. Any additional services made available for patrons through the library should also be available through the library website, if possible. (Examples are reservations of study rooms within the physical library, or equipment check-out.)

**Table 3-1** Functional Requirements for an academic library website.

### 3.3 Exploring the Domain

To further prepare myself for creating a list of task scenarios that accurately represented both the functional requirements of the interface and the needs

and behaviors of the users, I engaged in several exploratory activities to better familiarize myself with the domain of library science and usability testing. The first of these activities (section 3.31) was a user survey of University of Oregon undergraduates to learn more about their relationship with the UO Libraries website. The second activity was a brief walkthrough of both the University of Oregon Libraries website (section 3.32) and nine other academic library websites (section 3.33), in order to familiarize myself with similarities and differences across the domain. The final experience was participation as a user in the library's own usability studies for its website redesign project (section 3.34). Each of these experiences fit in nicely with the human-centered development process and allowed me to understand the problem I was facing from several angles.

### 3.31 User Survey

In order to familiarize myself with the user group, I decided to give a survey to a sample of University of Oregon students to learn more about their attitudes towards information-gathering in research and their usage of the library website. As a member of this user group, I already had an idea of certain traits and common tasks related to undergraduates. However, I wanted to fully develop these ideas, so that the tasks I wrote for my test would accurately reflect the needs and behaviors of undergraduates.

The survey and its explicit results are listed in Appendix B. In order to give the survey to students who represented the wide range of academic specialties and skill levels reflected in undergraduates, I had to choose a survey pool that was equally diverse. The survey was given to my Business Administration (BA) 315: Economy, Industry, and Competitive Analysis class. This class is a course for the BA minor, which attracts students from a

wide array of majors. Over 25 different academic specialties were reflected in the survey, which was given to 49 students. One difference between the survey group and the ultimate user group that was recruited for the testing was that the survey group was mostly upperclassmen; the testing group disproportionately represented younger students.

The most important observations from this survey were:

- All but two of the participating students had used the website before. A modest majority (55%) felt that they could use the website effectively.
- Students varied widely in their frequency of use. The majority of students used the site once a week (35%), once a month (22%), or once a quarter (29%).
- Less than a majority of students were satisfied with the library website (43%), but only 20% were unsatisfied. The rest were indifferent. The main reasons users found themselves dissatisfied: “I can’t find what I want on the site”, “It takes too long to find what I want”, and “I get better results from other online resources”.
- Although a majority of students (65%) use the library website at some point while writing a research paper, an even greater majority (96%) use a search engine like Google. In other words, more students use Google than the library website during the research process.

- The most common tasks that students identified were: locating a book (60%), locating a journal or periodical (55%), accessing electronic resources (49%), and locating articles in journals or periodicals (47%). Other tasks with a strong response by students included accessing Summit or Interlibrary Loan (27%), accessing research guides (22%), and checking library hours and locations (22%). One option, which I had not considered, was submitted by two students participating in the survey: accessing one's library account to check the status of and renew items. I do not know how strong of a response this task would have received had I included it in the list that students checked off, but recognize this as a very important task.

With these details about the user group in mind, and using a small list of tasks based on these characteristics, I moved on to a survey of academic library websites.

### 3.32 Walkthrough of the University of Oregon Libraries Website

To continue with preparation for this usability study, I familiarized myself with the University of Oregon Libraries website. The current website design has been active for the majority of my five-year college career, which means that I have used it extensively. I consider myself a proficient, but not expert, user of this website.

This section will provide an overview of the front page of the University of Oregon's website, followed by an overview of basic results pages on catalog search queries. This will provide a comparison point for the discoveries made in walkthroughs of other library websites, detailed in section 3.33. The following portion of this section will highlight the most

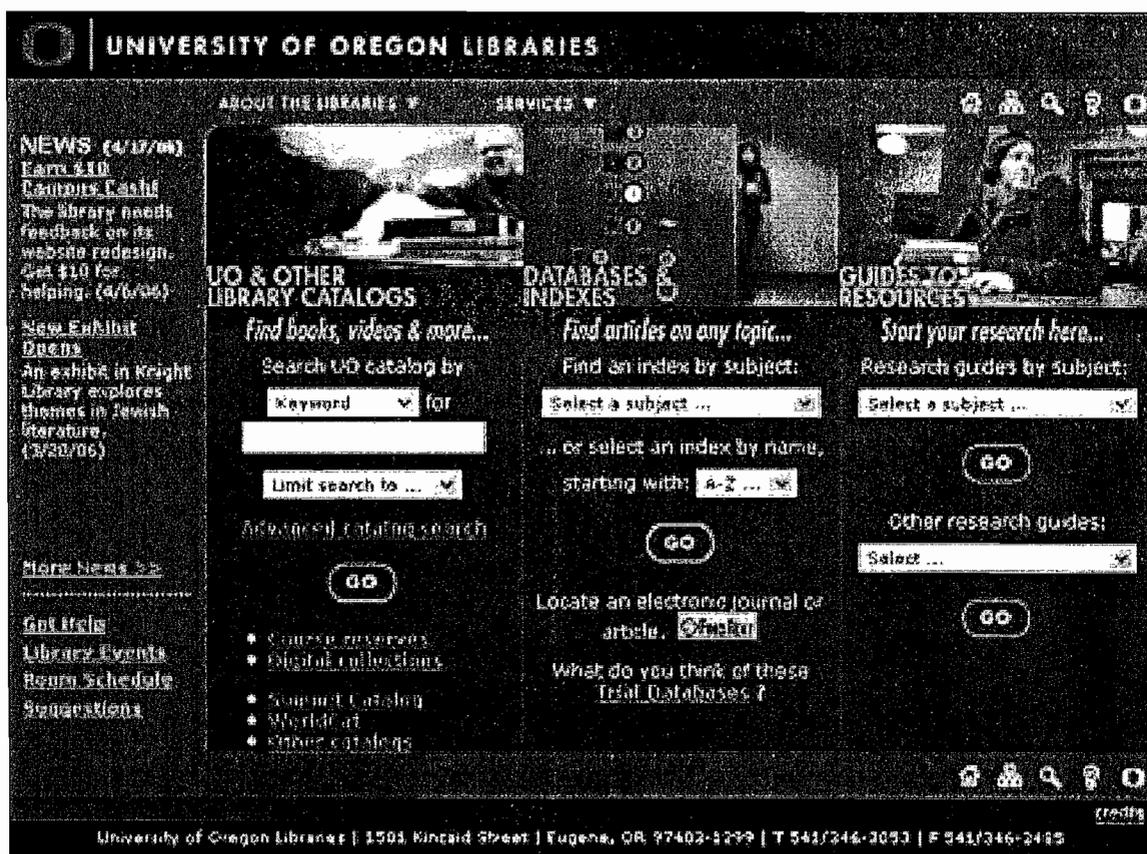


Figure 3-1: Front page of the University of Oregon Libraries website

compelling observations made while walking through the library websites of other universities.

Figure 3-1 shows the front page of the University of Oregon Libraries website. The page is divided into three parts to accommodate three different types of information-seeking tasks: the first section searches on the University of Oregon's holdings in its catalog, and gives access to the catalogs of other libraries, including Summit (a service in which Pacific Northwest universities loan books to each other) and WorldCat (similar to Summit, but over a far greater range of libraries). Users searching on the main catalog can search on terms like keyword, author, title, and subject. The search defaults to keyword. Likewise, users can narrow the parts of the catalog that are being searched: for instance, they can search for only Journals & Serials, or only Videos & Film. The default setting will search the full catalog.

The screenshot shows the University of Oregon Libraries website interface. At the top, there is a navigation bar with 'UNIVERSITY OF OREGON LIBRARIES' and links for 'ABOUT THE LIBRARIES' and 'SERVICES'. Below this is a search bar with 'UNIVERSITY CATALOG' and 'CATALOG SERVICES' options. The search results are displayed in a table format, sorted by year. The search criteria are 'AUTHOR' and 'coupland, douglas'. The results list four books by Douglas Coupland, each with a checkbox for selection and a 'Sort' button.

AUTHORS (1-9 of 9)		
<b>Coupland Douglas</b>		
1	<input type="checkbox"/> <u>Generation X : Tales For An Accelerated Culture / Douglas Coupland</u> Coupland, Douglas New York : St. Martin's Press, 1991. vi, 183 p. : ill. : 23 cm	1991
2	<input type="checkbox"/> <u>Life After God / Douglas Coupland</u> Coupland, Douglas New York : Pocket Books, c1994. 360 p. : 17 cm	c1994
3	<input type="checkbox"/> <u>Microserfs / by Douglas Coupland</u> Coupland, Douglas New York : ReganBooks, c1995. 371 p. : 22 cm	c1995
4	<input type="checkbox"/> <u>Polaroids From The Dead / by Douglas Coupland</u> Coupland, Douglas New York, NY : Regan Books, c1996. 168 p. : ill. : 20 cm	c1996

Figure 3-2: Appearance of a standard search result page on the University of Oregon Libraries website. This shows an author search on "Coupland, Douglas", with results sorted by year.

The central section of the library webpage gives access to the University's databases and indexes, which search for journal articles, both in the form of citations and full-text. There are many ways to access these databases, but they require some mastery in order for a user to get what he or she wants from this part of the webpage.

The last section of the homepage gives access to the library's research guides and help documents. The subject-specific research guides give descriptions and links to pertinent library-sponsored services fitting the subject matter. The help documents are more specific about certain aspects of the information-search process within the physical library, and its website.

The screenshot shows the University of Oregon Libraries catalog interface. At the top, there are navigation links for 'ABOUT THE LIBRARIES' and 'SERVICES'. Below these are search-related icons and a 'CATALOG SERVICES' dropdown. A search bar contains the text 'coupland douglas' and a 'Search' button. To the right of the search bar are buttons for 'Start Over', 'Mark This Item', 'MARC Display', 'Return to Results List', 'Repeat in Summits', and 'FindText'. Below the search bar, there are dropdown menus for 'View Entire Collection' and 'Year'. The main content area displays 'Record 3 of 9' with 'Previous' and 'Next' navigation arrows. The record details include: Author: Coupland, Douglas; Title: Microserfs / by Douglas Coupland; Publisher: New York : ReganBooks, c1995. Below this is a table with columns for LOCATION, CALL NUMBER, and STATUS. The table contains the following information:

LOCATION	CALL NUMBER	STATUS
KNIGHT	PS3553.C855 M53 1995	DUE 02-28-06MISSING +1 HOLD

Below the table, additional details are provided: Edition: 1st ed; Description: 371 p. : 22 cm; L.c. subject: Computer software industry -- Employees -- Fiction; Young adults -- United States -- Fiction; Genre: Humorous stories, qsfid; Bildungsromane, qsfid; ISBN: 0060391480; LCCN: 95011472 /f195.

**Figure 3-3:** Appearance of a result showing a particular item in the holdings. All items returned by the catalog search have this structure, with some variations. This return is on Douglas Coupland's book *Microserfs*.

Two links at the top of the page, “About the Libraries” and “Services”, reveal sub-menus of links when the cursor hovers over these icons. “About the Libraries” leads users to information about the physical libraries, including hours, contact information, and locations. “Services” directs users to specific library services not directly related to the information-seeking task, such as access of the library account, and other services that the library provides. In the top and bottom right corners of the interface, a row of small icons serve as “quick links” that appear on all University of Oregon Libraries pages. The links, from left to right, go to the libraries home page, the library website index, the library search tool (which uses Google to search over the content of the library pages, but not its holdings), library help resources, and the University of Oregon’s main (non-library) website.

Figure 3-2 shows an example of the appearance of a search query result on the University of Oregon catalogs. The results are in lists, grouped by ten. The title is listed first for a result, and as a link. Additional information about the item is listed below this link. Clicking on the link will either bring the user to another sub-menu (if there are multiple copies of the item, for instance), or will bring the user to a page describing the item. As an example, Figure 3-3 shows the descriptive page for Douglas Coupland's *Microserfs*. Note the linked (green, underlined) items in the results: clicking on most of these links will allow the user to do the equivalent of browsing on "nearby items" in a sorted list that is based on the type of link (i.e., nearby call number, title, author, subject). The "KNIGHT" link, meanwhile, displays information about finding books at the Knight library.

### 3.33 Walkthroughs of Academic Library Websites

I came into this project with my own ideas of the biggest usability problems surrounding the library website, and ideas for potential solutions, which were heavily shaped by my use of search engines such as Google. In particular, I felt that features which combined all searchable parts of the library would be the most comfortable and useful for students who were used to the highly flexible single-query Google engine.

In the process of familiarizing myself with the domain, I looked at nine other academic library websites, from medium- and large-sized private and public institutions. The websites I looked at were:

- The University of Texas<sup>16</sup>
- The University of Southern California<sup>17</sup>

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<sup>16</sup> <http://www.lib.utexas.edu/>

<sup>17</sup> <http://www.usc.edu/isd/libraries/>

- The University of California at Santa Cruz<sup>18</sup>
- Portland State University<sup>19</sup>
- Oregon State University<sup>20</sup>
- Stanford University<sup>21</sup>
- The University of Colorado at Boulder<sup>22</sup>
- The Indiana University at Bloomington<sup>23</sup>
- The University of Michigan<sup>24</sup>

For both the University of Oregon website and these nine sites, I tried out some basic tasks, such as finding a book, to see how each interface behaved. I did not try more complicated tasks with these interfaces, such as finding specific journal articles, because of time constraints and access limitations for those not affiliated with these schools. These walkthroughs complicated the issue of library website design considerably, by showing that my ideas for “solutions” had problems of their own. However, I was also able to anticipate some of the problems I would encounter with users in my own studies as a result of these walkthroughs. The most important observations from this exercise follow.

I came into my survey of other library websites expecting “competitors” to be significantly better. Instead, it was hard to feel that any site was better than the others: the ultimate lesson learned from these walkthroughs is that each site made tradeoffs and compromises as a result of its design decisions. This foreshadowed the extreme complexity of this design issue that

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<sup>18</sup> <http://library.ucsc.edu/>

<sup>19</sup> <http://www.pdx.edu/library/>

<sup>20</sup> <http://osulibrary.oregonstate.edu/>

<sup>21</sup> <http://www-sul.stanford.edu/>

<sup>22</sup> <http://ucblibraries.colorado.edu/>

<sup>23</sup> <http://www.libraries.iub.edu/>

<sup>24</sup> <http://www.lib.umich.edu/>

University of Colorado at Boulder CU Home | Search | A to Z | Map

University Libraries

Enter here the timeless fellowship of the human spirit

Chinoak Catalog Keyword Search

**Research Resources**

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- E-Journal Finder
- E-Reserves / Course Reserves
- Digital Asset Library (DIAL)
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- ILLiad (Interlibrary Loan)

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Library Information 303-492-8705 | Reference & Instructional Services 303-492-7521  
Send Comments to the Libraries  
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Figure 3-4: Front page of the University of Colorado at Boulder library website. Like the University of Oregon, this page has catalog searching available from the main page, but in an arguably less prominent location. Also noteworthy is the alphabet on the right side of the page; each letter links to its corresponding position in the Site Map.

ultimately has backed the greatest lesson from this work.

I was surprised to find that the University of Oregon was one of the few library websites that actually displayed a query to its catalogs on the libraries homepage. Most of the library sites I visited had access to their catalogs through a link on the homepage. Since accessing the catalogs for books or other information is the most common task for the user group (see section 3.31), saving users a click by placing the query box on the front page seems most appropriate.

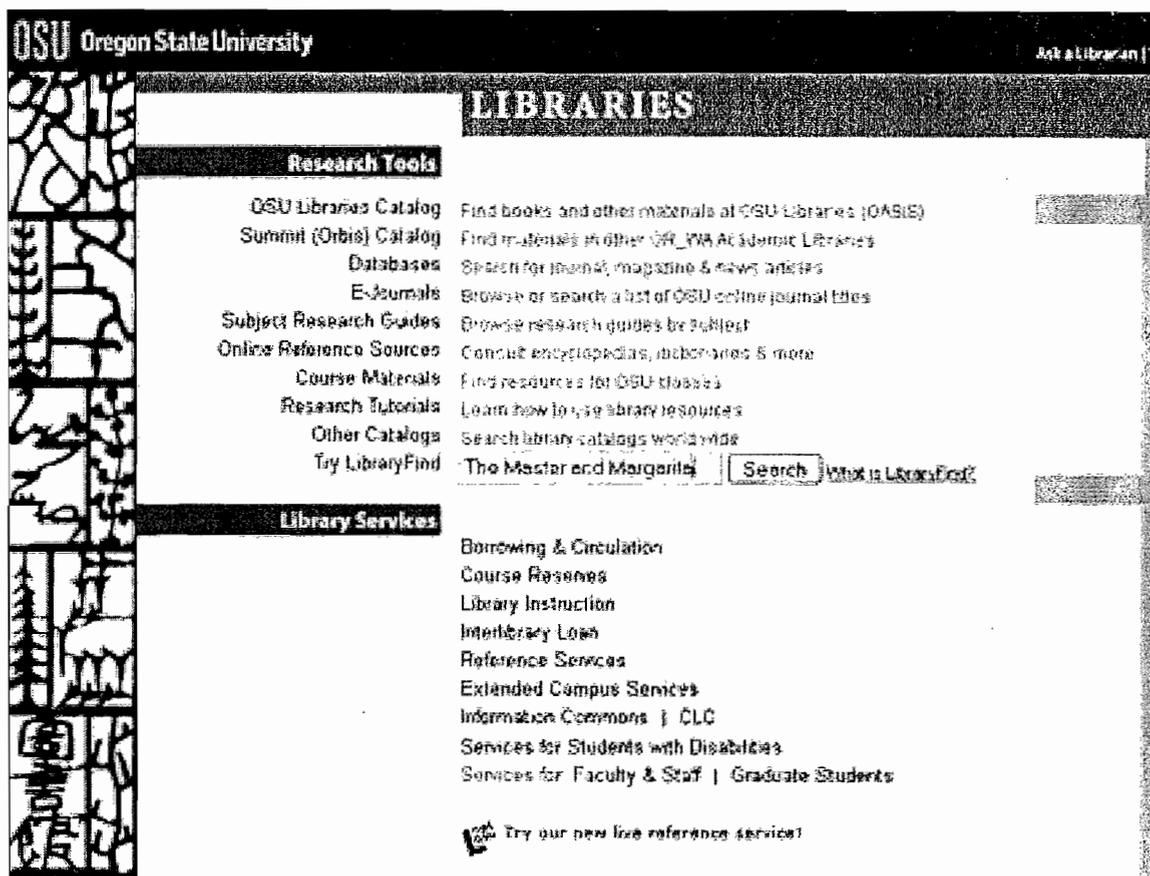


Figure 3-5: Front page of the Oregon State University library website.

Most of the surveyed websites presented catalog searching in the same way as the University of Oregon: searching was done over the catalog by a keyword, subject, title, or author. The University of Colorado at Boulder's library website mimics this search functionality on its homepage (Figure 3-4), like the University of Oregon. The query takes up less space because there is no option to limit the search to parts of the collection. I am interested if the smaller size and less obvious location of this query box changes user behavior; I would suspect that such a small query, placed on the right side of the page, might be overlooked by users that are unfamiliar with it.

Two library homepages break from the strictly categorized search; one offers a catalog search on all categories; and another offers a "metasearch" – i.e., a search of all of the library's holdings, from the catalog to database

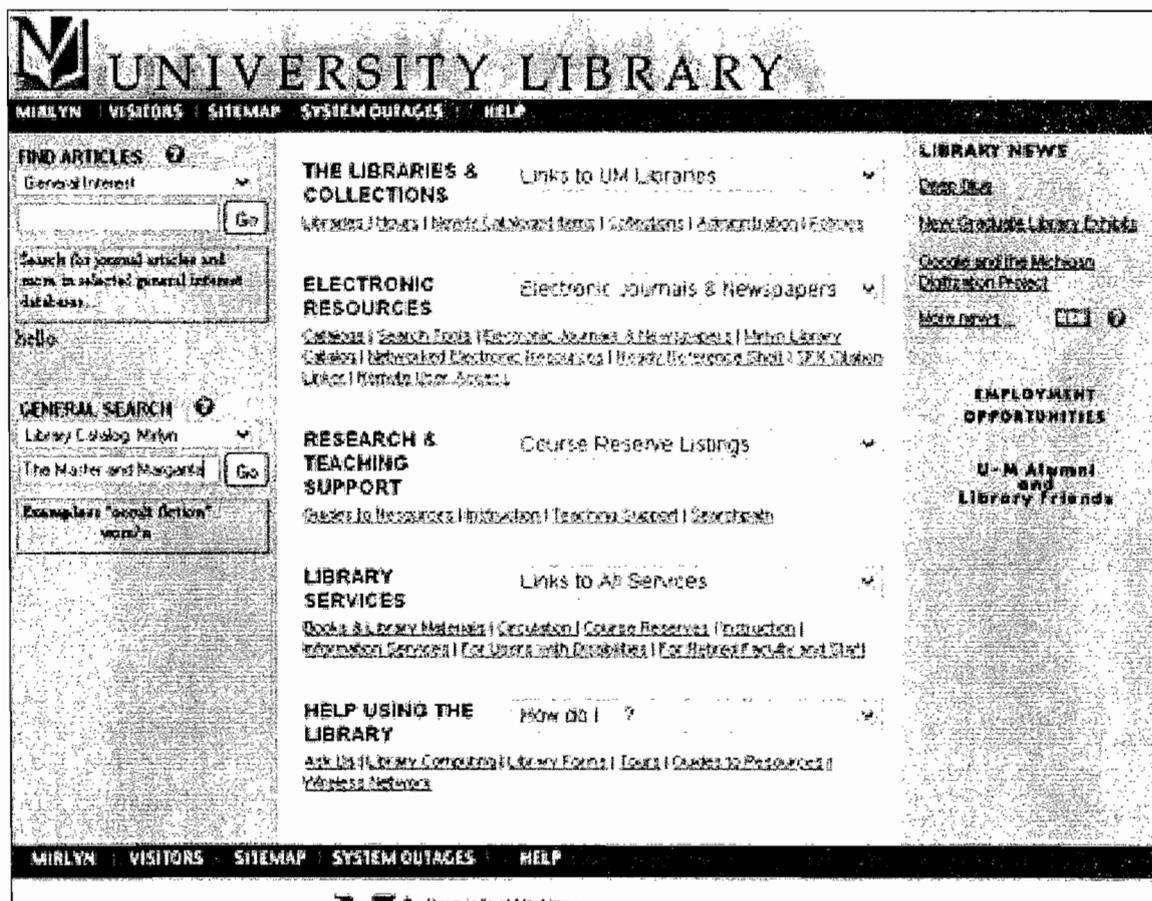


Figure 3-6: Front page of the University of Michigan library website.

contents. My thought was that the user group, which has grown accustomed to using search engines like Google, would prefer a Google-style query that handled everything in one sweep, and did not force the user to make distinctions such as “keyword” or “subject”. Oregon State University (Figure 3-5) provides this search utility as “LibrarySearch”; the tool is still under development, as it was named “MetaSearch” and only limited to OSU students when I initially performed the walkthrough. The University of Michigan (Figure 3-6) provides a “General Search” tab, which does require users to differentiate between sources (such as the catalogs or database holdings), but does not require any keyword or subject distinction.



What's new in Mirlyn

▶ FIND ARTICLES    ▶ FIND OTHER LIBR CATALOGS

Library Catalog of the University of Michigan: Ann Arbor and Flint

# Mirlyn

Login    Ask  
My Shelf    Help  
                  Coun

Basic Search    Advanced Search    Command Language    Browse    Results List    Previous

Ann Arbor and Flint    SEARCH RESULTS    Records 1 - 20 of 28

RESULTS FOR Words= The Master and Margarita; Sorted by: Title, then Year(descending)

Selected records: [Select All](#) | [Deselect All](#) | [Create Subset](#) | [Add to My Shelf](#)    [Jump to Title](#)

Limit options: [Available Now](#) | [Modify Search](#)    [Jump to #](#)

Sort options: [Format](#) | [Author](#) | [Title](#) | [Year\(a\)](#) | [Year\(d\)](#)    [Next Page](#)

#	Format	Author	Title	Year	Location
1	<input type="checkbox"/>		<a href="#">44th annual Clio awards [videorecording], the Clios 2003.</a>	2003	• <a href="#">Askwith Media Library - Room 2002 Shapiro   NONE - On Order</a>
2	<input type="checkbox"/>		<a href="#">An anthology of Russian literature from earliest writings to modern fiction : introduction to a culture / edited by Nicholas Rzhevsky.</a>	2005	• <a href="#">Hatcher Graduate PG 3213 .A561 2005</a>
3	<input type="checkbox"/>		Ericson, Edward F. <a href="#">The apocalyptic vision of Mikhail Bulgakov's The master and</a>	1981	• <a href="#">Hatcher Graduate 891.78 B933m3Q F88</a>

Figure 3-8: Results page for a query on "The Master and Margarita" on the University of Michigan's catalog search.

shown in Figure 3-7, and the initial results for the University of Michigan's engine are shown in Figure 3-8. In the OSU search engine, what is returned is "General" but obviously not the book; I clicked on the "Books" link and had no results at all<sup>25</sup>. The book is available in OSU's collections if one does an explicit title search on the catalog; it appears that the metasearch capabilities are not yet as flexible as a strict catalog search. The lesson from my perusal of these "do-all" queries is that they may only worsen the quality

<sup>25</sup> Since this search was performed and the figure captured, the Oregon State Libraries site has been updated again to include this query in its catalog results.

The screenshot shows a Google search interface with the query 'the master and margarita'. The search results are categorized under 'Web' and show approximately 3,000,000 results. The top results include book listings for 'The Master and Margarita' by Mikhail Bulgakov, with details on page counts (402, 432, and 69 pages). There are also links to a 'Frozen Concoction Maker' and 'Abebooks.com'. A section titled 'Bulgakov's Master and Margarita' provides a multimedia annotation. Another section, 'Master and Margarita (Introduction)', lists various editions and translations. The bottom results include an Amazon.com link for the book and a Wikipedia entry.

Figure 3-9: Results from a Google query for "The Master and Margarita".

of the search process unless the results that they return are relevant to the intention of the query. Is this possible? I tried a search on "Master and Margarita" in Google and the engine not only knew I had entered in the title of a book, but also links to relevant web information. This query result is shown in Figure 3-9. Of course, a student searching for *The Master and Margarita* on Google will have different needs than a student searching for this book on a library site. In particular, if searching the library site a student probably wants to locate the library's physical copy of the book (something they cannot do using an internet search engine); if searching Google, they probably want to find a synopsis of the book, or locate it through an internet vendor. However, in the Google results, we see that these most

The screenshot shows the IUCAT (Indiana University Catalog) search results page. At the top, it says 'IUCAT' and 'LIBRARIES'. Below that, there's a navigation bar with links like 'HOME', 'MY ACCOUNT', 'OTHER LIBRARY CATALOGS', 'ALL LIBRARIES INFO', 'FAQ', and 'LOGIN'. There are also search filters like 'CHOOSE YOUR SEARCH', 'KEYWORDS OR EXACT', 'ADVANCED KEYWORD', 'ARTICLES', 'CALL NUMBER', and 'CLASS RESERVED'. The search results are displayed in a table with columns for item number, title, author, year, and a 'Limit Your Search Results to the Following Categories' box. The categories listed include PE Children's literature, PP English literature, QZ General subject, ND Instruction Drawing Design, SV Recreation Leisure Sports, Physical training, PG Film, Video, Albanian language & literature, and N Visual arts. The results are numbered 1, 2, and 3.

**IUCAT** LIBRARIES

For Request Delivery (info), My Account (info), and ALF request (info) services, all Indiana University students, faculty, and staff must log in to IUCAT.

HOME MY ACCOUNT OTHER LIBRARY CATALOGS ALL LIBRARIES INFO FAQ LOGIN

CHOOSE YOUR SEARCH KEYWORDS OR EXACT ADVANCED KEYWORD ARTICLES CALL NUMBER CLASS RESERVED

GO BACK HELP REVISE SEARCH NEW SEARCH NEXT PRINT/EMAIL/SAVE

Search Results

keywords anywhere "The Master and Margarita" search found 85 titles  
Mark  items for Print/E-Mail/Save

#	Year	Title	Author	Year	Limit Your Search Results to the Following Categories
#1	2006	"Master i Margarita". za koga je proto?	Kurzon, Andree Moskva : Izdatel'skii Sredi Pravoostanovi T.Serki, 2006. Copy currently not available. Click <b>DISPLAY</b> for details.	2006	PE Children's literature PP English literature QZ General subject ND Instruction Drawing Design SV Recreation Leisure Sports Physical training
#2	2005	Zabytaia glavna romana "Master i Margarita" Mikhaila Bulgakova	Vasykov, A. A. Kaluga : Izdvo nauchno-literaturny N. F. Bochkarevoi, 2005 Copy currently not available. Click <b>DISPLAY</b> for details.	2005	PG Film, Video, Albanian language & literature N Visual arts
#3	2005	Тител "Master i Margarita" : razskazivannii Bulgakova		2005	

Figure 3-10: Results page for a query on "The Master and Margarita" on Indiana University's catalog. The "Limit Your Search" box on the right side of the page allows the user to select a subset of results based on categorization.

relevant results are placed at the top of the page, in the form of links to sites like Amazon<sup>26</sup> and Wikipedia<sup>27</sup>.

The next issue we deal with is the dizzying amount of information returned on certain queries. Making sense of what could be a wide array of results – in other words, information overload – is no simple task, and all of the library websites had problems with the ways they presented so many results. One technique for assisting with these large results is to provide feedback which helps the users refine, or filter, their result. (Shneiderman &

<sup>26</sup> <http://www.amazon.com>

<sup>27</sup> <http://www.wikipedia.com>

**IUCAT** INDIANA UNIVERSITY LIBRARIES

For Request Delivery (info), My Account (info), and ALF request (info) services, all Indiana University students, faculty, and staff must log in to IUCAT.

IUCAT HOME | MY ACCOUNT | OTHER LIBRARY CATALOGS | IU LIBRARIES INFO | ASK | LOGIN

CHOOSE YOUR SEARCH: KEYWORD OR EXACT | ADVANCED KEYWORD | BROWSE | CALL NUMBER | CLASS RESERVES

GO BACK | HELP | REVISE SEARCH | NEW SEARCH | PRINT/EMAIL/SAVE

Search Results

keywords anywhere "The Master and Margarita" search found 85 titles.  
2 were in the "PR English literature" category.  
[return to full results]  
Mark  items for Print/E-Mail/Save

#1	2004	<b>Limit Your Search Results to the Following Categories</b> PZ Children's literature PR English literature Q General science NC Illustration, Drawing, Design GV Recreation, Leisure Sports Physical training PG Slavic, Baltic, Albanian languages & literature N Visual arts. Fine arts
<b>Mark</b> <input type="checkbox"/>	The master and margarita Kemp, Edward. London : Oberon, 2004. copy available at Bl mgtm - Herman B Wells Library (B-WELLS). Click <b>DISPLAY</b> for details.	
#2	2000	
<b>Mark</b> <input type="checkbox"/>	In defence of T.S. Eliot Raine, Craig. London : Picador, 2000. Copy currently not available. Click <b>DISPLAY</b> for details.	

Figure 3-11: Results page following Figure 3-10 if the user clicks on "PR English literature" to limit search results.

Plaisant, 2005, 597). The catalogs for Indiana University provided such assistance: a keyword search for "The Master and Margarita" returns 85 titles, and the first two are not in English. However, one of the links under "Limit Your Search Results to the Following Categories" is "PR English literature", which fits the result I want (Figure 3-10). I click on this link and find an English adaptation of the book (Figure 3-11). Although this "Refine your search" tool is not perfect, it does help the user find a result matching their query without starting all over again, or heading off in the wrong direction because they wrote a poor query in the correct location and think they have hit a dead end. Similar refining tools exist on the North Carolina

The screenshot shows the NCSU Libraries website interface. At the top, there are navigation links: "Search the Collection", "Browse Subjects", "Services", "Library Information", "Comments", and "Help & Events". Below this, there are links for "NCSU LIBRARIES", "Library Account", and "My Computer".

The search bar contains the text "Catalog Search: master and margarita" and "Anywhere". There are "Go" and "Start" buttons. To the right, there is a "Send search to:" dropdown menu and another "Go" button.

Below the search bar, it says "Search 'master and margarita': We found 23 matching items. Limit results to currently available items." There are two columns of filters: "Browse By:" and "Narrow Results By:".

**Browse By:**

- D - History (General) and History of Europe (1)
- F - American local history (1)
- L - Education (1)
- N - Fine Arts (1)
- P - Language and Literature (18)
- Q - Science (1)

**Narrow Results By:**

- Subject: Topic**
  - masters and mistresses (8)
  - Bulgakov, Mikhail Afanasievich (6)
  - Russian fiction (5)
  - Russian literature (2)
  - Criticism and interpretation (2)
  - Show More ...
- Subject: Genre**
  - Fiction (4)
  - Congresses (3)
  - Political fiction (1)
  - Allegories (1)
- Library**
  - O. H. Hill (21)
  - Geigh (3)

At the top right of the results area, there are links for "Brief View" and "Full View", and a "Sort By: Relevance" dropdown menu.

The results list three items:

- 1. The Master & Margarita**  
**Author:** Bulgakov, Mikhail Afanasievich, 1891-1940  
**Published:** 1996.  
**Format:** Book  
**O.H. Hill Library**  
 PG3476 .B73 N313 1996      Stacks (5th floor)      Available
- 2. The master & Margarita**  
**Author:** Bulgakov, Mikhail Afanasievich, 1891-1940  
**Published:** c1995.  
**Format:** Book  
**O.H. Hill Library**  
 PG3476 .B73 N313 1995      Stacks (5th floor)      Checked Out
- 3. The writer's divided self in Bulgakov's The master and Margarita**  
**Author:** Fatman, Rita H.  
**Published:** 1998.  
**Format:** Book  
**O.H. Hill Library**

Figure 3-12: The North Carolina State University Libraries website allows users to narrow a search by specific keywords, or browse by results on specific academic subjects.

State University library website<sup>28</sup>, which I viewed after completion of these walkthroughs (see Figure 3-12), and the GigaBlast search engine<sup>29</sup>, which narrows a search by adding relevant “Giga Bits” to the original query (see Figure 3-13).

I also examined the issue of information overload that can occur when users first encounter a library website: i.e., by viewing its homepage. For the wide array of features and information supported by a library website, the screen space on the homepage is valuable indeed.

The University of Oregon’s site is less busy than others I surveyed, although it deals with issues of consistency that may overwhelm the user

<sup>28</sup> <http://www.lib.ncsu.edu/>

<sup>29</sup> <http://www.gigablast.com/>

**GIGABLAST** the master and margarita 10 Search

Results 1 to 10 of about 1,944,236 for the master and margarita. The following query words were ignored: the and For more quotes to add or to

<b>Giga Bits (more)</b>	74% <a href="#">novel</a>	26% <a href="#">Master and Margarita is considered</a>
162% <a href="#">Bulgakov</a>	38% <a href="#">Critical Comparison</a>	26% <a href="#">Mikhail Bulgakov novel</a>
99% <a href="#">Mikhail Bulgakov</a>	25% <a href="#">Master and Margarita movie</a>	20% <a href="#">Mikhail Afanasievich Bulgakov</a>

**Reference Pages** 19% [wood's lot : "the first tracing of a portal"](#)

**Related Pages** 100% [Mikhail Bulgakov: Мисирисъ Мисирисъ](#)

**Bulgakov's Master and Margarita**  
 Bulgakov's Master and Margarita, created by Kevin Moss, Middlebury.  
 www.middlebury.edu/bulgakov/2k - indexed: Dec 20 2003 - modified: May 22 1999 - [cached](#) - [stripout](#) - [older copies](#)

Figure 3-13: The GigaBlast search engine includes “Giga Bits” with its results on a query, which allow users to add additional, relevant words to a query in order to refine their search.

given the mishmash of query boxes, pull-down menus, buttons, icons, images, and regular links. In comparison, the Indiana University Libraries homepage in Figure 3-14 is an example of a consistent but textually busy design, linking to many of its services directly from the homepage. Another contrast is the homepage for the University of Texas (Figure 3-15), which is busy both textually and graphically, but links to fairly few of its services directly from the homepage. The Oregon State University Libraries website from Figure 3-5, meanwhile, is quite elegant in its simplicity, but will students be intimidated by the nearly pure-text appearance of the page? What are the benefits of each of these approaches? After participating in the usability study detailed in 3.33, I find that I actually prefer the textually heavy page (especially when the text is carefully chosen and adequately descriptive), with minimal, tasteful graphical accents. This is the approach that University of Oregon web redesigners took to prototyping the new homepage – it looks very similar to the Indiana homepage. I really enjoyed being able to have all of my options available right on the front page, as well as querying capabilities, which were placed in the top right corner of the page (but with more emphasis than the Colorado page of Figure 3-4). I

The screenshot shows the homepage for the Indiana University Libraries website. At the top left is the logo for Indiana University Libraries. Below it is a navigation menu with links such as 'Find Information', 'Library Services', and 'About IU Libraries'. The main content area is divided into several columns. The first column contains links to 'JUCAT Library Catalog', 'Search All', 'Database A-Z', 'Databases by Subject', 'Databases by Type', 'Online Full-Text Journals', and 'OneSearch @IU'. The second column contains links to 'Libraries & Collections', 'Collections by Subject', 'Collection Managers', 'Libraries of IU', 'Libraries of Other IU Campuses', 'New Resources', 'Scholarly Communication', 'SERIA', and 'IUScholarWorks'. The third column contains links to 'Library Services', 'Request, Review & Request', 'Teaching & Research', 'Student Researcher', 'E-Reserves', 'Class Reserves', 'Visitors', 'Ask a Librarian', and 'OnCourse Instructor Toolkit'. The fourth column contains links to 'About IU Libraries A - Z', 'Welcome Information', 'Hours & Locations', 'Alumni & Donors', 'Departments & Staff', 'Computing & More', and 'Employment'. To the right of the navigation menu is a section for 'Library Research Seminars' with a photo of a seminar. Below the navigation menu is a 'NEWS & EVENTS' section with a search box and three news items: 'Register Now for May Research Seminars', 'We Deliver History Any Way You Like', and 'Winners of Undergraduate Research Award Announced'. To the right of the news items is a photo of a library building. At the bottom of the page is the footer with the text 'INDIANA UNIVERSITY' and 'INDIANA UNIVERSITY LIBRARIES, 1330 EAST Tenth STREET, INDIANA UNIVERSITY, BLOOMINGTON, INDIANA 47405 Phone: 317.434.3140. Library@indiana.edu'.

Figure 3-14: Homepage for the Indiana University Libraries website.

anticipate that the main drawback of textually heavy pages is overwhelming the inexperienced users who are there only to complete basic tasks.

### 3.34 Participation in a Usability Study

The University of Oregon Libraries website is actually undergoing a redesign project at the same time, albeit independently, as the development of this thesis (the new design is expected to launch on September 01, 2006). As a result, I had the opportunity to participate as a user in the usability testing that the library was doing on a prototype of the redesigned system. This gave me the rare chance to see a usability study similar to my own, but from the side of the participant instead of the test administrator. The timing of this test participation was extremely convenient, as it took place in the week before my own usability testing.



Figure 3-15: Homepage for the libraries at the University of Texas.

The test was similar to those outlined in the academic library studies of section 2.31. In particular, I was tested by myself, with the test monitors in the room: one test monitor guided me through the tasks, and another took notes. The computer was set up in a small room in the library, and I was audio-recorded while screen-capture software recorded my actions. The test included an extensive pre-test questionnaire, and an open-ended discussion of my thought process for each of the tasks after I had completed the entire series of scenarios. The prototype was mostly a revision of the front page of the library website; the tasks were typically completed once I had found the link or query box on the front page that sent me in the appropriate direction.

My experiences as a participant led me to make some new decisions in regards to my own usability testing. In particular, even though the prototype

of the library's website included changes that improved the efficiency of task performance, I found myself defaulting to the behaviors that I had developed to cope with the old design (i.e., the less efficient route). In turn, I found that my experience with this domain, and my research into this field, meant that I was considerate of adequate "thinking out loud" techniques, but I avoided many of the usability pitfalls that other students may have found. I decided that, in my usability testing, even though I wanted my users to reflect all skill levels, my selected user group should be weighed slightly towards the less experienced student. I felt that these users would reveal substantially more about the usability problems I was trying to unearth with this study.

#### 4. STUDY DESCRIPTION AND METHODOLOGY

This chapter describes the usability study that I developed and administered in April and May of 2006. The methodology for developing this test is modeled after the steps outlined in Douglas' "How to do Usability Testing" paper (1998):

1. *Identify purpose of the test.* Typically, a usability test would be conducted by developers of a product. The usability testing in this thesis is unusual: its purpose is to provide a learning experience, and to explore the issues surrounding the development of usable library interfaces. The purpose of this test is to discover if the library interface is usable for undergraduates at the University of Oregon, with the usability measures of effectiveness, efficiency, and satisfaction as guides for making this judgment. The larger purpose is to learn about the usability problems that are encountered in the website and compare these to problems encountered in academic library interfaces overall.

2. *Find a Test Site.* Douglas stresses that developers or test administrators are not present in the room during testing, as "participants and developers will often change their behavior to conform to the others' expectations" (p. 3). The test site for this study, detailed in section 4.2, allows the test monitor to watch the study by videotape without interfering with participants.

3. *Create participant materials.* These materials are reprinted in Appendices C and D. Douglas emphasizes that the creation of good task scenarios is the

most important step in materials creation, a sentiment which is reflected in the design of this thesis.

4. *Prepare video equipment.* If the test is videotaped, developers will be able to go back and review the participants' decisions as often as is necessary. This is highly preferred to trying to take detailed notes at the time of the test: without the opportunity to stop, rewind, and review, the test monitor will inevitably miss some details.

5. *Prepare the schedule.* An explicit schedule which accommodates materials preparation, recruitment of subjects, administration of both the pilot and actual tests, and analysis of results is necessary for the testing to run smoothly. This was especially important for this thesis as I had less than five months in total to plan and complete all testing; many tests can take six to nine months to plan and execute properly.

6. *Select users.* The user group for this study was defined in section 3.1; the user recruitment method is defined in section 4.1. Douglas stresses that pairs of users are ideal for these tests. Single-user testing, known as protocol analysis, presents serious limitations as the users are expected to engage in unnatural behaviors, like "thinking out loud", to give test monitors an idea of their mental processes. The pressure of thinking aloud may cause users to give feedback that doesn't accurately reflect their actual mental processes. Paired testing, known as constructive interaction, allows users to naturally overcome some of these testing difficulties, as it "attempts to elicit verbal information within naturally occurring conversation" (p. 6-7). In order to foster this sort of discussion, however, careful selection of compatible pairs is

important. In particular, pairing users of similar gender (due to culturally-based social dynamics) and expertise with computers or other related knowledge is important, as an unequal dynamic could hinder the collaboration that occurs with paired testing.

The number of pairs that should be tested is also important. Douglas recommends three pairs of users as “the minimum number to differentiate universal problems from those which are more unique to individuals” (p. 7). The librarians mentioned in section 2.31, meanwhile, frequently cite Jakob Nielsen’s “Why You Only Need to Test with 5 Users” (2000), which explains that five tests on a relatively homogenous user group will typically reveal about 85 percent of usability problems; any tests after this will reveal substantially less new information. From both papers, usability testing a smaller number of users, making changes, and performing a new test on another small group of users (an iterative approach) will be significantly more productive than using the entire set of participants in just one test.

*7. Conduct pilot test.* A pilot test is administered exactly as the final test would be, with participants selected from the same testing population. The difference with this test is that the test administrator is looking for any problems or anomalies which should be fixed before real test administration begins: are the tasks clearly worded? Does the software have any bugs which cause the program to crash? Is the length of the testing session what was expected? Larger-scale test designs may include multiple, iterative pilot tests, in order to anticipate and iron out all potential problems that may occur during actual testing.

8. *Conduct the Usability Test.* Testing methodology is given in 4.4; the methodology is roughly equivalent to what is presented in Douglas' article.

9. *Analyze the Results.* Videotapes allow the test monitors to comprehensively review the results of the usability test. Douglas recommends keeping a log of information about problems encountered during the usability test. Specifics of this analysis are given in section 4.6.

With this process as a guide, the outline of my usability test methodology follows.

#### 4.1 Participants

My recruitment needs for the study were twelve undergraduates, reflecting a sample of the overall undergraduate population. This number reflects five pairs of testers, as well as a pair to participate in the "pilot test". A higher number of pairs would have allowed for better recognition of usability problems, but the time required to analyze test results for more than five pairs would be too large for a project of this scope.

To reflect the diversity of undergraduates at the University of Oregon, it was important to choose a recruitment method that reached a variety of students. Two 100-level Computer & Information Science (CIS) classes from the Spring 2006 quarter were chosen for the pool of participants: CIS 111, "Computers and Computation", and CIS 122, "Multimedia and Web Design". Choosing 100-level CIS courses allowed quick and easy contact with the instructors for the courses, who in turn could show the test to students as an example of higher-level CIS work.

Students were not offered extra credit in these courses for volunteering to participate. Instead, a compensation of \$20.00 for participating in and completing the test was offered as incentive to volunteer. Interested students were asked to fill out a small questionnaire (Appendix C.1) indicating some basic information about themselves, perceived competency with research and the library website, and their scheduling availability for the next week. Response was strong, with 32 volunteers overall.

I paired students by the following criteria, in order of importance:

1. Scheduling availability
2. Gender
3. Perceived Competence with the Library Website

The criteria of major, class standing, and number of research papers completed as a college student were not used to select and pair students. However, they were used as additional background information in establishing the library expertise of the student, as well as for confirming that the students represented a variety of undergraduates. The research paper question was included because research typically brings students to the library; I wanted to have it available as another gauge of competence with the website and information science. Students were paired by the same gender and similar levels of expertise in order to encourage full cooperation during testing.

The pairs were intended to represent a distribution of library skill levels, but reflected a larger number of inexperienced users, in the hopes that they would reveal more about the website's usability problems. Ultimately, there were three pairs of inexperienced students, two pairs of moderately experienced students, and one pair of experienced students selected and scheduled for testing. Selected participants were sent an email (Appendix

C.2), which provided necessary test information and requested they confirm the test date.

#### 4.2 Setting

The test was administered in the Department of Computer Science's Human-Computer Interaction Lab, which is located in Deschutes Hall at the University of Oregon. The lab is divided into two rooms, which facilitates the test administrator's watching participants from another room. One room is set up for the participants. It contains a lab computer and two video cameras. One camera is set up behind the users and captures the screen output from above their heads. Another camera takes a profile shot from the side of the participants, so that the administrator can watch them interacting. Typically, the second shot is superimposed as a smaller image on the first shot of the screen. Participants are also hooked up by microphone to a sound system, which records their interactions while participating in the study.

The second laboratory has a television and VCR set up so that the test administrator can watch the test live. The equipment in the other laboratory is connected to this room and allows the test administrator to interfere with the participants at only the necessary moments.

Participants used the laboratory computer to perform the tasks. The lab computer is a Dell PC, running the Windows ME operating system. Its monitor is a 19" CRT with a 1024x768-pixel resolution. All participants used the Mozilla Firefox browser to access the library web site for the study.

### 4.3 Pilot Test & Revisions

The pilot test was conducted on May 01, 2006. Following the test, several changes were made to the test methodology and materials.

Pilot testers did not fill out the pre- and post-test questionnaires that were given later on. The main reason these questionnaires had not been developed at this point is because I was still not sure of the questions that would arise from watching these participants complete the tasks. In particular, I did not want to give the participants a questionnaire that included questions which were not ultimately useful for my analysis, so I wanted to be very selective about the questions that I included. Instead of administering the questionnaire, I had an open discussion with the participants about their testing experience. This not only helped me figure out the types of questions I wanted to include in the questionnaires, but also helped me revise other aspects of the test for future participants.

The initial orientation script was significantly wordier than the script that was included in final testing. The first script had been modeled after a guide given by Rubin's *Handbook of Usability Testing*, and included details that were ultimately unnecessary. Rubin had placed strong emphasis on using the orientation script to put participants at ease. It is probably a trait of the user group at hand that these users did not need to be overly reassured that the problem was with the interface and not themselves. Likewise the participants did not seem to have any anxiety about being videotaped. Additionally, details about how the users should behave were deemed unnecessary; many of the ideal user behaviors emerged as a natural consequence of placing the participants in a pair.

The most important changes made after the pilot test were to the tasks. The initial tasks had been included as a list on one page, and the

questions were not separated from the task itself. For the rest of the tests, each task was included on a page of its own, with the question differentiated. This made the movement between tasks obvious on the videotape, as the users would have to turn the page to move on to the next task. The tasks themselves also proved to be too easy and not completely reflective of user behaviors. Pilot testers were originally given ten tasks; some of the most difficult tasks from section 4.5 had been removed for fear that they were too complicated for this type of usability test. Many of these originally nixed tasks dealt with article-finding, which did reveal itself to be the source of many usability problems. However, the participants of the pilot test voiced that finding articles was a core task they performed when they used the interface, and should be incorporated in the study. When the pilot testers moved through the list of tasks with relative ease and speed (on the one task they gave up on, they gave up fairly quickly), it was obvious that the more difficult questions could be revised and re-worked into the list of tasks. The list was also re-structured so that the tasks were ordered by difficulty, from the perceived easiest to the perceived hardest activity, instead of by functional grouping. Ultimately, these changes were very successful, as they allowed testers to better fill the time that had been allotted for the test, and exposed many additional usability issues.

#### 4.4 Procedure

A consistent procedure was used for each usability test, with the exception of the pilot test, where some of the test materials were not fully developed and the test administration was less polished.

All tests were held during the week of May 01 – May 05, 2006 during normal academic hours (between 8:00 am and 5:00 pm). Participants were

directed to the HCI lab with signs that had been placed in the building prior to the testing time. All testing equipment was turned on and prepared prior to participant arrival. When participants arrived, they were given the Consent Form (C.3), Agreement for Videotaping Form (Appendix C.4), and Pre-Test Questionnaire (Appendix C.6) to fill out. The Consent Form and Agreement for Videotaping form dealt with the issue of confidentiality for human subjects testing. In particular, participants were told that the videotape would only be used for my research purposes, and no information that could be tied to their identity would be released in my findings. In a larger-scale usability test, these confidentiality issues would have also been addressed to the University of Oregon's Office for the Protection of Human Subjects.

After both participants had arrived and filled out the forms, I started recording the session. Participants were then read the Orientation Script (Appendix C.5) and given the chance to ask any questions they had about the process. Finally, they were equipped with microphones and presented with the tasks. I then left the room and watched the tests from the other half of the HCI lab.

During testing, participants read through the task, then attempted to complete it on the library interface. Single participants were instructed to vocalize their thought process, but partners were expected to have collaborative conversation, and were simply encouraged to work together on the process (for an explanation of the use of single participants during some tests in this study, see section 4.6). Participants performed these tasks in search of an answer to a question that was posed at the end of each task. When they felt they competently knew the answer to a question, they flipped to the next page in the book of tasks, and returned to the homepage.

When the participants had provided an answer to the final question proposed by the last task, I returned to the tester's room for debriefing. Participants were given the Post-Test Questionnaire (Appendix C.7) to fill out. While they were attending to this paperwork, I stopped the recording. Finally, participants signed off on the Receipt of Reimbursement (Appendix C.8) and received their \$20 for participation in the study. I retained all materials from the testing for my own use, with the exception of the reimbursement receipts, which were used for processing by the department of Computer & Information Science.

#### 4.5 Tasks

Using the information gathered in Chapter Three, and with particular attention paid to the functional requirements and tasks indicated in question nine of the user survey, fifteen tasks were developed for the usability test. These tasks were not meant to reflect certain academic specializations, so the subject matter of many of the information seeking activities is lumped into "general education". Ultimately, this meant that a significant number of the materials referred to in the tasks were the type suitable for college-level history and literature courses. The materials found in these tasks ultimately reflect a significant portion of my lower-level coursework in the Honors College, but many of the materials were also found through exploration of the library website, as well as some serious guesswork.

Each usability test was not supposed to last more than one hour of time, and with running out of time and user burnout as worries, the initial list of tasks was overly conservative. This meant that, of fifteen original tasks, only ten were included in the pilot test.

Significant care was given to wording of the tasks. I worked to communicate library concepts without necessarily giving away explicit terminology or creating unnecessary confusion, although this was not always possible. It was most important to avoid wording questions in a way that would explicitly give away the method for approaching a task. This did not appear to be a problem with the tasks as they are structured.

The fifteen tasks are shown in Table 4-1, and the tasks are mapped to the functional requirements they are modeled after in the second column. Refer back to Table 3-1 for the functional requirements corresponding with the listed numbers. Additional information about each of these tasks, including the reasons they were chosen and the problems I anticipated, is included in Appendix D.

**Table 4-1** Tasks, which have been mapped to the functional requirements from Table 3-1.

Task	Functional Mapping (see Table 3-1)
<b>“Easy” Tasks</b>	
1. A friend has recommended the book <i>The Autograph Man</i> . Who is the author?	2, 3
2. You are interested in checking out a copy of <i>The Handmaid’s Tale</i> by Margaret Atwood. Is the item available for checkout?	2, 3
3. Name one of the plays written by Henrik Ibsen.	2, 3
4. What time does the Architecture and Allied Arts library close on Saturdays?	16
5. You want to watch the movie version of Harper Lee’s <i>To Kill a Mockingbird</i> . According to the library website, where will you find this movie?	2, 3
<b>“Moderate” Tasks</b>	
6. You are looking for the book <i>Art &amp; Fear</i> by David Bayles and Ted Orland. Although it is available through the University of Oregon, you will not be able to find it in the shelves of the Knight library. Which UO library is this book located at?	2, 3
7. Is the <i>Journal of Personality and Social Psychology</i> available online? What is the number of the most recently-published volume?	2, 6, 11
8. Find and view the electronic copy of <i>The New Hacker’s Dictionary</i> by Eric S. Raymond.	2, 7, 6

9. You are going to write a paper on James Joyce's <i>A Portrait of the Artist as a Young Man</i> . For background research, you are looking for books which contain essays that others have written about this novel. List the title of a book which meets this criterion.	3, 5
<b>“Hard” Tasks</b>	
10. You are trying to find the book <i>King Leopold's Ghost</i> by Adam Hochschild. You have discovered it is not available in any of the UO libraries, but your professor has told you that, by using the library website, you can request that the book be sent from another college library. Name one of the libraries which carries this book.	2, 4
11. You are writing a paper for your Environmental Studies class on sea turtles. You want to find journal articles that have been written about this subject.	10
12. You are looking for back issues of the magazine <i>The Atlantic</i> . From what year are the oldest back issues in the University's collection?	2, 3
13. Log into Addie Beseda's library account using the student number 950414104 and the PIN 123456. What is the due date on <i>We Are All Suspects Now: Untold Stories from Immigrant Communities after 9/11</i> ?	13
14. “Academic Search Premier” searches a large collection of journal and magazine articles. Open this resource from the library web site. What is the other name this resource goes by?	12
<b>“Very Hard” Tasks</b>	
15. For your English class, your professor wants you to print out “Once More to the Grove: A Note on Symbolic Space in the Knight's Tale” from the current issue (Volume 40, Number 4) of <i>The Chaucer Review</i> . The author is Joshua R. Eyler. The article starts, “Upon the death of _____, Theseus announces...” Fill in the blank.	9

Table 4-1 Tasks, which have been mapped to the functional requirements from Table 3-1.

#### 4.6 Analysis of Videotapes

Using the information provided by Douglas' “How to Do Usability Testing” as a guide, the videotapes of the tests were prepared for further analysis by creating a detailed log of these tapes post-testing. In order to simplify the reviewing process, the videotapes were converted to DVDs.

The logs which I created were broken down by task, with the following information listed after each task heading: perceived difficulty (noted in Appendix D), whether or not the task was completed, and the time to

complete the task. Then, I watched the videotapes of the participants going through the tasks. For each choice the user made with the interface, I wrote down a description of the choice and the time in the DVD that it occurred. These notes allow for analysis of even greater detail than is presented in this thesis. For instance, this information could have been used to draw graphs detailing the paths that each user or pair of users chose while completing each task, and a comparison with the most efficient path. For the purposes of this paper, however, the notes are only used to summarize the behaviors of the participants across tasks.

Actual test administration revealed additional issues that, given additional time, funding, and a project of greater scope, would have merited a re-test. In particular, no-shows were a problem. Of ten scheduled participants, three did not show up at their confirmed testing time. This meant that of the five usability tests, only two were pair-based; the other three were done by a single user. I had anticipated potential no-shows, and single users were instructed to carry on with the test as originally planned, with the instruction to think through their actions out loud. This approach did not work very well for the single testers, who typically approached thinking out loud as vocally reading the links they clicked and the queries they made, but not explaining their decisions. The pairs, in turn, did not vocalize their queries or link choices nearly as often (actually somewhat problematic given the high detail of the site and the quality of the video), but in their problem-solving as a pair revealed substantially more about their thought processes in their approach to tasks. The inconsistency between these two types of testing made the quality of the results overall somewhat unsatisfactory. However, for a project of this scope, the information gleaned

from these five testers was still helpful and adequate: just not as good had all tests been in pairs.

An additional problem arose as a consequence of testers sequentially performing the same task on the same computer. The Firefox browser is, by default, set to save information that is entered into forms and queries. When users fill out a similar query, then, a list of already-completed queries is displayed on the screen. This meant that all but the first testers would see the queries of former testers on the same task. Similarly, link coloring for certain pages revealed links that had been recently visited. Ultimately, these “hints” had little obvious impact on the performance of the users. However, for the sake of consistency across tests, it would have been ideal to turn these settings off, so that each pair of users was given a fresh browser at the start of their test. There was also one question which involved checking out an electronic book. Three tests were held back-to-back, and the testers for the second two tests saw a timeout screen for this electronic book when they initially loaded the page, as a result of the previous tester’s viewing of the book. Both of these testers did not appear to be hindered by this discrepancy; they still completed the task after this point with relative ease. However, once again for consistency’s sake, this timeout screen should have been dealt with before the test began.

Two additional notable discrepancies occurred. One tester accidentally skipped a task by flipping past the descriptive page; I did not catch this while I was watching her participate in the tasks, so ultimately her final test results are missing this question. Similarly, one tester had an external website (an electronic journal) fail during his work on a question. Access to this external website was the only way to finish the task, so I had to interfere

and the task was not completed. These two discrepancies are noted in the task-by-task results (Appendix D).

Following design and administration of the test, and analysis of the videotapes, the information gained from testing can now be applied to the research questions posed in the introduction. In particular, these results will be evaluated in terms of the usability measures of effectiveness, efficiency, and satisfaction.

## 5. RESULTS AND ANALYSIS

As we begin this discussion of results, it is important to look back on the research questions posed in Chapter One. This usability test was conducted to learn these things:

- Is the library interface usable by the usability measures of effectiveness, efficiency, and satisfaction?
- What usability issues that are common across all academic library interfaces emerge from this study?

The first question is answered by using measurements of effectiveness, efficiency, and satisfaction to determine the usability of the interface. As may be expected, usability is not a black-and-white “yes, this interface is usable” or “no, this interface is not usable” measurement. Instead, there are aspects of this interface which succeed, and others which could use improvement. The second question is answered by comparing the usability problems encountered in this study with the usability problems that emerged in the other usability studies of section 2.31 and the walkthrough of sections 3.32 and 3.33. These problems are categorized within the usability measurements of effectiveness, efficiency, and satisfaction.

### 5.1 Effectiveness

Recall from section 2.12 that effectiveness measures “the extent to which a task is achieved.” For this usability test, I have measured effectiveness by examining completion of the tasks. Completion is measured in this test as the student’s ability to answer the question posed by the task, regardless of whether they answered the question right. Students’ ability to answer a question right could also be a measure of effectiveness by looking at the

quality of results, but is not included due to the ambiguity of “correctness” in some participant’s answers.

Table 5-1 displays a task-by-task completion breakdown for each test. Completed tasks are marked with an “X”, and incomplete tasks are left blank, and have been shaded a dark grey so that they are differentiated from the rest of the results. Tasks which were not completed for reasons beyond the user’s conscious choice are marked with an N/A and are not included in the completeness measurement. Test numbers are listed in rows, and groups of participants are indicated in the order of test administration by “G1” through “G5”. Groups one and four consisted of pairs of testers; the remaining groups consisted of a single tester.

Task	G1	G2	G3	G4	G5	%
1	x	x	x	x	x	100
2	x	x	x	x	x	100
3	x	x	x	x	x	100
4	x	x	x	x	x	100
5	x	x	x	x	x	100
6	x	N/A	x	x	x	100
7	x	x	x	x	x	100
8	x	x	x	x	x	100
9		x	x	x		60
10	x	x	x	x	x	100
11	x	x	x	x	x	100
12	x	x	x	x	x	100
13	x	x	x	x	x	100
14	x	x	x	x	x	100
15	x	x	x	x	N/A	100

Table 5-1 Completion of Tasks.

This table shows that for completion of all but one task, the interface was effective. The task which was not completed in test one and test five asked users to find a book of essays given certain criteria. In retrospect, this task was probably too advanced and specific for a test of this nature. Students who are familiar with the type of work (literary criticism) will know what to look for, but students who are unfamiliar will cling to the clues that were

given in the directions – in particular the title of the book and the word “essays”. Because of this, I will exclude this question in this portion of the evaluation and say that effectiveness overall was achieved.

## 5.2 Efficiency

Section 2.12 describes efficiency as “the amount of effort required to accomplish a goal”. For this test, efficiency is measured as the time taken to complete a task. In testing, this time was measured from the moment that the participant read the task to the moment where they confidently answered the question provided by the task (or, in the case of Task 9, when they gave up and moved on to the next task). Table 5-2 shows the times to complete each task in seconds, with mean and standard deviation noted as well. One note: these times are not as reliable a source of measurement as they would be had all tests been on pairs or all tests been on single users. Typically, single users take less time to complete a task because they do not spend the time collaborating and discussing options like pairs of participants.

Task	G1	G2	G3	G4	G5	Mean (seconds)	SD (seconds)
1	30	N/A	20	33	42	31.3	9.07
2	42	33	48	44	60	45.4	9.84
3	245	447	150	88	50	196.0	158.51
4	29	48	52	21	26	35.2	13.88
5	93	N/A	62	49	108	78.0	27.22
6	48	32	92	35	44	50.2	24.25
7	99	50	98	105	161	102.6	39.42
8	353	117	100	68	80	143.6	118.55
9	434*	172	108	199	328*	248.2	131.12
10	272	236	224	118	88	187.6	79.93
11	99	93	133	199	61	117.0	52.48
12	150	69	100	683	130	226.4	257.08
13	109	64	153	111	92	105.8	32.41
14	102	40	172	74	108	99.2	48.80
15	410	220	119	359	N/A	277.0	132.45

\*Did not complete the task.

Table 5-2 Completion times (in seconds).

Although the library website succeeds in effectiveness, it is not nearly as successful with efficiency. This is a component of the library's design that certainly needs improvement. I would like to look in particular at the tasks with a mean completion time of over 180 seconds (3 minutes). Many of the academic library usability testers of section 2.31 forced students to move on if they did not complete a task within three minutes. I did not incorporate this cutoff because users were informed that they could give up on the task when they felt they had reached a dead end. Each of these tasks, however, can be completed by an expert user in far less than three minutes. What usability problems are common causes for inefficiencies in performance of the following tasks?

- Task Three asked users to list one of the plays written by Henrik Ibsen. The optimal solution to this task required an author search.
- Task Nine asked users to find a book of essays about James Joyce's *Portrait of the Artist as a Young Man*. The optimal solution to this task involved a keyword search on the title of the book and careful perusal of query result details.
- Task Ten asked users to find the names of other libraries stocking the book *King Leopold's Ghost*. Participants needed to figure out the purpose of the Summit catalog or WorldCat database in order to reach this answer.
- Task Twelve asked users to find information on the University's holdings of *The Atlantic*, and list the date of the earliest back issue.
- Task Fifteen asked users to find a full-text copy of an article from *The Chaucer Review*.

These tasks seem quite different, and some were surprising in their inefficiency. Task twelve, for instance, fulfills the same functional

The screenshot shows the University of Oregon Libraries catalog interface. At the top, there is a navigation bar with 'UNIVERSITY OF OREGON LIBRARIES', 'ABOUT THE LIBRARIES', and 'SERVICES'. Below this is a search bar with 'LIBRARIES CATALOG' and 'CATALOG SERVICES'. The search results page shows a search for 'henrik ibsen' under the 'AUTHOR' field. The results indicate 'No matches found; nearby AUTHORS are:' and lists several authors with their works and years. A corrective link is visible in the text: 'Your entry henrik ibsen would be here ----- Change search to [ibsen, henrik](#)'.

Mark		Year
<input type="checkbox"/>	<u>Henriette FI 1764 1778</u> Etude Stylistique De La Correspondance Entre Henriette *** Et L. J. Rousseau ; La Subjectivité Dans /Anna Joubert ; Préface De L. P. Requiea KNIGHT; PQ2058 .J38 1987 Henriette Marie Queen Consort Of Charles I King Of England 1609 1609 -- See <u>Henriette Maria, Queen, consort of Charles I, King of England, 1609-1609</u> Henrik Ca 1187 Ca 1259 -- See <u>Henricus, de Lottis, ca. 1187-ca. 1259</u> Your entry henrik ibsen would be here ----- Change search to <a href="#">ibsen, henrik</a>	1987
<input type="checkbox"/>	<u>Henriksen Aage</u> Organismat udviklingen I Dansk Litteratur 1770: 1870 /af Aage Henriksen, Erik A. Nielsen 1975 Og Knud Wentzel KNIGHT; PT7752 .H4	1975
<input type="checkbox"/>	<u>Henriksen Caroline C</u> Blik Paa Sprogvidenskabens Historie. /English KNIGHT; P541.P413 1983	1983
<input type="checkbox"/>	<u>Henriksen Donald Anton</u> Europa Stadtsplanke Of The Louvre Caution: Please Contact William Little 1954	1954

Figure 5-1: Results of a search on author Henrik Ibsen. The library recognizes author searches with the last name first, i.e. "Ibsen Henrik". The website incorporates a corrective link, but it is buried in text and was ignored by most testers.

requirements as the earliest tasks: find out if the library has an item, and be able to retrieve some important information about that item from the website.

As Table 4-1 shows, the tasks were ordered by perceived difficulty. This difficulty was established as an educated guess on my part, and is supported by the anticipated problems detailed in Appendix D. I anticipated that some of my difficulty ratings were inaccurate, but did not know which would be off-target, or to what degree. The longest tasks to complete were not all perceived "hard" or "very hard" tasks; in particular, I felt that the Henrik Ibsen task (Task Three) and the *Portrait of the Artist* task (Task Nine) were "easy" and "moderate", respectively. The reasons why these tasks

KEYWORD	portrait of the artist as a young man	View Easy Collection	Search
54 results found. Sorted by Date			
Next			
Title	James Joyce's A portrait of the artist as a young man : a casebook / edited by Mark A. Wolfinger		
Publisher	Oxford : New York : Oxford University Press, 2009		
LOCATION	CALL NUMBER	STATUS	
KNIGHT	PR649.J73 P6 A53 P8625	DUE 07-25-06	
Description	1 v., 360 p. : 22 cm		
Notes	Includes bibliographical references (p. 357-360)		
Contents	The portrait in perspective / Hugh Kenner -- The problem of distance in A portrait of the artist / Wayne Booth -- The style of the troubled Celtic soul / Helena Cowart -- A portrait of the artist / Patrick Parrinder -- The challenge of "spiritual argument" (an old-fashioned gloss guessing at a borrowed structure) / Fritz Rienecker -- The name and the year / density in The Odyssey and A portrait of the artist as a young man / Maed Korman -- Stephen's day in Joyce's Portrait: the shape of life / Michael Bevenson -- Framing, being framed, and the Janus faces of authority / Vicki Mahaffey -- Shook by his touch: The aestheticizing of homosexual passion in A portrait of the artist as a young man / Joseph Valente -- Portrait of an artist as a young man / Erin Hogan -- The woman of the Baylisses Hall / James Joyce and the politics of celebrity / Allison Edge -- Goodbye Ireland! It's going to hurt / geography, scars, and narratives the nation / Marlene Morewood -- Between Stephen and James: portraits of Joyce as a young man / Mark Wolfinger		
AV author	Wolfinger, Mark A., 1957-		
Author	Casebooks in criticism		
L.C. subject	Joyce, James, 1882-1941. Portrait of the artist as a young man. Irishtu (Ireland) -- In literature. Young men in literature		
ISBN	0195350759 (pbk. : paper)		
ISBN	0195350767 (pbk. : alk. paper)		
LCBN	2008040518		

Figure 5-2: Example of a correct answer for the Portrait of the Artist as a Young Man task. Although this resource does not say “essays” anywhere, it gives descriptive cues: the contents are a list of titles by different authors; there is an editor; the words “casebook” and “criticism” are used.

were more difficult than expected are a result of the same usability problems summarized below, and the general misunderstanding I made was this: although I correctly anticipated the problems these students would run into, I did not understand how far off-course participants would go as a result of these problems. In the other “easy” and “moderate” tasks, participants recovered from their missteps with far greater ease.

Students spent so much time on the most problematic tasks because they typically started in the right direction, made a small mistake, and then started making increasingly wild guesses on other tools available through the website. They finally got the task right when they were eventually led back to their original starting point with a slightly different query or request. What characteristics sent these users on the equivalent of a “wild goose chase”?

- *Novice Searchers are Performing Inflexible Searches.* The main cause of inefficiency in the Henrik Ibsen problem was that all participants

The screenshot shows the University of Oregon Libraries Catalog interface. At the top, there are navigation links for 'ABOUT THE LIBRARIES', 'SERVICES', and 'CATALOG SERVICES'. Below this is the 'LIBRARIES CATALOG' header. A search bar contains the text 'Atlantic'. Below the search bar, there are buttons for 'Start Over', 'Return to Results List', 'Limit/Sort', and 'Repeat in Summit'. A search history dropdown is visible. The search results are displayed in a table with columns for 'TITLE', 'View Entire Collection', and 'System Sorted'. The results are as follows:

TITLE	View Entire Collection	System Sorted
1 <input type="checkbox"/> <u>Atlantic (Boston, Mass. : 1937)</u> [Boston, Atlantic Monthly Co.] 78 v. ill. 29 cm		
2 <input type="checkbox"/> <u>Atlantic (Boston, Mass. : 1981)</u> [Boston, Mass. : Atlantic Monthly Co., c1981- 26 v. : ill. : 28 cm		c1981-
3 <input type="checkbox"/> <u>Telephone Directory: Atlantic Region, Annuaire Téléphonique: Région De L'Atlantique</u> [Ottawa] Government Telecommunications Agency, [1978]. x. 28 cm		1978

At the bottom of the results, there are buttons for 'Save Marked Records' and 'Save All On Page', and another set of navigation buttons: 'Start Over', 'Return to Results List', 'Limit/Sort', and 'Repeat in Summit'.

Figure 5-3: Matches of all items filed under the title "Atlantic". Is it obvious that the first two results are displaying a periodical?

did an author search with the author's first name listed first. The "correct" query puts the last name first, similar to the formatting of citations and bibliographies. Figure 5-1 shows the result for an incorrect query: students typically could not make sense of all the information being presented, assumed they had headed in the wrong direction, and started off in a new direction, instead of refining their search on the correct information. Variations on this problem of students not taking the time to fix flawed search results repeatedly occurred across other tasks as well.

- *Descriptive and Categorical Cues Don't Make Sense.* Students took the descriptive, categorical wording of the tasks quite literally. In the

Leaf only	Atlantic (Boston, Mass. : 1932)		
Title	The Atlantic		
Publisher	[Boston, Atlantic Monthly Co.]		
LOCATION	CALL NUMBER		STATUS
KNIGHT	AP2 AB v. 150 1932	(LIMITED LOAN)	AVAILABLE
KNIGHT	AP2 AB v. 151 1933	(LIMITED LOAN)	AVAILABLE
KNIGHT	AP2 AB v. 152 1933	(LIMITED LOAN)	AVAILABLE
KNIGHT	AP2 AB v. 153 1934	(LIMITED LOAN)	AVAILABLE
KNIGHT	AP2 AB v. 154 1934	(LIMITED LOAN)	AVAILABLE
KNIGHT	AP2 AB v. 155 1935	(LIMITED LOAN)	AVAILABLE
KNIGHT	AP2 AB v. 156 1935	(LIMITED LOAN)	AVAILABLE
KNIGHT	AP2 AB v. 157 1935	(LIMITED LOAN)	AVAILABLE
KNIGHT	AP2 AB v. 158 1935	(LIMITED LOAN)	AVAILABLE
KNIGHT	AP2 AB v. 159 1937	(LIMITED LOAN)	AVAILABLE
<a href="#">View additional copies or search for a specific volume/copy</a>			
First publ.	v. 150-227; July 1932-June 1971		
Description	78 v. il. 23 cm		
Alt title	Atlantic (Boston, Mass. : 1932) The Atlantic (Boston, Mass. : 1932)		
Continues	Atlantic monthly (Boston, Mass. : 1857) 0160-6514 (OCoLC)11500798		
Cont. by	Atlantic monthly (Boston, Mass. : 1971) 0004-6795 (OCoLC)2445096		
ISSN	0160-6506		
LCRN	00642311 //192		
Record 1 of 3			
◀ Previous    Next ▶			
<input type="button" value="Start Over"/> <input type="button" value="Request Item / Place Hold"/> <input type="button" value="Mark This Item"/> <input type="button" value="MARC Display"/> <input type="button" value="Return to Results List"/> <input type="button" value="Repeat in Summit"/>			

Figure 5-4: Descriptive page shown when clicking on the first “Atlantic” link in Figure 5-3. Users in this task were typically looking for confirmation that *The Atlantic* was a magazine, as the task description had explained. What cues does this page give the users that they have found the right resource? What cues does it lack?

*Portrait of the Artist* task, for instance, participants scoured the descriptive result pages for any indication that the book contained a collection of papers or essays. This information was not as obvious as I first expected. Figure 5-2 shows the result page for a book meeting the criteria of the *Portrait of the Artist* task. Although the results page does not say “essays” anywhere, there are other cues that students did not pick up on: the author is an editor, the contents are listed under several titles by several authors, and the words “casebook” and “criticisms” are used, which I interpret as synonymous with “a book of essays on the subject.” Similarly, *The Atlantic* was so hard for users to find because they wanted confirmation that they had found a

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**UNIVERSITY OF OREGON LIBRARIES CATALOG** CATALOG SERVICES ▾

### Interlibrary Loan (ILL) Book Request Form

Before requesting a book through this ILL form, be sure that you have searched for the book in the UO Libraries Catalog, the Summit Catalog, and the WorldCat database. Books, dissertations, etc., located in either Summit or WorldCat can be requested directly through those services. Items requested through Summits or WorldCat arrive more quickly.

- Returnable materials, such as books, videos, and media, should be available in 7 - 14 days.
- Indicate pickup location in the form below.
- You will be notified if the requested item cannot be obtained.

Author (last name, first name) \_\_\_\_\_

Title (required) \_\_\_\_\_

Place of Publication \_\_\_\_\_

Publisher \_\_\_\_\_

Year Published (required) \_\_\_\_\_

Edition \_\_\_\_\_

Additional Comments \_\_\_\_\_

Source of Citation \_\_\_\_\_

ISBN or OCLC# (use format \_\_\_\_\_)

**Instructions**

**Authorized Users & Fees**

**Request Another Item**

**Contact ILL by Email**

**Contact ILL by Phone**  
• 541-346-3055

**Catalog Home Page**

Figure 5-5: The Interlibrary Loan Book Request Form initially led some participants astray in their search for a catalog which provided a service similar to Interlibrary Loan. Students neglected to initially read the descriptive paragraph before the request form.

magazine in the catalog. Figures 5-3 and 5-4 display results of a search on *The Atlantic*, and its descriptive results page. Is it obvious that this item is a periodical?

- *A Knowledge Gap Exists Between Students and the Interface.*

Continuing on the topic of *The Atlantic*, students did not have a clear enough distinction between “magazine” and the rest of the terminology regarding periodicals and serials to understand when the items could be interchanged and when they stood discretely. Students were looking for the word *magazine*, which is a correct term for *The Atlantic*, but is never used in the descriptive terminology on the results pages. Similarly, the entire website is based on an infrastructure that

students are untrained in. As the usability studies of section 2.31 confirm, students do not have a clear understanding of the conceptual model behind the library interface. They do not know what is available in the catalog and what is not, nor do they understand the purpose of a database. If students' decisions with the interface are based on guesswork, they will be apt to quickly switch paths, since they were not confident in their actions in the first place.

- *Names for Links Lack Needed Information.* The *King Leopold's Ghost* task, for instance, is identical to the easy book-locating tasks, but with one exception: it requires that the student know the purpose of the Summit or WorldCat catalogs, which are both available from the homepage. Participants sent into the task with an idea of the job they were supposed to do, but no name for this particular functionality, had to figure it out on their own. The "Interlibrary Loan" page, available off the main Libraries homepage under "Services", was a common path for students, and did not clearly aid students' exploration of these catalogs. In particular, students initially skipped over the large chunks of text which prompted them to look in these catalogs before filling out an Interlibrary Loan request, and instead immediately started filling out the "request book" form (see Figure 5-5). Several other paths were taken to find this answer and are reflected in the large times needed to complete the task.
- *Interfaces are Cluttered, so Users Overlook the Right Answer.* Consider Figures 5-1 and 5-5. Figure 5-1 is the author search on Henrik Ibsen; there is a link on the page that directs users to the correct author query, but it is buried in a list of results that are alphabetized close to the original query. Only one user noticed this link after performing an

FINDTEXT  UNIVERSITY OF OREGON LIBRARIES 

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**Title:** ONCE MORE TO THE GROVE: A NOTE ON SYMBOLIC SPACE IN THE KNIGHT'S TALE.  
**Source:** The Chaucer review [0009-2002] yr:2006 vol:40 iss:4 pg:433

**Full Text**  
 Full text available from [Project Muse](#)  
 Year: 2006 Volume: 40 Issue: 4 Start Page: 433   
 Available from 2000 volume: 34 issue: 5

**Print Holdings**  
 We own this journal. Find it in the [UO Libraries Catalog](#)   
 Available from 1966 volume: 1

**Other Services**  
 Is this journal peer-reviewed (refereed)? Check [Ulrich's Periodicals Directory](#),   
 Questions? [Please contact us.](#) 

**Web Search**  
 Search for similar information in [Google Scholar](#).  
[Anchor Title](#)   
 Search Terms: ONCE MORE TO THE GROVE AT 

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**Figure 5-6:** Results of a FindText search on the article “Once More to the Grove: A Note on Symbolic Space in the Knight’s Tale”. In this task, students were looking for the electronic full text of this article, which is available. Where is the appropriate link in these search results? What is the importance of the rest of the information displayed?

author search under this query. Similarly, Figure 5-6 shows a FindText result for the article from *The Chaucer Review*. Users typically wanted to find the full-text copy of the article; although a link to this article is available, participants were confused and thrown off by the additional options that the results page presented to them.

- *The Task of Finding Articles is Inconsistent and Time-Consuming.* Students looking for articles on the library website typically have two different goals in mind: either they are looking for specific articles related to a subject, or they have a specific article in mind and want to

The screenshot shows the University of Oregon Libraries website. The main heading is "Databases & Indexes: Environmental Studies". Below this, it says "Found 5 items:" and lists several databases with circular icons next to them: Academic Search Premier, AGRICOLA (Agriculture), Columbia Earthscape: An Online Resource on the Global Environment, Geobase (Geography), and JSTOR. There is a "Select" button next to each. Below the list, there is a "Select" button and a note: "This is a selected list of major indexes and abstract databases, selected based on your search criteria." There are also links for "Looking for an overview of a topic or background information? Try a research guide" and "Staff at reference desks in all the UO libraries can help identify other resources. The libraries also provide an e-mail reference service." A section titled "WE ALSO RECOMMEND..." lists "The following databases may also be relevant to your search:" and includes Aquatic Sciences and Fisheries Abstracts (ASFA), ArticleFirst, BioOne, BIOBASE (Biology), Google Scholar, and Web of Science. A note says "NOTE: Expanded Coverage: 1975 to present". On the right side, there is a sidebar titled "INDEX SEARCH" with a search bar and a "Go" button. Below the search bar, it says "Browse alphabetical list of all index names:" and lists letters A through Z. There is also a section "or select an index by subject area:" with a dropdown menu and a "Go" button. At the bottom of the sidebar, there is a link "Want to access these databases from off-campus?"

Figure 5-7: The Libraries list of Databases & Indexes for the Environmental Studies academic discipline. Each of these databases or indexes may return different articles than the others.

acquire the full text of the article. For the first task, students have to go through these steps to find the articles they want:

1. Identify a database which could carry articles on this subject.

Some general-education databases exist; otherwise, the subject needs to be broken down into an academic discipline. Task Eleven, which instructs users to find an article on Sea Turtles, suggests that users should look for databases under the Environmental Studies subject (see Figure 5-7).

2. Open an appropriate database, and search on the subject. Every database has a different interface, which students must adapt to, and is out of the design control of the UO Libraries.

TITLE  View Entire Collection Title  Search

Next >>

Title **The Chaucer review**  
 Publisher [University Park, Pa.] Pennsylvania State University Press, [1966]-

[Go to UO's copy of Chaucer review \(from Project Muse\)](#)  
[Go to UO's copy of Chaucer review \(from ECO\)](#)

Fulltext for this item is available at:  
 Chaucer Review -- Project Muse Jan. 01, 2000-

Location **KNIGHT PR 1901 .C5**  
 LIB. HAS 1(1966)-15(1981), 17(1982)-39(2003)  
 Latest Received: 2005 #0-4

Location **INTERNET WEB SITE**  
 LIB. HAS v.34(2000) to present [Project Muse]  
 v.34(2000)-v.38(2003) [ECO]

LOCATION	CALL NUMBER	STATUS
INTERNET	WEB SITE	AVAILABLE
KNIGHT	PR1901 .C5 v.1-2 1966-68 (LIMITED LOAN)	AVAILABLE
KNIGHT	PR1901 .C5 v.3 no.1-2,4 1968-69 (LIMITED LOAN)	AVAILABLE
KNIGHT	PR1901 .C5 v.4-5 1969-71 (LIMITED LOAN)	AVAILABLE
KNIGHT	PR1901 .C5 v.6-7 1971-73 (LIMITED LOAN)	AVAILABLE
KNIGHT	PR1901 .C5 v.8 1973-74 (LIMITED LOAN)	AVAILABLE
KNIGHT	PR1901 .C5 v.9 1974-75 (LIMITED LOAN)	AVAILABLE
KNIGHT	PR1901 .C5 v.10 1975-76 (LIMITED LOAN)	AVAILABLE
KNIGHT	PR1901 .C5 v.11 1976-77 (LIMITED LOAN)	AVAILABLE
KNIGHT	PR1901 .C5 v.12 1977-78 (LIMITED LOAN)	AVAILABLE

Figure 5-8: Catalog detail on the journal *The Chaucer Review*, which is available online in multiple forms.

- Click on results to determine if the article is relevant, and if it is available at the UO Libraries, either through full-text or on the physical shelves. Results pages also vary by interface, and many do not make this information obvious.
- If the student wants to comprehensively ensure that they have discovered all articles available through the UO Libraries, they must repeat this process on all other applicable databases.

Finding an explicit article is equally time-consuming, and the UO Libraries may carry an explicit article despite the fact that the route the student has taken to find it has not turned up any results. These are the options students have to find the full text of an article:

1. Do a catalog search on the journal, and see if the UO Libraries carries it. If looking for electronic full-text articles, check if an online version exists. Sometimes an online version of a journal only includes online citations, or the full text of a limited number of articles. For Task Fifteen, the UO libraries had *two* “electronic copies” of *The Chaucer Review* (see Figure 5-8), but only one of these electronic copies contained full text articles. Several participants initially looked at the wrong electronic copy. As a result, this strategy (which is the one I use the most often) is highly problematic.
2. Do a FindText search for this article. Figure 5-5 shows the results for the search on Task Fifteen’s *Chaucer Review* article. FindText is a great resource, but many students do not know how to use it, and it requires that they know explicit information about the article they are trying to find beforehand.
3. Use a database to find the article. Students using Academic Search Premier to find the article for Task Fifteen were successful, but still had to deal with making sense of the results page and finding the link to the full text of the article (which was linked by the FindText service – see Figure 5-9). This route is also problematic because it requires students to locate the proper database: only the appropriate databases will return the article.

As this shows, even when students are able to competently find an article, they typically have to take several steps to complete their task, and try many pathways before they can ensure that they have exhausted all options. Union database searches like FindText help with this endeavor, but they require that the student knows the article



questionnaires I was more interested in the feedback as a comparison to the user survey done in 3.31 than as a measurement of satisfaction. Were I to write these questionnaires again, I would have included more in the post-test questionnaire to gauge the participant's opinion of the library website. In particular, I would have asked the participants to give numerical value to components of satisfaction such as perceived ease of use, comfort, and adequacy of results. This would have allowed me to quantitatively reflect on satisfaction like I have with effectiveness and efficiency.

We can still glean some details from these questionnaires, however. The pre-test questionnaire, for instance, asked users to mark all of the tools they used for library research: the library website, items from the library collection, reference librarians or other experts, search engines, online booksellers / vendors, and other online resources. Participants then ranked these resources by their usefulness. Although half of the participants did use library resources, every single user ranked search engines as the most useful tool for their research. The final question in this questionnaire asked students why they preferred this resource. These responses were consistent for almost all responses: search engines are convenient, fast, easy to use, and return adequate results. These factors, then, are probably the most important components of student satisfaction with the library website. Compare these responses with students' criticism of the library website in the user survey of section 3.31: students felt that the library interface was too hard to use, didn't return the results they wanted, and took too long to use. From this information, we can conclude that students may not find the library interface unsatisfactory, but they certainly prefer the "competing" interfaces of search engines.

The results of the post-test questionnaire are summarized in Table 5-3 and show students' reactions to the usability test they had just completed. Nearly all of the criticisms made by participants tied to the tasks in which they had the most trouble, and the reasons for these troubles were addressed in section 5.2.

Table 5-3: Summarized responses to the post-test questionnaire.

Question	Responses
<p><i>Were there any tasks in the usability test that you did not know the library website supported? If so, what were these tasks?</i></p>	<ul style="list-style-type: none"> <li>• I didn't know that people had their own library accounts!</li> <li>• No – I've taken a Journalism class that taught me how to do a lot of these things.</li> <li>• Online databases, journal/article searches, electronic text, library account access, searching for books outside of the UO catalogs.</li> <li>• I don't use the library site often, or at all, so a lot of this was new but it was kind of exploratory.</li> <li>• I figured there would be online versions of articles, but I didn't know where to find any of it until now. I really thought it would be easier than it was.</li> </ul>
<p><i>What things made the tasks you performed today more difficult?</i></p>	<ul style="list-style-type: none"> <li>• The magazines were so hard to find!</li> <li>• The hardest part is jumping from one interface to another. It took time to get used to the fact that all databases worked differently and I didn't initially understand that the database existed outside of the library website.</li> <li>• Lack of description as to what some resources did – in particular the Summit and WorldCat catalogs.</li> <li>• Trying to find specifics on the contents of books, like essays.</li> <li>• We had to dig pretty far to find the articles that we were looking for.</li> <li>• You pretty much know where you should be searching in order to get the right results.</li> </ul>

<p><i>What changes would you make to the library website's interface to make it work better for you?</i></p>	<ul style="list-style-type: none"> <li>• Make access to resources like articles and databases a little easier to navigate.</li> <li>• Incorporate search by keyword for articles on the homepage.</li> <li>• Include a "My Account" link in plain sight on the homepage.</li> <li>• A more simplistic design for just finding books. There's too much clutter, when I think a large percentage of people just want to see if the library has a book.</li> <li>• More search-friendly labeling and clearly organized and displayed links so we don't have to guess at what links are or where we might be able to find them.</li> <li>• I'd like to have a better idea of when I'm exiting and re-entering the library site.</li> <li>• The homepage is intimidating; it's dense and it tries too hard to present a lot of options. It would be better to start with a narrower set of options and then be given more options as you continue your search.</li> <li>• Magazine searching should be improved.</li> </ul>
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**Table 5-3:** Summarized responses to the post-test questionnaire.

This summary shows that the time students spent in front of the interface certainly gave them the opportunity to form some criticisms of the Libraries website, and voice their dissatisfaction with aspects of their experience. In particular, students wanted more guidance, less time commitment, and fewer choices when interacting with the interface. Of course, many of the suggestions made by these participants are more complicated than they initially seem: thus the motivation for this entire thesis. However, it is obvious that students believe that the interface is capable of working better for them.

With the troubles encountered through evaluation of these usability measures as a guide, this thesis now transitions into discussion and recommendations. Now that these usability problems have been highlighted, what improvements can be made to the interface, and the conceptual model underlying the interface, to make the system better for this undergraduate user group?

## **6. DISCUSSION & RECOMMENDATIONS**

Analysis is complete, with a summary of the library interface's usability examined in terms of the three main usability measures: effectiveness, efficiency, and satisfaction. Although effectiveness measures were met in testing by this interface, efficiency and satisfaction were the source of some issues that bear commonality with the issues raised by the librarians of sections 2.31 and 3.1. To summarize:

Problems similar to those found in sections 2.31 and 3.1:

- A Knowledge Gap Exists Between Students and the Interface. (2.31: 1, 4)
- Names for Links Lack Needed Information. (2.31: 2)
- Interfaces are Cluttered, so Users Overlook the Right Answer. (2.31: 3)
- Students prefer the ease of use, speed, convenience, and perceived adequacy of results of the search engine to the library interface.

(Manuel's observations in section 3.1.)

Additional problems which emerged in this study:

- Novice Searchers are Performing Inflexible Searches. (Although this is similar to Manuel's observations in section 3.1.)
- Descriptive and Categorical Cues Don't Make Sense. (This is similar to 1 and 4 in section 2.31.)

Instead of providing explicit recommendations to these usability issues, I would prefer to look at (and attempt to answer) the research questions that have emerged as a result of my study of the library interface and its undergraduate user group. Harkening back to Chapter One, these questions are:

- What are the similarities and distinctions between academic library websites and other online resources: specifically, search engines? How has students' familiarity with these online tools influenced the usability of the academic library website?
- How important is training in information research to successful use of the library website? How important should it be?
- Are students fully aware of the functionality provided by the academic library website? If students had this awareness, would their overall usage of and preference for the library website versus other online resources be influenced?

The blessing of a study done outside of the context of a redesign project or established financial barriers is that the typical limitations which are imposed on these recommendations are nonexistent. This discussion is meant to examine the conceptual underpinnings of the interface versus the interface's cosmetic look and feel. Of course, this means that much of this discussion may not be realistic given the immediate needs and limitations of library staff. It is my hope, however, that these ideas inspire discussion of their own, and future brainstorming into solutions for these compelling questions.

## 6.1 The Library Interface and the Search Engine

Academic library websites and internet search engines are two very different online tools and sources of information, but they share enough in common that students often interchange the functionality of the two, or use one (typically the search engine) in place of the other (the library interface). What similarities exist in these websites that allow this interchangeability, and how can students become more aware of the differences, so that they

begin to adequately use the interfaces that are most appropriate for their tasks? This discussion will begin by looking at the distinctions between these two interfaces based on several different criteria: these distinctions are outlined in Table 6-1

**Table 6-1:** An outline of the core similarities and distinctions between search engines such as Google and the academic library website.

	<b>Google, Other Search Engines</b>	<b>Library Website</b>
<i>Primary Function</i>	An index into information available on the World Wide Web. Google especially has found new ways to search the contents of the internet, but these sources hardly overlap with the contents of the library website. These search engines typically use advertisements as their primary source of income, which means that they also exist to sell products, enable transactions and facilitate collaboration.	An index into the holdings of a Library, or a digitized Card Catalog. Returns information about items in the holdings, and how to locate them. The items can have either a physical presence, for which the website directs the user to the physical location, or an electronic presence, for which the website is a portal to the information. The library website also serves as a portal to databases and indexes of articles from journals. Finally, the website provides additional services as a research guide and information-acquisition tool for students.
<i>Types of Information Queried &amp; Returned</i>	Webpages composed with HTML and other Web languages, but can also include Adobe .pdf files, images, videos, and other digital media  Searches are done on a decentralized, heterogeneous collection of information.	Books, videos, music, periodicals, maps, and other sources of information found in a catalog. Citations for articles and books in the collection, i.e. information on how to find these items physically. Electronic copies of articles, journals, and other library resources.  Searches are done on a centralized, integrated collection of information.
<i>Tasks Appropriate for Interface Usage</i>	To find the address of a particular webpage that the user has in mind.  To find webpages meeting certain criteria.	To find items in the library's catalog.  To find articles meeting certain criteria, or an explicit article based on a citation.  To do research for an academic paper.

<p><i>Tasks Appropriate for Interface Usage (Continued)</i></p>	<p>To find information about a person, place, or thing. (Note credibility section for the problems with this task.)</p> <p>To find information about popular culture or personal opinions on a subject.</p> <p>To access web-based tools or applications.</p>	<p>To find information about a person, place, or thing.</p> <p>To learn about information searching and the research process.</p> <p>To access library-specific tools and resources</p>
<p><i>Credibility of Information Provided</i></p>	<p>Anybody can create a website, and identity is often difficult to confirm. Anonymity is rampant.</p> <p>There is a process for evaluating the credibility of websites, but Google and others do not directly aid in this process (i.e. it does not give any information about whether or not a website is credible.) The relevance metric <i>can</i> bring the most credible sites to the top of the page, but this is often dependent on whether the query is on a subject that is controversial versus common knowledge.</p> <p>Credible sites do exist in the form of online news sites, the online presence of established physical organizations, and websites with an “.edu” domain (academic institutions). However, these sites are not foolproof.</p>	<p>Librarians trained in information science, and other academics decide about the information that is carried by the library.</p> <p>Journals (and academia in general) use a system of peer review to allow articles to be published. Only articles that pass muster are available within these sources.</p> <p>In general, there are many more checks in place to establish that the information provided by these resources is credible before they ever appear in the results page of a library search.</p>
<p><i>Strengths</i></p>	<p>Responses are extremely fast, and typically require two steps (typing in the query, and clicking on the result).</p> <p>Responses are ordered in a way that the information a user wants is typically (although not always) displayed in the first few results.</p>	<p>The information provided is more credible and typically better for academic pursuits.</p> <p>Many resources are provided to library patrons that would be expensive or unavailable to normal users of the internet (i.e., not available through a web search).</p>

<p><i>Weaknesses</i></p>	<p>The relevance metric that determines the order of returned results can be manipulated by webpage creators.</p> <p>The information provided by returns on controversial issues is especially unreliable; credibility is a consistent issue.</p>	<p>The website's searching capabilities are often inflexible and hard to work with, making it hard for users to get to the information they need.</p> <p>Results of queries are not necessarily ordered in a way that makes sense to the user.</p> <p>Finding a resource may involve substantial work; see section 5.2 for an example of the steps required to find an article.</p>
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**Table 6-1:** An outline of the core similarities and distinctions between search engines such as Google and the academic library website.

To make sense of the reasons that students often interchange the functionality of the search engine with that of the academic library website, it's best to think about the common tasks that the search engine is used for outside of research for an academic paper. Undergraduates use the internet for many functions outside of academic schoolwork, and the Google Zeitgeist, a yearly summary of notable popular search queries, is excellent evidence of this reality.<sup>30</sup> The top searches of 2005 reveal some core tasks that the “average” user utilizes a search engine for:

- The names of websites, such as Wikipedia, Myspace<sup>31</sup>, or applications, such as iTunes<sup>32</sup> and Ares<sup>33</sup>. This implies that people use the search engine to direct them to the correct website or hosting site.
- The names of celebrities or other notable people, which imply that search engines are used to direct people to information provided for

<sup>30</sup> See <http://www.google.com/intl/en/press/zeitgeist2005.html> for the 2005 Google Zeitgeist.

<sup>31</sup> <http://www.myspace.com>

<sup>32</sup> iTunes is the digital music player created by Apple Computer. <http://www.itunes.com>

<sup>33</sup> Ares is a peer-to-peer file sharing application. <http://aresgalaxy.sourceforge.net/>

entertainment purposes (such as gossip rags or fan sites), similar reading a public-interest magazine such as *People*.

- Keywords for cultural or news phenomena, implying that people use search engines to learn more about current events.

Although search engines are used to acquire information, this short list shows that the accuracy or credibility of this information is not as important, nor does it carry the same consequences, as the information typically used for research papers. For these standard tasks, the search engine does an excellent job. It makes sense, then, that students untrained in library science and research would then turn to the source of information that usually gives them what they want in a short period of time when they need to embark on the information seeking task of researching for a paper. Similarly, many of the functions offered on the library website *look* like those offered on a search engine, even though the underlying infrastructure is completely different. As a result, students either use search engines for their research, or they try to use the library website like a search engine, and run into problems when some of their searching behaviors do not work well on this new, yet seemingly similar, interface.

How can the library interface adapt in a way that still allows it to provide the distinctive functions it currently offers students, while accommodating some of the “bad habits” they may have picked up as a result of the ease of use of search engines for simpler, less consequential tasks? First, let’s look at the ways that the problems students encountered could be influenced by the behaviors they have acquired from using search engines on a far more frequent basis than the library web site.

- Students expect the engine to be smart enough to know the proper context of their query, and return the most “relevant” results. They do

not think about what this relevance should be because they typically get the results they want in the first few hits on simpler search engine queries. As a result, on library searches, if they don't see what they want in the first few hits, students either assume that they are using the wrong tool, entered the wrong query, or that a relevant result does not exist.

- Students expect the engine to accommodate their novice searching skills, which means they are flexible about the order of words entered (such as the name of an author), the significance of words such as “and” (more likely a connector than a boolean value for novice searchers), pluralizations and other details. If the right result is not returned based on a flawed query, students will not expect the fault to be with their search skills, and will not change their query to better fit the strict requirements of the system.
- Students expect results pages to give them the contextual evidence that they need to determine if a result is what they are looking for. In terms of the types of queries mentioned earlier, there are often many results that a user will find satisfactory; the contextual criteria are not as specific. Students have the visual cues of images and additional website markups, along with textual descriptions, to guide them in their evaluation of a particular hit (if, for instance, they click ahead to a website listed on the results page), and these aesthetic cues can often (however superficially) give the user a quick idea of the adequacy of the result.

In light of these challenges, the designer of the academic library website must find a way to accommodate these search-engine-based behaviors without compromising the functionality of the website; in fact, a

successful design would communicate the differences between these interfaces while accommodating the students' initial tendency to intermix the two. Certainly, this is no simple challenge, especially given the financial and technical limitations that many libraries face -- their systems are of a much smaller scale than a worldwide technological giant like Google. With these three behaviors in mind, I'd like to suggest these recommendations to accommodate the searching behaviors of undergraduates:

- Establish a relevance metric for the library website. This idea of "relevance" should not be the same as it is for a site like Google, where results based on the popularity of a site are often an adequate judge of its fittingness to a query. This sort of ranking method does not work for the type of information provided by the library website. Instead, explore the meaning of a "relevant result" for types of queries. In particular, a task-based relevance metric makes the most sense; return results based on how well they fit the most common tasks of users. For instance: my survey showed that the most common task is still finding a book in the catalogs. If a student searches on a book like *The Master and Margarita*, they are most likely doing a search for that particular book, so it should be listed first. Of course, this is an oversimplified presentation of an intelligent system. Developing a ranking standard for different types of queries and results, based on the frequency of different tasks on those queries, will require significantly more thought and exploration, but a relevance to results that makes more sense to students is essential.
- Allow for more flexible searching, in particular with searches on things such as titles and author names. Make some assumptions about the errors students may make in their queries, and test for these

assumptions. For instance, if “Henrik Ibsen” returns no results, try the “Ibsen Henrik” query instead and return those results if they appear, instead of forcing students to make this additional query themselves. Try searching for an exact title, and if it does not return an explicitly matching result, then search on a keyword or another component of the query. Search on the “novice” version of a query including boolean terms such as “and” or “or” first, and use the quantity and type of results to determine if a more explicit search is needed. Once again, this requires intelligence built into the system that may be over idealistic for a library interface, but certainly some changes are feasible. If these changes cannot be made, use “refine your search” terminology on results pages to help users accommodate users’ queries to lead them to the right results, and to keep them from giving up on their query until they are absolutely sure that no pertinent results exist. Suggest synonyms or other terms on searches that may fit what the user actually intended: coming up with the correct query off of the top of one’s head can often be difficult.

- Although the infrastructure of the online catalog is not likely to change, start accommodating additional types of information in the form of metadata to allow students to make the contextual conclusions that make sense to them. In particular, any metadata which takes advantage of the rich capabilities of computers and the internet, especially through graphical output and visualizations, will make students’ evaluation of results much less difficult. Elizabeth Breakstone has introduced me to the “Functional Requirements for

Bibliographical Records”, or FRBR, model of cataloging information.<sup>34</sup>

Although this new cataloging standard mostly exists as a theory at this point in time, it shows that librarians are working to make the organization of a catalog better utilize the capabilities of technology.

These ideas are exciting, but they do not address all of the issues raised by the usability problems encountered by students. In particular, even if students’ behaviors were not so heavily influenced by their information seeking habits with search engines, their lack of knowledge in regards to library science could still hinder their completion of a task on the library interface.

## 6.2 Accommodating the Information Illiterate

I have discovered that the most exasperating issue facing the designers of library interfaces is accommodating users who do not have the proper training in information literacy to be able to use an interface that is based on the complicated infrastructure of information science. I found myself as conflicted as librarians have been when I witnessed the usability test in which my participant was an experienced user of the website. As a Journalism student, this participant had learned all about gathering information, and was able to apply this directly to the tasks presented in the usability test. I watched this participant breeze through some of the tasks that proved to be extremely difficult for the rest of the users, who lacked the same background as this student.

One serious limitation of usability testing is that, at least in the form as it was presented in this thesis, it evaluates the interface purely as a “walk-

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<sup>34</sup> A summary of this concept can be found on Wikipedia: <http://en.wikipedia.org/wiki/FRBR>

up-and-use” system. Not all systems are meant to be “walk-up-and-use”; certainly some have to rely on a base level of expertise on part of the user. Think of scientific visualization software, for instance. Many of the terms used as variables in the visualization may be common knowledge to the scientists who use the software, but incomprehensible to the layman. So there are some occasions where learning can and should be expected. Some usability tests accommodate this by providing training sessions for users before the tasks begin. Watching the differences between an experienced user and inexperienced users made me wonder if the library interface should be treated as one of these interfaces that simply requires a base level of knowledge from its users. Certainly, many librarians would love for this to be the case.

Unfortunately, the library interface will have to accommodate the inexperienced user because the *user* expects it to be a walk-up-and-use interface, and will not acquire the library science knowledge needed to competently use the interface. They will likely not see the connection between knowledge of library science and their difficulty with the interface, because they see enough similarity between the library interface and one that they think they can use competently – search engines. Despite the discussion raised in section 6.1, the similarities of these interfaces – in particular, that their core task is performing a search for some type of information - allow students to believe these tools are interchangeable in the research process. Worse yet, students that are exclusively using the search engine to get information (seemingly) get away with it academically.

How can the library interface do the necessary job of accommodating these users? I have been compelled by Norman’s concept of “knowledge in the world” (1988, 54-80). Norman argues that we use many of the constraints

already present in the environment – both natural and cultural – to competently recall familiar objects and make sense of unfamiliar objects. I also witnessed my users taking advantage of “knowledge in the world” when testing on tasks. For instance, in a query on the library catalog, a filter on the parts of the catalog that are being searched actually allowed users to get an idea of the items that were contained in the catalog. This helped them search for a video with ease, but they were lost when they had to find a magazine, which was not listed in the pull-down menu. In what ways can we work in “knowledge in the world” to the library interface? Certainly, it’s not a question with an easy or simple answer, but it may provide a satisfactory compromise to the issue of accommodating untrained users. With “knowledge in the world”, users have the opportunity to become competent users of the library interface, as well as better-trained students of library science, through their use of the system.

Another component to this knowledge is whether or not students are aware of the full functionality of the website. The results of my post-test questionnaire indicate that this is not the case. Perhaps students are overly reliant on search engines for their research because they have not yet had the chance to learn that the library provides much better tools for academic information-gathering tasks. The library interface, therefore, also needs to bring its best features to the forefront so that the user who may understand only the basic functions of the website becomes aware of these features.

One good example is the FindText resource. This tool has been my favorite discovery from usability testing, and I wish I had known about it when I was collecting the articles referenced in this paper. I often had the exact citation of the article beforehand, but no way to know if the library actually carried the full text of the article. FindText would have been perfect

for this task, but its appearance on the homepage of the Libraries website (note Figure 3-1) did not make its purpose obvious. In particular, the FindText icon is inconsistent with the appearance of the rest of the tools provided on the front page. This is so students familiar with the tool associate with this icon when they are trying to find the full text of an article off of a database citation (note Figure 5-9). Unfortunately, some users may be unlikely to notice this tool in the first place because it does not look anything like the rest of the options provided to them on the homepage.

Section 3.33 discussed the different types of library interfaces, and in particular I would like to discuss the textually busy website, such as for the Indiana University Libraries (Figure 3-14). Although this front page contains many links, they all share a consistent experience. Students may have to take more time to read over the descriptions of each of these links, but by doing so they are getting information about each option available to them, instead of skipping over items that do not look like the other tools they have accessed. Certainly, textual guidance must be used with care, as students are unlikely to carefully read large chunks of text. But well-placed, well-chosen words can aid communication immensely. I believe that undergraduate use of the academic library website would increase if students had a better idea of the functions it offered. In turn, once they were aware of these tools, students would be in a better position to start understanding the distinctions between the library interface and the search engine.

## CONCLUSION

This project began as an exploration of usability and usability testing, with the library website serving as the medium for this learning experience. As I became further involved with research and test development, however, I discovered that the interface I had chosen to study was far more complicated than originally anticipated. Certainly, the library website has its share of usability issues, of which even the expert users of the site may be critical. However, there are few quick and easy solutions to these usability problems. Certainly, the larger, more pervasive problems have no immediately obvious solutions.

As a result, the additional exploration that could have emerged from this study is far beyond the scope of an undergraduate thesis. While developing the usability test, I became quite aware of the impact that each of my design decisions had on the output of the results. It is likely that a different set of design decisions would have returned a different set of results and usability problems. What type of usability test will reveal the maximum number of usability problems that are most relevant to the needs of the user group? Even an improvement on the usability test presented in this thesis would have returned better results. Additionally, a thesis centered on the output of one usability test is at odds with usability tests as a part of iterative human-centered development. A grander version of this project would have involved multiple usability tests. It also would have tested samples of the *entire* undergraduate user group, including students with disabilities and international students, in an effort to accommodate universal usability. The recommendations presented in this paper would be further expanded and hopefully implemented in some form, which would be followed up by testing for the effectiveness of these changes.

What emerges from this study is an acute awareness of the immense challenges facing librarians as their field becomes increasingly steeped in the continually evolving digital age. Not only have librarians created electronic versions of their library catalogs, but they now have the opportunity to accommodate new tools and types of information, while serving a user group that is increasingly trained on information seeking as a function of the search engine. Just as the library websites of several years ago were less complicated in functional expectations than the library website of today, it is inevitable that the expected capabilities of library websites will broaden further over the years to come. These websites will need to accommodate a large number of highly varied information resources, an assortment of functional requirements, and an uneducated target user group. The tools that have been developed in other information-rich arenas, however, may present some compelling solutions for this growing library website design problem. Coping with information overload is far from an easy issue to deal with. As the elegant and creative innovations in other fields have shown, however, this problem can be solved.

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## APPENDICES

### A. Glossary: Library Science Terminology

These definitions are taken from three separate library glossaries: the University of Michigan's Shapiro library for undergraduates, Cornell University's library, and Wikipedia's list of library terminology. Citations for these three glossaries are found on the reference pages. Each definition will be followed by a tag listing its source: Shapiro, Cornell, or Wikipedia.

*article* - Sometimes referred to as a paper, an article is a brief composition on a subject, usually appearing in a magazine or journal. [Cornell]

*boolean operator, or boolean logic* - Boolean operators, otherwise known as logical operators, are used to construct complex searches in a database. They help make a search more accurate. There are 3 logical operators: AND, OR and NOT. [Cornell]

*browse (online)* - to inspect something casually, particularly to use an internet browser to casually inspect Web pages. This involves following links from page to page (also called surfing) rather than searching directly. The main difference between browsing and searching is that with browsing you have very little advance knowledge of what will be on the next page. [Wikipedia]

*call number* - A group of letters and numbers given to each item which is used to arrange materials in the library. The Library of Congress System (LC

call number) is used for most University of Michigan materials; an example: GV 836 .A2C72. [Shapiro]

*catalog* - a complete and systematically organized enumeration of items, particularly the complete enumeration of a libraries' resources on a set of paper cards (card catalog) or in an electronic database (bibliographic database). [Wikipedia]

*controlled vocabulary* - refers to limiting ones searches to the exact subject headings contained in the Library of Congress. An example would be "History - Bibliography etc". Some indexes, like Wilson Indexes, have their own system of headings and hence their own controlled vocabulary. [Wikipedia]

*EBSCO / EBSCOHost* – EBSCO is the vendor of many popular databases that the University of Oregon subscribes to, such as Academic Search Premier and Business Source Premier. The names of these databases and the title “EBSCO” or “EBSCOHost” are often used interchangeably. [http://libweb.uoregon.edu/guides/databases/ebsco.pdf]

*edition* - a version of a published text, or all the instances of a published text issued at a given time. An example would be the 2nd edition (2001). [Wikipedia]

*electronic journal* - A publication, often scholarly, that is made accessible in a computerized format and distributed over the Internet. An electronic journal or e-journal may have a traditional paper counterpart or historical antecedent. [Cornell]

*FindText* – FindText is a service offered by the University of Oregon Libraries that unites many of the website's databases and indexes with the full text of journal articles (typically found through online holdings of journals). If a student has the full citation of an article, or wants to find out if a particular journal is available online, they can use a FindText query to get this information. They can also use FindText to move from a citation in a database results page to the library's copy of the full text of the article in that citation (if it is available). [<http://libweb.uoregon.edu/guides/findtext/>]

*free-text search* - a simple word or character search, usually with very few Boolean, proximity, or scope limiting options. It is simple and fast.  
[Wikipedia]

*full-text database* - A full text database is a resource that provides access to the complete text of an item. In a full text periodical resource, both the bibliographic descriptions and the articles themselves will be available.  
[Cornell]

*holdings* - The total stock of materials, print and nonprint, owned by a library, usually listed in the catalog. Synonymous with library collection. Also refers to the copies, volumes, issues, or parts of a title owned by a library, indicated in a holdings note in a catalog record. [Cornell]

*index* - An index is a guide to the contents of a file, document, or a group of documents. An index is used to point to the contents of something. For example, there are indexes in the backs of books that describe and point to

the contents of those books. There are also very large indexes that describe the contents of journals and provide enough information to locate an article in a journal. Indexes are usually arranged by subject, author, or keyword. They can come in both paper and electronic form. [Cornell]

*interlibrary loan* - when patrons of a library arrange for resources from other libraries to be sent to their library. This resource sharing system is being promoted by the International Federation of Library Associations.  
[Wikipedia]

*ISBN* - International Standard Book Number. A unique 10-digit code assigned to a specific edition of a book before it is published. [Cornell]

*ISSN* - International Standard Serial Number. A unique 8-digit code assigned to the specific title of a serial. [Cornell]

*journal* - A publication which has scholarly information, usually written by professors, researchers, or experts in a subject area., and not intended for the general public. See magazine. [Shapiro]

*keyword searching* - Most online catalogs and bibliographic databases include an option that allows the user to search by keyword(s). In this type of search, users enter a significant word or words that describe the research topic, and the catalog or database retrieves all records where the search terms appear whether they appear in the title field, abstract field, subject heading field, contents field, notes field, etc. [Cornell]

*literature search* - the search of traditional resources including books, catalogs, encyclopedias, dictionaries, atlases, bibliographies, handbooks, manuals, periodicals, indexes, yearbooks, gazetteers, directories, chronologies, almanacs, and guides. It is useful because it opens up a vast world of pre-1995 information that is not available online. [Wikipedia]

*magazine* - A periodical intended for the general public rather than for scholars. [Shapiro]

*online catalog* - a record of the holdings of an institution (usually a library), or group of institutions, that can be found on the internet. An example is UCSD's "Roger". [Wikipedia]

*periodical* - An item which is published on a regular basis, such as journals, magazines, and newspapers. [Shapiro]

*searching strategy* - a generalized set of techniques used in the process of determining what information you currently have, determining what information you need, and determining how to get it. Some possible strategies include; controlled vocabulary searches, specific entry searches, browsing, general scanning, broad to narrow searches, adjacent item browsing, subject tracings searches, keyword searches, citation searches, literature searches, cross reference searches, and chat room questions and other direct people contact searches. [Wikipedia]

*Scholars' Bank* – Scholars' Bank is a digital repository of the intellectual output of University of Oregon students, faculty, and community members.

It gives a permanent home to electronic versions of student papers such as Honors Theses, and resides as a subset of UO Digital Collections.

[<https://scholarsbank.uoregon.edu/dspace/>]

*serial* - A publication which is intended to continue indefinitely. This includes periodicals such as magazines, journals, newspapers, and books such as almanacs and yearbooks which come out every year. [Shapiro]

*Summit* – Also known as the Orbis Cascade Alliance, this is a database of catalog holdings for 33 academic institutions in the Pacific Northwest (Oregon and Washington), including the University of Oregon. Through Summit, students can reserve books from other academic institutions, which are then sent to the UO and checked out by students in the same way they would check out UO books. [<http://summit.orbiscascade.org>]

*truncation* - the shortening of a search word, field, or record. In the case of truncating a search word, this is a strategy used to search among multiple variants or spellings of a word. The asterisk (\*) is generally used as a wildcard to replace a letter or letters. An example is invest\* which will pick up instances of invest, investor, investments, investigations, etc. In some databases the asterisk must be accompanied with a number that define the number of characters that can be truncated. [Wikipedia]

*University of Oregon (UO) Digital Collections* – The UO Digital Collections have established a large and growing number of digital artifacts on the UO Libraries website. These items include many digitized items from the University of Oregon Archives, which are sometimes so rare that only one

copy of the information exists. Photos, documents from past University presidents, and other Oregon memorabilia and intellectual output (Scholars' Bank) can be found in the Digital Collections.

[<http://libweb.uoregon.edu/diglib/search.html>]

*University of Oregon (UO) Libraries* – The UO Libraries is the encompassing entity that represents the University of Oregon libraries: the Knight Library, the Architecture and Allied Arts Library, the Portland Architecture Library, the Law Library, the Mathematics Library, the Oregon Institute of Marine Biology (OIMB) Library, and the Science Library. The UO Libraries mission statement is: “The University of Oregon Libraries enriches the student learning experience, encourages exploration and research at all levels, and contributes to advancements in access to scholarly resources.”

[<http://libweb.uoregon.edu>]

*WorldCat* – Like the Summit database, WorldCat provides access to catalogs from libraries around the world. Students using WorldCat can then request these items to be sent to the UO Libraries through an Interlibrary Loan Request on the WorldCat database (a slightly more complicated process than with Summit.) [<http://libweb.uoregon.edu/dbs/worldcat.html>]

## B. User Group Survey & Result Breakdown

47 students in BA 315: Economy, Industry, and Competitive Analysis, a course for the BA Minor (taken by students in a wide variety of majors) completed the survey on March 01, 2006. Two business majors at the Lundquist Business Technology Center were also surveyed on March 02, 2006 (since Business majors are not allowed to take the BA minor course.) The results are listed here.

*This survey is intended to aid in background research for a usability study of the UO's Library website. If any of the listed responses do not quite fit your own opinion, feel free to add any additional notes or details as you see fit.*

Major

---

25 different majors are represented in the results of this survey (of 82 undergraduate majors offered – according to <http://registrar.uoregon.edu/facnstaff/majorminorcodes.htm#UgradMajors>). Majors represented with multiple responses were Political Science (8), Psychology (5), Human Physiology (4), International Studies (4), Journalism: Public Relations (3), Mathematics (3), Architecture (2), Digital Arts (2), Family & Human Services (2), Business Administration (2), and Sociology (2). Additional majors represented (one response only) are History, Humanities, General Science, Biology, Interior Architecture, Art: Metalsmithing and Jewelry, Pre-Journalism, Planning Public Policy and Management, Journalism, Journalism: Electronic Media, Theatre Arts, Japanese, and Art. Two responses were dual majors. One response did not indicate a major.

Year in School:  FR     SO     JR     SR

The survey was completed by 27 seniors, 17 juniors, and 5 sophomores.

**If you have more than one answer for a question, feel free to mark down multiple responses.**

Do you feel you know how to use the library website effectively?

Yes                       No                                       Maybe

Yes – 27 students

No – 8 students

Maybe – 16 students

2. At what frequency do you use the library website?

- |                                       |   |
|---------------------------------------|---|
| <input type="checkbox"/> Once a day   | <input type="checkbox"/> Once a week                            |
| <input type="checkbox"/> Once a month | <input type="checkbox"/> Once a quarter                         |
| <input type="checkbox"/> Once a year  | <input type="checkbox"/> I have never used the library website. |

Once a day – 5 students

Once a week – 17 students

Once a month – 11 students

Once a quarter – 14 students

Once a year – 1 student

I have never used the library website – 2 students

3. If you have used the library website, how did you learn to use it?

- |   |   |
|---|---|
| <input type="checkbox"/> Taught myself          | <input type="checkbox"/> Through a class            |
| <input type="checkbox"/> A friend showed me     | <input type="checkbox"/> Used online help documents |
| <input type="checkbox"/> Other (explain): _____ |   |

Taught myself – 27 students

Through a class – 21 students

A friend showed me – 1 student

Used online help documents – 1 student

Other – 7 students

Responses for other:

- “Librarian came to class to teach us.”
- “Info Hell” (J202 course – learned in class)
- “Called the library help number”
- “A class showed the minimum, I explored the rest”
- “Asked for help from person at desk in library”
- “Asked info desk”
- “Library staff showed me”

4. If you use the library site, where do you typically access it?

- |   |   |
|---|---|
| <input type="checkbox"/> At a UO library. | <input type="checkbox"/> On campus, but not at the library. |
| <input type="checkbox"/> Off campus.      |   |

At a UO library – 26 students

On campus, but not at the library – 8 students

Off campus – 26

5. Overall, would you say you've been satisfied with the library website?

- |                                      |  |
|--------------------------------------|--|
| <input type="checkbox"/> Satisfied   | <input type="checkbox"/> Not satisfied       |
| <input type="checkbox"/> Indifferent | <input type="checkbox"/> I've never used it. |

Satisfied – 21 students

Not satisfied – 10 students

Indifferent – 17 students

I've never used it – 0

(Students who responded with "I've never used the library website" in problem 2 did not respond to any additional questions in the first part of the survey.)

6. If you have been dissatisfied with the library website, what have you found to be unsatisfactory?

- |   |   |
|---|---|
| <input type="checkbox"/> I don't like to use computers.         | <input type="checkbox"/> I can't figure out how to use it.                              |
| <input type="checkbox"/> I can't find what I want on the site.  | <input type="checkbox"/> It's easier to use other online resources (Google etc.)        |
| <input type="checkbox"/> It takes too long to find what I want. | <input type="checkbox"/> I get better results from other online resources (Google etc.) |
| <input type="checkbox"/> Other                                  |   |
| (explain): _____  |   |

I don't like to use computers – 0 students

I can't figure out how to use it – 5 students

I can't find what I want on the site – 10 students

It's easier to use other online resources (Google etc.) – 11 students

It takes too long to find what I want – 11 students

I get better results from other online resources (Google etc.) – 8 students

Other – 5 students

Responses for other:

- "I learned to use it sophomore year in Info Hell (J202) and I've forgotten everything 2 years later"
- "A lot of sources are not online or in the library"
- "The overall site is designed poorly"
- "Don't use enough to have any unsatisfactory"
- "Links to different search databases are unclear – which are what type of media, etc."

**Think back to the last few research papers you wrote, and the tools you used in the research process.**

7. When you research a paper, are you likely to use any of the following tools?

- UO Library Website
- Amazon / Powells / other online bookstores
- Google or other search engines
- Wikipedia or other online encyclopedias / collections
- I don't use any online tools.
- Other

(explain): \_\_\_\_\_

UO Library Website – 32 students

Amazon / Powells / other online bookstores – 2 students

Google or other search engines – 47 students

Wikipedia or other online encyclopedias / collections – 23 students

I don't use any online tools – 0 students

Other – 6 students

Responses for other:

- “Lexis-Nexis”
- “Books”
- “Journals *through* library web site”
- “Pubmed.com”
- “Books, class websites, book websites”
- “Books, periodicals”

8. At what points (if ever) in the research process do you use the library website?

- |   |   |
|---|---|
| <input type="checkbox"/> START—Initial Overview         | <input type="checkbox"/> MIDDLE—Core research |
| <input type="checkbox"/> AT THE END—Final fact-checking | <input type="checkbox"/> NEVER                |

Start – 28 students

Middle – 25 students

At the end – 3 students

Never – 10 students

9. If you use the library site, what are the core tasks you use it for?

- To find out if a book is in stock at a UO library
- To find out if a book is in stock through SUMMIT/ORBIS or Interlibrary Loan
- To locate a journal or periodical
- To locate a particular article in a journal or periodical
- To access electronic resources (online databases, electronic books)
- To access the library's research guides
- To check library hours or locations
- To build a reading list
- To check the name or spelling of an author, title, or publisher.
- Other

(explain): \_\_\_\_\_

To find out if a book is in stock at a UO library – 29 students

To find out if a book is in stock through SUMMIT/ORBIS or Interlibrary Loan – 13 students

To locate a journal or periodical – 27 students

To locate a particular article in a journal or periodical – 23 students

To access electronic resources (online databases, electronic books) – 24 students

To access the library's research guides – 11 students

To check library hours or locations – 11 students

To build a reading list – 1 student

To check the name or spelling of an author, title, or publisher – 4 students

Other – 6 students

Responses for other:

- "Mainly for medline"
- "Check library account info & reserve laptop checkouts thru media services + to locate video material info."
- "E-reserves"
- "'Renew book" is a really good tool"
- "To find reserves for class"
- "Looking up industry data"

Additional survey details:

- One student who replied "maybe" on the first question included, "Never tried to use it"
- One student changed the frequency of "once a quarter" to "2-5 times a quarter" on question 2.
- One student checked "satisfied" in question 5 and wrote "somewhat" next to the response.

- One student checked “indifferent” in question 5 and wrote “Could be easier but has a lot of info.”
- I noticed that two students responded with frequent library website use (daily) but never used the library website for research papers / projects. I wasn’t able to tell what they use it on a daily basis for.

## C. Test Materials

C.1 Recruitment Questionnaire

Name \_\_\_\_\_

Email \_\_\_\_\_

Phone \_\_\_\_\_

Major \_\_\_\_\_

Gender:             Male                       FemaleYear in school:    Freshman                       Junior  
                          Sophomore                       Senior**How many papers or projects requiring extensive research have you done as a college student?**

- None  
 1-4  
 4-8  
 8-12  
 More than 12

**Do you feel you know how to use the library website effectively?**

- Yes  
 Maybe  
 No  
 I have never used the library website.

**Please circle the hours you are available to participate for each of the following days (you must be free for the entire hour):**

Monday May 01	Tuesday May 02	Wednesday May 03	Thursday May 04	Friday May 05
8:00 am	8:00 am	8:00 am	8:00 am	8:00 am
9:00 am	9:00 am	9:00 am	9:00 am	9:00 am
10:00 am	10:00 am	10:00 am	10:00 am	10:00 am
11:00 am	11:00 am	11:00 am	11:00 am	11:00 am
12:00 pm		12:00 pm		12:00 pm
1:00 pm		1:00 pm		1:00 pm
2:00 pm		2:00 pm		2:00 pm
3:00 pm		3:00 pm		3:00 pm
	4:00 pm		4:00 pm	4:00 pm
	5:00 pm		5:00 pm	5:00 pm
6:00 pm		6:00 pm	6:00 pm	6:00 pm
7:00 pm		7:00 pm	7:00 pm	7:00 pm

Note: this is Week Five of spring quarter 2006 (next week).

*Please return to the department of Computer & Information Science, Deschutes Hall, c/o Addie Beseda. If you have any questions for Addie, you can get in touch with her at abeseda@uoregon.edu.*

C.2 Selection Letter (E-mail)

Dear [Participant Name],

Earlier this week you volunteered to participate in a usability study for my senior thesis. I appreciate your willingness to help with my project and would like to schedule you for a usability test on [Test Date] at [Test Time].

The test will be held at the Human-Computer Interaction Lab on the 3rd floor of Deschutes Hall (located next to Oregon Hall on 13th Avenue). On the day of the test, there will be signs in the building which will point you to the testing room. The entire test should take no more than an hour of your time. Once you complete the test, you'll be reimbursed \$20 for your time and assistance.

Please let me know as soon as possible if you will be able to make this scheduled test time. I appreciate your prompt reply.

If you have any additional questions about the test I will be happy to answer them. Thanks again for your participation and I look forward to seeing you next week!

Sincerely,

Addie M. Beseda

Department of Computer & Information Science, Clark Honors College

abeseda@uoregon.edu

503-830-9579

C.3 Consent Form

## CONSENT FORM

Thank you for volunteering to be a “usability tester” for this Honors thesis project.

If you decide to participate, you will work through several prepared scenarios with a partner. These scenarios attempt to replicate your typical usage of the library web interface. The scenarios should take no more than an hour of your time. The session will be videotaped. This tape of your activities will allow us to analyze undergraduate library usage patterns, the functions of the library interface which are most useful and successful, and the aspects of the interface which need improvement.

Any information obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. Your responses/data will not be directly associated with your name.

Your participation is voluntary. Your decision whether or not to participate will not affect your relationship with the department of Computer & Information Science, the libraries, or any other institution at the University of Oregon. If you decide to participate, you are free to withdraw your consent and discontinue participation at any time without penalty.

If you have questions regarding your rights as a research subject, contact Human Subjects compliance, University of Oregon, Eugene, OR 97403, (541) 346-2510. You will be given a copy of this document for your records.

When you complete the usability test, you will receive \$20 as compensation for your assistance.

To indicate that you have read and understand the information provided above, please place an ‘x’ in the checkbox below if you wish to participate.

I willingly agree to participate in the usability study. I understand that I may withdraw my consent at any time and discontinue participation without penalty and that I am not waiving any legal claims, rights, or remedies.

Signature of participant \_\_\_\_\_

Date \_\_\_\_\_

C.4 Agreement for Videotaping Form

## AGREEMENT FOR VIDEOTAPING

I have received an adequate description of the purpose and procedures for videotaping sessions during the course of the usability study. I give my consent to be videotaped during participation in the study, and for those videotapes to be viewed by persons involved in the study, as well as for other professional purposes as described to me. I understand that all information will be kept confidential and will be reported in an anonymous fashion, and that the videotapes will be erased after an appropriate period of time after the completion of the study. I further understand that I may withdraw my consent at any time.

Signature of participant \_\_\_\_\_

Date \_\_\_\_\_

## C.5 Orientation Script

### ORIENTATION SCRIPT

Hi, my name is Addie Beseda, and as I mentioned when I visited your class, I am a computer science student in the Honors College. For my senior thesis, I am learning about usability testing. In particular, I'm looking at the usability challenges that one encounters with academic library websites. Thank you for coming and assisting with a vital part of my research. In today's study, you'll be testing the University of Oregon Libraries website. Since I am an Honors College student, I am only observing the website; I have not been involved in its creation.

During this test, I will not be in the room with you, but instead watching you by videotape in another room. The video from today's study is for my research purposes only, and will remain confidential. Any information I use from today's test will not be attached to your identity in any way. The videotape will be erased when I am done with my research.

You will be given a list of fifteen tasks which are intended to be a reflection of the typical uses of this website by undergraduates. When performing these tasks, I encourage you to behave as you normally would when interacting with this type of interface. Although I have introduced this to you as a "Usability Test", it is important you know that I am testing the library website and not you. You may run into some frustrating situations while performing these tasks; let me reiterate that these situations are a reflection of deficiencies in the website and not in yourself. Most of the tasks are framed as questions. These questions have no right or wrong answers; instead, I have provided them to help you figure out when you've completed a task. You will not be graded in any way on your answers to these questions.

There may be certain tasks which you feel lost or stuck on. I encourage you to complete as much as possible, but if you feel like you have exhausted your options, it is okay to move on to the next task. Even if you are stuck, I will only interfere with the test before its completion if exceptional problems occur.

I encourage you to discuss any of your ideas with your partner and work together to complete the tasks. When you find the answer to a question, turn the page to move on to the next task, and reset your browser to the home page. When you are done with the last task, I will come back in and ask you to fill out a questionnaire about your experience. You will be given \$20 as a token of appreciation for your time and contributions at the end of this process.

Before we get started, you now have the opportunity to ask me any questions.

C.6 Pre-Test Questionnaire

## PRE-TEST QUESTIONNAIRE

Name \_\_\_\_\_

**1. Do you feel you know how to use the library website effectively?**

- Yes  
 Maybe  
 No

**2. Which resources do you use when working on a research paper?**

- The UO Library Website  
 Items from the UO library's collection (Books, Magazines, Journals...)  
 UO reference librarians or other experts on the topic  
 Search Engines (Google, Ask.com, Yahoo!, etc.)  
 Online booksellers / vendors (Amazon, Barnes & Noble, etc.)  
 Other online resources

(If checked, list the most common online resources you use:)

**3. Rank these resources by their usefulness to you: your most preferred resource should be "1".**

- \_\_\_\_\_ The UO Library Website  
 \_\_\_\_\_ Items from the UO library's collection (Books, Magazines, Journals, etc.)  
 \_\_\_\_\_ UO reference librarians or other experts on the topic  
 \_\_\_\_\_ Search Engines (Google, Ask.com, Yahoo!, etc.)  
 \_\_\_\_\_ Online booksellers / vendors (Amazon, Barnes & Noble, etc.)  
 \_\_\_\_\_ Other online resources

(If checked, list the most common online resources you use:)

**4. In question 3, why do you prefer the resource you ranked #1?**

C.7 Post-Test Questionnaire

## POST-TEST QUESTIONNAIRE

**1. Were there any tasks in the usability test that you did not know the library website supported? If so, what were these tasks?**

**2. What things made the tasks you performed today more difficult?**

**3. What changes would you make to the library website's interface to make it work better for you?**

C.8 Reimbursement Receipt Form

## REIMBURSEMENT RECEIPT FORM

I confirm that I have received \$20 for completing my participation in Addie Beseda's usability study.

Name (print): \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

## D. Task-by-Task Detail

### D.1 Task One: The Autograph Man

*Task Text:* A friend has recommended the book *The Autograph Man*.

Who is the author?

*Perceived difficulty:* Easy

*Mapping with functional requirement:* Given specific information, find an item in the library's collections.

*About the task:* This task was intended to give participants a successful start to the usability test, and was not intended to reveal usability problems. In particular, both a keyword and title search on "The Autograph Man" in the catalog would return the same results. As a basic book search, this task captured the quintessential library website-usage scenario.

*Task completed in testing:* 5 of 5

*Time to complete task in testing:*            0:30   0:??   0:20   0:33   0:42

### D.2 Task Two: The Handmaid's Tale

*Task Text:* You are interested in checking out a copy of *The Handmaid's Tale* by Margaret Atwood.

Is the item available for checkout?

*Perceived difficulty:* Easy

*Mapping with functional requirement:* Given specific information, find an item in the library's collections. Access important information (availability) about an item.

*About the task:* This task was similar to the first task, with some slight complications. In particular, users had the option to search on both the author and the title. A keyword search returned the relevant result at the bottom of the page. Also, the library has three copies of the book available: I

was interested to see how users would handle multiple results for the same item.

*Task completed in testing:* 5 of 5

*Time to complete task in testing:* 0:42 0:33 0:48 0:44 1:00

### D.3 Task Three: Henrik Ibsen

*Task Text:* Name one of the plays written by Henrik Ibsen.

*Perceived difficulty:* Easy

*Mapping with functional requirement:* Given specific information, find an item in the library's collections. Without a particular book in mind, but given a keyword or subject to search by, be able to find a book meeting criteria.

*About the task:* This task was intended as a variation on the standard catalog book search, with many elements that were meant to complicate the search.

The main variations: there were many answers to this question, not just one or two appropriate results, and many ways to reach an answer. For participants to determine if a work by Henrik Ibsen was a play or not, they typically had to read the descriptive notes about the work. Could the user make sense of these descriptions? Also, by using the word "play", I was distinguishing a catalog item that, although it was still shelved as a book, went by a different name. Finally, this task was meant to compel users to do an author search. The correct way to do this query is by entering the author's last name first; I wanted to see if users were aware of this query behavior, and if they fixed it when they discovered what had been done wrong.

*Task completed in testing:* 5 of 5

*Time to complete task in testing:* 4:05 7:27 2:30 1:28 0:50

#### D.4 Task Four: AAA Library Hours

*Task Text:* What time does the Architecture & Allied Arts library close on Saturdays?

*Perceived difficulty:* Easy

*Mapping with functional requirement:* Patrons should be able to find out information (hours open) about the physical libraries on campus.

*About the task:* Since students also use the library website as an access point for information about the physical library, it was important to include a task which pointed participants to this information. Information about the AAA library, and its hours can be found by clicking either “Hours & Phone Numbers” or “UO Libraries & Collection” from under the “About the Libraries” tab on the library homepage.

*Task completed in testing:* 5 of 5

*Time to complete task in testing:*            0:29   0:48   0:52   0:21   0:26

#### D.5 Task Five: To Kill a Mockingbird

*Task Text:* You want to watch the movie version of Harper Lee’s *To Kill a Mockingbird*.

According to the library website, where will you be able to find this movie?

*Perceived difficulty:* Easy

*Mapping with functional requirement:* Given specific information, find an item in the library’s collections. Access important information (location) about an item.

*About the task:* Like the third task, this scenario was intended to have users search on non-book items in the catalog. It also required them to make sense of the location details given in these results. There were two copies of the movie available; one in the law library and one in the video collections. I

hoped that students would see the video collections link and look into what this location actually meant (these collections are located on the first floor of the Knight library).

*Task completed in testing:* 4 of 4 (One participant skipped)

*Time to complete task in testing:* 1:33 N/A 1:02 0:49 1:48

#### D.6 Task Six: Art & Fear

*Task Text:* You are looking for the book *Art & Fear* by David Bayles and Ted Orland. Although it is available through the University of Oregon, you will not be able to find it in the shelves of the Knight library.

Which UO library is this book located at?

*Mapping with functional requirement:* Given specific information, find an item in the library's collections. Access important information (location at a library other than the main Knight library) about an item.

*Perceived difficulty:* Moderate

*About the task:* Not only was this task intended to make the user sort through the description of the item in order to find its location, but the title used words that would make a keyword search mostly useless. In this respects, the task was less forgiving than those before it.

*Task completed in testing:* 5 of 5

*Time to complete task in testing:* 0:48 0:32 1:32 0:35 0:44

#### D.7 Task Seven: Journal of Personality & Social Psychology

*Task Text:* Is the *Journal of Personality and Social Psychology* available online?

What is the number of the most recently-published volume?

*Perceived difficulty:* Moderate

*Mapping with functional requirement:* Given specific information, find an item in the library's collections. Patrons should be able to determine if a journal is available physically, electronically, both, or neither.

*About the task:* This was the first task treading into the territory of journals and finding articles, and was intended to be one of the simpler tasks on this subject. In particular, do participants know that journals are found in the library catalog? It also intended to explore the idea of electronic resources and journal subscriptions. The journal in question is available online, and the second question was intended for users to actually open the online resource and make some sense of it.

*Task completed in testing:* 4 of 5 (One group found the wrong journal)

*Time to complete task in testing:* 1:39 0:50 1:38 1:45 2:41

#### D.8 Task Eight: The New Hacker's Dictionary

*Task Text:* Find and view the electric copy of *The New Hacker's Dictionary* by Eric S. Raymond.

What is the name of the chapter listed after "Contents"?

*Perceived difficulty:* Moderate

*Mapping with functional requirement:* Given specific information, find an item in the library's collections. Electronic information should be clearly differentiable from physical collections.

*About the task:* This was another scenario which incorporated electronic resources; in this case, electronic books (one of the most exciting resources made available by the library). The electronic copy of this book is listed with all of the paper copies in catalog search results: is it easy to discern the electronic copy? Are there any other ways to get at electronic books? Finally, I had noticed issues with linking to electronic resources from the description

page; did other students run into problems actually accessing electronic resources?

*Task completed in testing:* 5 of 5

*Time to complete task in testing:* 5:53 1:57 1:40 1:08 1:20

#### D.9 Task Nine: Portrait of the Artist as a Young Man

*Task Text:* You are going to write a paper on James Joyce's *A Portrait of the Artist as a Young Man*. For background research, you are looking for books which contain essays that others have written about this novel.

List the title of a book which meets this criterion.

*Perceived difficulty:* Moderate

*Mapping with functional requirement:* Without a particular book in mind, but given a keyword or subject to search by, be able to find a book meeting specific criteria.

*About the task:* This task was an attempt to capture browsing, or going into the research process with an idea of the criterion, but not the specific book in mind. It also was intended to show when a keyword search was useful. In particular, a keyword search on "A Portrait of the Artist as a Young Man" returned many books which, by reading either the title or the description, typically met this criterion.

*Task completed in testing:* 3 of 5 (Two gave up, indicated by \*)

*Time to complete task in testing:* 7:14\* 2:52 1:48 3:19 5:28\*

#### D.10 Task Ten: King Leopold's Ghost

*Task Text:* You are trying to find the book *King Leopold's Ghost* by Adam Hochschild. You have discovered it is not available in any of the UO libraries, but your professor has told you that, by using the library website, you can request that the book be sent from another college library.

Name one of the libraries which carries this book.

*Perceived difficulty:* Hard

*Mapping with functional requirement:* Given specific information, find an item in the collections of other libraries through an interlibrary loan service.

*About the task:* This task relied on users to find and use either the Summit catalog, or WorldCat. The functions of these catalogs are not obvious from the main homepage, and even though catalog searches include a potentially helpful “Repeat in Summit” button, if students do not know the purpose of the catalog, they are not likely to know where to start. I was interested to see the ways that students without prior knowledge of this service were able to find the catalog needed to answer this question. Once the students found the appropriate catalog, the rest of the task was not intended to be difficult.

*Task completed in testing:* 5 of 5

*Time to complete task in testing:* 4:34 3:56 3:44 1:58 1:28

#### D.11 Task Eleven: Sea Turtles

*Task Text:* You are writing a paper for your Environmental Studies class on sea turtles. You want to find journal articles that have been written about this subject.

Find the title of an article about sea turtles.

*Perceived difficulty:* Hard

*Mapping with functional requirement:* Patrons searching for articles in a particular subject should be able to perform a search on a subject or keyword which allows them to browse available articles meeting their search criteria.

*About the task:* This task was another dealing with the complicated issue of finding articles. This task captured a simpler version of the common research task of finding articles which pertain to a specific topic using the

library's databases and indexes. Environmental Studies was provided as a cue for students to choose the appropriate collection of databases or the correct research guide; without this cue, I anticipated that the task would have been substantially more difficult, and I was more interested to see how students would handle the task of finding an article when they already had this basic information.

*Task completed in testing:* 5 of 5

*Time to complete task in testing:* 1:39 1:33 2:13 3:19 1:01

#### D.12 Task Twelve: The Atlantic

*Task Text:* You are looking for back issues of the magazine *The Atlantic*. From what year are the oldest back issues in the University's collection?

*Perceived difficulty:* Hard

*Mapping with functional requirement:* Given specific information, find an item in the library collections. Patrons should be able to determine the type of the item (magazine, i.e. periodical) from the information provided.

*About the task:* *The Atlantic* is available through the University's collections, but not online. This was another task involving the confusions in distinction between journals, articles, periodicals, and other similarly grouped items: where did users expect to find magazines? I anticipated the most difficult parts of this task to be related to the relatively common name of the magazine: could participants effectively search on it? Similarly, if the correct result was on the search results page, could participants discern that it was indeed a magazine and not a book or some other resource?

*Task completed in testing:* 5 of 5

*Time to complete task in testing:* 2:30 1:09 1:40 11:23 2:10

*Notes from testing:* Notes from testing.

### D.13 Task Thirteen: Library Account

*Task Text:* Log into Addie Beseda’s library account, using the student number 950414104 and the PIN 123456.

What is the due date on *We Are All Suspects Now: Untold Studies from Immigrant Communities after 9/11?*

*Perceived difficulty:* Hard

*Mapping with functional requirement:* Users of the library website should be able to open information about their library account and patron record, which should include information about items that are checked out.

*About the task:* Access to one’s account for information on checked-out items, as well as the ability to renew, is a helpful online library service that many students are unaware of: when forming my user survey, I overlooked this particular task, and was reminded of it only when a student wrote “check library account info” in the “other” section of the core tasks question. I decided that access to one’s library account should be a core task, even if it is presently overlooked by many students. The design of the library’s website reflects this: the link to one’s library account is on the homepage under “Services”, at the bottom of the list of links. The most difficult part of this task was finding the access to this page; otherwise it was relatively straightforward. I used my library account with my PIN temporarily changed for the testing so that participants did not have to compromise their own accounts; my account preserved consistency in the testing as well.

*Task completed in testing:* 5 of 5

*Time to complete task in testing:*            1:49   1:04   2:33   1:51   1:32

#### D.14 Task Fourteen: EBSCOHost

*Task Text:* “Academic Search Premier” searches a large collection of journal and magazine articles. Open this resource from the library web site.

What is the other name this resource goes by?

*Perceived difficulty:* Hard

*Mapping with functional requirement:* If a library patron has a specific (library-subscribed) database in mind, they should be able to access that particular database directly from the library website.

*About the task:* At this point in the testing, participants had likely dealt with databases such as Academic Search Premier for the sea turtles question. I was interested to see how students approached finding a database if they had to go into the search task with the database name in mind, instead of a specific subject grouping. This task also gave participants the chance to make proper utilization of the site search tool, which searches all library websites and includes a return that links to this database. Finally, the EBSCOHost databases, which include Academic Search Premier, are frequently just referred to as “EBSCOHost” – how obvious is the interrelationship between the terms for students?

*Task completed in testing:* 5 of 5

*Time to complete task in testing:*            1:42   0:40   2:52   1:14   1:48

#### D.15 Task Fifteen: Chaucer Review

*Task Text:* For your English class, your professor wants you to print out “Once More to the Grove: A Note on Symbolic Space in the Knight’s Tale” from the current issue (Volume 40, Number 4) of *The Chaucer Review*. The author is Joshua R. Eyler.

The article starts, “Upon the death of \_\_\_\_\_, Theseus announces...” Fill in the blank.

*Perceived difficulty:* Very Hard

*Mapping with functional requirement:* Patrons with prior knowledge of the specific journal article they want should be able to determine how this article can be acquired (and, if electronically, should be able to acquire the article.)

*About the task:* Finding a full-text journal article, given the specific information that could be gleaned from a citation, is by far one of the most difficult of core tasks for undergraduates. In particular, based on the online subscriptions and databases that the University describes to, the process of acquiring a full-text source is different for every article. This article could be found through the library catalog’s online copy of *The Chaucer Review*, or a database: Academic Search Premier also returned it. However, not all returns provided the full text. The catalog returns two links to online copies of *The Chaucer Review*; only one includes the full-text article. This particular task was intended to show only one example of how many usability obstacles exist when accessing full-text data that the library has access to through an electronic subscription.

*Task completed in testing:* 4 of 5 (One student was stopped by technical difficulties: the subscription site was down.)

*Time to complete task in testing:*            6:50   3:40   1:59   5:59   N/A